1050233

Final

(See separate copy of BACT-determination for Intent & Final permits)

DZ
3/17/94

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF PERMIT

In the matter of an
Application for Permit by:

DEP File No. PSD-FL-194
Polk County

Mr. G. F. Anderson
Tampa Electric Company
P. O. Box 111
Tampa, FL 33601-0111

/

Enclosed is Permit Number PSD-FL-194 to construct a power plant facility at County Road 630 approximately 13 miles southwest of Bartow, Polk County, Florida, issued pursuant to Section (s) 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on 2/28/94 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Cynthia A. Doyle (Clerk) 2/28/94 (Date)

Copies furnished to:
W. Thomas, SWD
D. Martin, Polk Co.
J. Harper, EPA
J. Bunyak, NPS
L. Curtin, Holland & Knight

Final Determination

Tampa Electric Company
Polk County, Florida

260 MW INTEGRATED COAL GASIFICATION
COMBINED CYCLE UNIT

File No: PSD-FL-194
PA-92-32

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

February 17, 1994

Final Determination

The Technical Evaluation and Preliminary Determination for the permits to construct a 260 megawatt (MW) integrated coal gasification combined cycle (IGCC) combustion turbine, coal gasification facilities, an auxiliary boiler and a fuel oil storage tank at an electrical power plant site in Bartow, Polk County, Florida, was distributed on December 20, 1993. The Notice of Intent to Issue was published in the Tampa Tribune on December 27, 1993. Copies of the evaluation were available for public inspection at the Department offices in Tampa and Tallahassee.

No adverse comments on the evaluation and proposed permits were submitted by the National Park Service (NPS) and the U.S. Environmental Protection Agency (EPA) in their letters dated January 27 and January 26, 1994 respectively.

Tampa Electric Company submitted comments on the Technical Evaluation and Preliminary Determination for the Polk Power Station. The applicant noted that the fuel bound nitrogen adjustment should also apply to oil firing during the two year hot gas clean up demonstration period. The Department agrees with the applicant's comment, and includes the language in the permit to reflect that.

The final action of the Department will be to issue the PSD permit (PSD-FL-194) with the changes noted above.

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:
Tampa Electric Company
702 North Franklin Street
Tampa, Florida 33602

Permit Number: PA-92-32
PSD-FL-194
Expiration Date: June 1, 1996
County: Polk
Latitude/Longitude: 27°43'43"N
81°59'23"W
Project: 260 MW Integrated Coal Gasification Combined Cycle Combustion Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-212 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For one 260 MW integrated coal gasification combined cycle (IGCC) combustion turbine (GE 7F CT or equivalent) with maximum heat input at 59°F of 1,755 MMBtu/hr (syngas) and 1765 MMBtu/hr (oil) to be located at the Polk County site near Bowling Green, Florida. The coal gasification facility will consist of coal receiving, storage and process facilities, air separation unit, gasifier, product gas cleaning facilities, acid gas removal unit, and auxiliary equipment. The first phase will also include a 49.5 MMBtu/hr auxiliary boiler and a 71,450 barrel fuel oil storage tank.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Tampa Electric Company (TECO) application received July 30, 1992.
2. Department's letter dated September 22, 1992.
3. TECO's letter dated April 12, 1993.

Florida Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
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Attachments are listed below:

1. Tampa Electric Company (TECO) application received July 30, 1992.
2. Department's letter dated September 22, 1992.
3. TECO's letter dated April 12, 1993.

GENERAL CONDITIONS:

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

A. Operation and Construction

The construction and operation of Polk Power Station (Project) shall be in accordance with all applicable provisions of Chapter 17, F.A.C. The following emission limitations reflect final BACT determinations for Phase I (integrated gasification, combined cycle (IGCC) combustion turbine and auxiliary equipment) of the project fired with syngas or fuel oil. BACT determinations for the remaining phases will be made upon review of supplemental applications. In addition to the foregoing, the Project shall comply with the following conditions of certification as indicated.

B. Heat Input

The maximum heat input to the IGCC combustion turbine (CT) shall neither exceed 1,755 MMBtu/hr while firing syngas, nor 1765 MMBtu/hr while firing No. 2 fuel oil at an ambient temperature of 59° F. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the heat input correction to other temperatures shall be provided to DEP for review 120 days after the siting board approval of the site certification. Subject to approval by the Department, the manufacturer's curve may be used to establish heat input rates over a range of temperature for the purpose of compliance determination.

SPECIFIC CONDITIONS:

C. Hours of Operation

The IGCC unit in Phase I may operate continuously, i.e., 8,760 hrs/year.

D. Fuel

Only syngas and low sulfur fuel oil shall be fired in the IGCC combustion turbine. Only low sulfur fuel oil shall be fired in the auxiliary boiler. The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent, by weight.

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed 49.5 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content (by weight). All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

F. Fuel Consumption

The maximum coal input to the coal gasification plant shall not exceed 2,325 tons per day, on a dry basis.

G. Fugitive Dust

Fugitive dust emissions during the construction period shall be minimized by covering or watering dust generation areas. Particulate emissions from the coal handling shall be controlled by enclosing all conveyors and conveyor transfer points (except those directly associated with the coal stacker/reclaimer for which an enclosure is operationally infeasible). Fugitive emissions shall be tested as specified in Specific Condition No. J. Inactive coal storage piles shall be shaped, compacted, and oriented to minimize wind erosion. Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.

SPECIFIC CONDITIONS:

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

POLLUTANT	FUEL	BASIS[a]	EMISSIONS LIMITATIONS - 7F CT Post Demonstration Period LB/HR*	TPY[b]
NOx	Oil	42 ppmvd**	311	N/A
	Syngas	25 ppmvd	222.5	1,044
VOC[c]	Oil	0.028 lb/MMBtu	32	N/A
	Syngas	0.0017 lb/MMBtu	3	38.5
CO	Oil	40 ppmvd	99	N/A
	Syngas	25 ppmvd	98	430.1
PM/PM_{10}[d]	Oil	0.009 lb/MMBtu	17	N/A
	Syngas	0.013 lb/MMBtu	17	74.5
Pb	Oil	5.30E-5 lb/MMBtu	0.101	N/A
	Syngas	2.41E-6 lb/MMBtu	0.0035	0.067
SO_2	Oil	0.048 lb/MMBtu	92.2	N/A
	Syngas	0.17 lb/MMBtu	357	1563.7

Visible Emissions Syngas 10 percent opacity
Oil 20 percent opacity

(*) Emission limitations in lbs/hr are 30-day rolling averages. "Pollutant emission rates may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the emission rate correction to other temperatures at different loads shall be provided to DEP for review 120 days after the siting board approval of the site certification. Subject to approval by the Department, the manufacturer's curve may be used to establish pollutant emission rates over a range of temperature for the purpose of compliance determination."

(**) The emission limit for NO_x is adjusted as follows for higher fuel bound nitrogen contents up to a maximum of 0.030 percent by weight:

SPECIFIC CONDITIONS:

FUEL BOUND NITROGEN (% by weight)	NO_x EMISSION LEVELS (ppmvd @ 15% O_2)
0.015 or less	42
0.020	44
0.025	46
0.030	48

using the formula STD = 0.0042 + F where:

STD = allowable NO_x emissions (% by volume at 15% O_2 and on a dry basis).

F = NO_x emission allowance for FBN defined by the following table:

FUEL BOUND NITROGEN (% by weight)	F (NO_x % BY VOLUME)
0 < N < 0.015	0
0.015 < N < 0.03	0.04 (N-0.015)

N = nitrogen content of the fuel (% by weight).

NO_x emissions are preliminary for the fuel oil specified in Specific Condition D of Conditions of Certification. The permittee shall submit fuel bound nitrogen content data for the low sulfur fuel oil prior to commercial operation to the Bureau of Air Regulation in Tallahassee, and on each occasion that fuel oil is transferred to the storage tanks from any other source to the Southwest District office in Tampa. The % FBN (Z) following each delivery of fuel shall be determined by the following equation:

$x(Y) + m(n) = (x+m)(Z)$
where x = amount fuel in storage tank
y = % FBN in storage tank
m = amount fuel added
n = % FBN of fuel added
Z = % FBN of composite

(a) Syngas lb/MMBtu values based on heat input (HHV) to coal gasifier and includes emissions from H_2SO_4 plant thermal oxidizer. Pollutant concentrations in ppmvd are corrected to 15% oxygen.

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

$\frac{\text{Load (\%)}}{100}$ x hours of operation $\leq$ 876 for fuel oil.

SPECIFIC CONDITIONS:

(c) Exclusive of background concentrations.

(d) Excluding sulfuric acid mist.

2. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and No. 2 fuel oil **during the two year demonstration period**, shall not exceed the following:

		EMISSIONS LIMITATIONS 7FCT	
POLLUTANT	FUEL	LB/HR*	TPY[a]
NO_x	Oil**	311	N/A
	Syngas	664.2	2,908.3
VOC[b]	Oil	32	N/A
	Syngas	3	38.5
CO	Oil	99	N/A
	Syngas	99	430.1
PM/PM_{10}[c]	Oil	17	N/A
	Syngas	17	74.5
Pb	Oil	0.101	N/A
	Syngas	0.023	0.13
SO_2	Oil	92.2	N/A
	Syngas	518	2,269
Visible Emissions		Syngas 10 percent opacity Oil 20 percent opacity	

(*) Emission limitations in lbs/hr are 30-day rolling averages.

(**) Footnote ** as shown in Specific Condition H.1. for fuel bound nitrogen adjustment also applies to oil firing during the Demonstration Period.

(a) Annual emission limits (TPY) based on 10-percent annual capacity factor firing No. 2 fuel oil.

$$\frac{\text{Load (\%)}}{100} \times \text{hours of operation} \leq 876 \text{ for oil.}$$

(b) Exclusive of background concentrations.

(c) Excluding sulfuric acid mist.

SPECIFIC CONDITIONS:

3. The following allowable turbine emissions, were determined by BACT, and are also tabulated for PSD and inventory purposes:

ALLOWABLE EMISSIONS

POLLUTANT	FUEL	IGCC POST DEMONSTRATION LB/HR	IGCC POST DEMONSTRATION TPY[a]	IGCC 2-YEAR DEMONSTRATION LB/HR	IGCC 2-YEAR DEMONSTRATION TPY[b]
Sulfuric Acid[c]	Syngas	55	241	55	241
Inorganic Arsenic	Syngas	0.0006	0.019	0.08	0.35
Beryllium	Syngas	0.0001	0.0029	0.0001	0.0029
Mercury	Syngas	0.0034	0.017	0.025	0.11

(a) Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

(b) Based on baseload operations firing syngas, with a maximum of 8760 hrs/yr of HGCU operations; up to 10 percent annual capacity factor firing fuel oil.

(c) Sulfuric acid mist emissions assume a maximum of 0.05 percent sulfur in the fuel oil.

4. Excess emissions from the turbine resulting from startup, shutdown, malfunction, or load change shall be acceptable providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24-hour period unless specifically authorized by the Department for a longer duration. Best operating practices shall be documented in writing and a copy submitted to the Department along with the initial compliance test data. The document may be updated as needed with all updates submitted to the Department within thirty (30) days of implementation and shall include time limitations on excess emissions caused by turbine startup.

5. After the demonstration period, permittee shall operate the combustion turbine to achieve the lowest possible NO_x emission limit but shall not exceed 25 ppmvd corrected to 15% oxygen and ISO conditions.

SPECIFIC CONDITIONS:

6. The combustion turbine will be operated for 12-18 months after the demonstration period (estimated to be from Mid 1998 until December 31, 1999). During that period NO_X emission testing will be performed on the turbine at a regular interval of every 2 months. The Department shall be provided with a test protocol including a time schedule 15 days prior to the initial test. The permittee will provide the Department the emission test results 30 days after the test is performed. These results are not for compliance purposes. The Department shall be notified and the reasons provided if a scheduled test is delayed or canceled.

7. One month after the test period ends (estimated to be by February 2000), the permittee will submit to the Department a NO_X recommended BACT Determination as if it were a new source using the data gathered on this facility, other similar facilities and the manufacturer's research. The Department will make a determination on the BACT for NO_X only and adjust the NO_X emission limits accordingly.

I. Auxiliary Boiler Operation

Operation of the auxiliary boiler shall be limited to a maximum of 1,000 hours per year and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable. The following emission limitations shall apply:

1. NO_X emissions shall not exceed 0.16 lbs/MMBtu for oil firing.

2. Sulfur dioxide emissions shall be limited by firing low sulfur fuel oil with a maximum sulfur content of 0.05 percent by weight.

3. Visible emissions shall not exceed 20 percent opacity (except for one six-minute period per hour during which opacity shall not exceed 27 percent), while burning low sulfur fuel oil.

J. Performance Testing

Initial (I) compliance tests shall be performed on the turbine using both fuels and on the auxiliary boiler using fuel oil. The stack test for the turbine and the auxiliary boiler shall be performed with the sources operating at capacity (maximum heat rate input for the tested operating temperature). Capacity is defined as 90 - 100 percent of permitted capacity. If it is impracticable to test at capacity, then sources may be tested at less than capacity; in this case subsequent source operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for purposes of

SPECIFIC CONDITIONS:

additional compliance testing to regain the rated capacity in the permit, with prior notification to the Department. Annual (A) compliance tests shall be performed on the turbine and the auxiliary boiler with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests for the applicable emission limitations shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Rule 17-297, F.A.C., and the requirements of 40 CFR 75:

1. Combustion Turbine

a. Reference Method 5B for PM (I, A, for oil only).

b. Reference Method 8 for sulfuric acid mist (I, for oil only).

c. Reference Method 9 for VE (I, A).

d. Reference Method 10 for CO (I, A).

e. Reference Method 20 for NO_X (I, A).

f. Reference Method 18 for VOC (I, A).

g. Trace elements of Lead (Pb), Beryllium (Be) and Arsenic (As) shall be tested (I, for oil only) using Emission Measurement Technical Information Center (EMTIC) Interim Test Methods. As an alternative, Method 104 for Beryllium (Be) may be used; or Be and Pb may be determined from fuel analysis using either Method 7090 or 7091, and sample extraction using Method 3040 as described in the EPA solid waste regulations SW 846.

h. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I,A).

i. ASTM D 1072-80, D 3031-81, D 4084-82, or D 3246-81 for sulfur content of natural gas (I, and A if deemed necessary by DEP).

j. Reference Method 22 for fugitive emissions (I,A).

2. Auxiliary Boiler

a. Reference Method 9 of VE (I,A).

b. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I,A).

SPECIFIC CONDITIONS:

c. Reference Methods 7, 7A, 7C, 7D, or 7E for NO_x (I,A).

Other DEP approved methods may be used for compliance testing after prior departmental approval.

K. Sulfur Content of Fuel

The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334 by testing for sulfur content of the fuel oil in the storage tanks once per day when firing oil. Testing for fuel oil heating value, shall also be conducted on the same schedule.

L. Monitoring Requirements

A continuous emission monitoring system (CEMS) shall be installed, operated, and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO_2 or O_2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75 when those requirements become effective within the state.

1. Each CEMS shall meet performance specifications of 40 CFR 60, Appendix B.

2. CEMS data shall be recorded and reported in accordance with Chapter 17-297.500, F.A.C., 40 CFR 60 and 40 CFR 75. The record shall include periods of startup, shutdown, and malfunction.

3. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

4. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Specific Condition No. H.4. herein, which exceeds the applicable emission limits in Condition No. H.1.

SPECIFIC CONDITIONS:

M. Notification, Reporting and Recordkeeping

To determine compliance with the syngas and fuel oil firing heat input limitation, the permittee shall maintain daily records of syngas and fuel oil consumption for the turbine and the heating value for each fuel. All records shall be maintained for a minimum of two years after the date of each record and shall be made available to representatives of the Department upon request.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 17-209 through 17-297, F.A.C., and 40 CFR 60 Subparts A and GG. The requirements shall include:

1. 40 CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

2. 40 CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial startup of each turbine and the auxiliary boiler not more than 60 days nor less than 30 days prior to such date.

3. 40 CFR 60.7(a)(3) - By postmarking or delivering notification of the actual startup of each turbine and the auxiliary boiler within 15 days of such date.

4. 40 CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMSs performance, no less than 30 days prior to such date.

5. 40 CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

6. 40 CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any startup, shutdown or malfunction of a turbine and the auxiliary boiler, of the air pollution control equipment, and when the CEMS is inoperable.

7. 40 CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days of the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d).

8. 40 CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine and boiler firing rates, but not more than 180 days after the initial startup of each turbine and the auxiliary boiler.

SPECIFIC CONDITIONS:

9. 40 CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

10. 17-297.345 - By providing stack sampling facilities for the combustion turbine and the auxiliary boiler.

All notifications and reports required by this specific condition shall be submitted to the Department's Air Program, within the Southwest District office. Performance test results shall be submitted within 45 days of completion of such test.

O. Submission of Reports

The following information shall be submitted to the Department's Bureau of Air Regulation within 12 months of issuance of this permit:

1. Description of the final selection of the turbine and the auxiliary boiler to be installed at the facility. Descriptions shall include the specific make and model numbers, any changes in the proposed method of operation, fuels, emissions or equipment.

2. Description of the CEMS selected. Description shall include the type of sensors, the manufacturer and model number of the equipment.

3. If construction has not commenced within 18 months of issuance of this permit, then the permittee shall obtain from DEP a review and, if necessary, a modification of the BACT determination and allowable emissions for the unit(s) on which construction has not commenced [40 CFR 52.21(r)(2)]. Units to be constructed or modified in later phases of the project will be reviewed and limitations revisited under the supplementary review process of the Power Plant Siting Act.

P. Protocols

The following protocols shall be submitted to the Department's Air Program, within the Southwest District office, for approval:

1. CEMS Protocol - Within 60 days of selection of the CEMS, but prior to the initial startup, a CEMS protocol describing the system, its installation, operating and maintenance characteristics and requirements. The Department shall approve the protocol provided that the system and the protocol meet the requirements of 40 CFR 60.13, 60.334, Appendix B and Appendix F. This condition of certification shall be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75 when those requirements become effective within the State.

SPECIFIC CONDITIONS:

2. Performance Test Protocol - At least 90 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Air Program, within the Southwest District office, a protocol outlining the procedures to be followed, the test methods and any differences between the reference methods and the test methods proposed to be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

Q. Modifications

The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change.

Issued this 24th day
of February, 1994

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Virginia B. Wetherell

Virginia B. Wetherell, Secretary

Transmit Confirmation Report

No.	:	013
Receiver	:	813523780354
Transmitter	:	FLA DEP TPA AIR
Date	:	Feb 07,96 15:15
Time	:	04'22
Mode	:	Norm
Pages	:	07
Result	:	OK

Department of
Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

Facsimile Transmission Sheet

DATE __February 7, 1996_____

TO: Leonard Brenner
Cubix
FAX 352-378-0354

FROM: John J. Taylor, DEP, SOUTHWEST DISTRICT
PHONE: 813-744-6100 SUNCOM 542-6100 EXT. 117

Attached is the information you requested.

PA-92-32A.
Tampa Electric Co.

Call if you have any further questions.

AIR DIVISION FAX NUMBER: 813-744-6458 SUNCOM 542-6458

Total Number of Pages _ 7___

Bill Thomas
copy all PA's
PG

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In Re: TAMPA ELECTRIC COMPANY POLK POWER STATION MODIFICATION OF CONDITIONS OF CERTIFICATION PA 92-32 POLK COUNTY, FLORIDA	)))))	DEP CASE NO. PA 92-32A OGC CASE NO. 92-1399

D.E.P.
FEB 23 1995
SOUTHWEST DISTRICT
TAMPA

FINAL ORDER MODIFYING CONDITIONS
OF CERTIFICATION

On January 26, 1994, the Governor and Cabinet, acting as the Siting Board, issued a final order approving certification for the Tampa Electric Company (TEC) Polk Power Station Project. That certification order approved the construction and operation of a 260 MW (net) first phase of an ultimate 1150 MW capacity, integrated coal gasification combined cycle (IGCC) facility and associated facilities to be located in Polk County, Florida.

On May 12, 1994 and September 9, 1994, TEC filed requests to modify the conditions of certification pursuant to section 403.516(1)(b), Florida Statutes (F.S.). TEC requested that the conditions be modified to approve changes to the plant design, layout, and operating conditions. The changes include increases in size and operating parameters for the auxiliary boiler, replacement of uncovered coal piles with coal silos, decreased NOx emission limits for the IGCC combustion turbine, revised monitoring requirements for the auxiliary boiler, and updating of applicable regulatory requirements.

Copies of TEC's request were distributed to all parties to the certification proceeding and made available for public review. On December 23, 1994, a Notice of Proposed Modification of Power Plant Certification regarding the proposed modifications was published in the Florida Administrative Weekly. TEC published notice of the proposed modification in the Tampa Tribune and Lakeland Ledger on December 3, 1994. The notice specified that a hearing would be held if requested on or before 45 days from receipt of the proposed modification by the parties or within 30 days of publication of the notice. No written objection to the proposed modification was received by the Department.

Accordingly, in the absence of any timely objection,

IT IS ORDERED:

The proposed changes to the TEC Polk Power Station , described in the May 12, and September 9, 1994 requests for modification, are **APPROVED**. Pursuant to Section 403.516(1)(b), F.S. the Department hereby **MODIFIES** the conditions of certification for the Polk Power Station as follows:

XIII. AIR

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed ~~49.5~~ 120.0 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content by weight. All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

G. Fugitive Dust

Fugitive dust emission during the construction period shall be minimized by covering or watering dust generation areas. Particulate matter emissions from the coal handling equipment shall be controlled by enclosing all coal storage, conveyors and conveyor transfer points ~~(except those directly associated with the coal stacker reclaimer for which an enclosure is operationally infeasible.)~~. Fugitive emissions shall be tested as specified in Condition No. XIII.J. ~~Inactive coal storage shall be shaped, compacted, and oriented to minimize wind erosion~~. Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. ~~When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.~~

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

			Emission Limitations 7F CT Post demonstration Period	
Pollutant	Fuel	Basis	lb/hr	tpy
NOx	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd	~~222.5~~ 220.25	~~1,044~~ 1,032.9

I. Auxiliary Boiler Operation

Normal operation of the auxiliary boiler shall be limited to a maximum of ~~1,000~~ 3,000 hours per year ~~and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable.~~ The auxiliary boiler may operate continuously (i.e. 8,760 hrs/yr) in the standby mode. The following emission limitations shall apply:

1. NOx emissions shall not exceed ~~0.16~~ 0.10 lbs/MMBtu for oil firing.

2. Sulfur dioxide emissions shall be limited by firing low sulfur oil with a maximum sulfur content of 0.05 percent by weight.

3. Visible emissions shall not exceed 20 percent opacity (6-minute average) (except for one six-minute period per hour during which opacity shall not exceed 27 percent), while burning low sulfur fuel oil.

a. The CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

b. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C., and 40 CFR 60. The record shall include periods of startup, shutdown and malfunction.

c. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

d. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of the CEMS.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 62-212 and 62-4, F.A.C., and 40 CFR 60, Subparts A, Db and GG.

Any party to this Order has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department of Environmental Protection in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that the Final Order is filed with the Department of Environmental Protection.

DONE AND ENTERED this 20th day of February, 1995 in Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for Kenneth J. Plante
Virginia B. Wetherell
Secretary
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000
Telephone: (904) 488-4805

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52
Florida Statutes, with the designated
Department Clerk, receipt of which
is hereby acknowledged.

Clerk 2-22-95 Date

CERTIFICATE OF SERVICE

I DO HEREBY certify that a true an correct copy of the foregoing has been sent by U.S. Mail to the following listed persons:

Lawrence N Curtin
Attorney at Law
Holland & Knight
P.O. Drawer 810
Tallahassee, FL 32302

Karen Brodeen
Assistant General Counsel
Dept. of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-0850

Michael Palecki, Chief
Bureau of Electric & Gas
Florida Public Service Commission
101 East Gaines Street
Tallahassee, FL 32399-0850

Carolyn S. Holifield, Chief
Dept. of Transportation
605 Suwannee Street, M.S. 58
Tallahassee, FL 32399-0458

Doug Leonard, Executive Director
Ralph Artigliere, Attorney at Law
Central Florida Regional Planning Council
409 E. Davidson Street
P.O. Box 2089
Bartow, FL 33830

Julia Greene, Executive Director
Tampa Bay Regional Planning Council
9455 Koger Blvd.
St. Petersburg, FL 33702

John J. Dingfelder
Assistant County Attorney
Hillsborough County
P.O. Box 1110
Tampa, FL 33601-1110

Mark Carpanini
Attorney at Law
Office of County Attorney
P.O. Box 60
Bartow, FL 33830-0060

Martin D. Hernandez
Richard Tschantz
Assistant General Counsels
Southwest Florida Water Management District
2370 Broad Street
Brooksville, FL 34609-6899

James Antista, General Counsel
Florida Game and Fresh Water Fish Commission
Bryant Building
620 South Meridian Street
Tallahassee, FL 32399-1600

Sara M. Fotopulos
Chief Counsel
Environmental Protection Commission of Hillsborough County
1900 Ninth Avenue
Tampa, FL 33605

this 22 day of February, 1995.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

David A. Crowley for
RICHARD T. DONELAN, JR.
Assistant General Counsel
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400
(904) 488-9314

~~L~~. Monitoring Requirements

1. IGCC Combustion Turbine

A continuous emission monitoring system (CEMS) shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO2 or O2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75, if applicable, when these requirements become effective within the state.

~~1~~ a. Each CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

~~2~~ b. CEMS data shall be recorded and reported in accordance with Chapter 62-297.500, F.A.C., 40 CFR 60 and 40 CFR 75, if applicable. The record shall include periods of startup, shutdown, and malfunction.

~~3~~ c. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

~~4~~ d. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

~~5~~ e. For purposes of the reports required under this certification, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Condition No. XIII.H.4 herein, which exceeds the applicable emission limits in Condition No. XIII.H.1.

2. Auxiliary Boiler

A CEM shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the auxiliary boiler to monitor nitrogen oxides emissions and in accordance with 40 CFR 60.13 to monitor opacity.

TECO - POLK PWR. STA. facility file

Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

December 9, 1997

Mr. Randy Barnes
Office of Polk County Property Appraiser
255 N. Wilson Ave.
Bartow, FL 33830-3801

RE: Tampa Electric Co., Polk Power Plant Pollution Control Facilities Estimate (attached)

Dear Mr. Barnes:

We agree with the allocation of the facilities as listed on the attached sheet as pollution control facilities. This determination is based on a plant visit as well as input from our Waste Management Division.

If you have any questions, please contact me at (813) 744-6100, x107.

Sincerely,

G. J. Kissel, P.E.
District Air Engineer
Southwest District

c: Mr. P. Matonte, TECO
Polk County file
Polk Power Plant file

attachment

c:\tax117.doc

Tampa Electric Company
Polk Power Plant Unit 1
Pollution Control Facilities Estimate

HGCU & Sulfuric Acid Plant	
Hot Gas Cleanup	$16,515,924
Sulfuric Acid Plant	22,491,005
Subtotal - HGCU	$39,006,929
Cold Gas Cleanup	
Syngas Scrubbing	$2,564,265
Low Temp Gas Cooling	1,805,760
Acid Gas Removal	9,504,120
Sulfur Recovery	100,263
Tail Gas Treating	83,599
Clean Gas Heating	2,798,258
Subtotal - CGCU	$16,656,265
Gasification Plant	
Slag Handling	$4,857,540
Blackwater Handling	9,320,318
Fines Filtration	1,256,083
Process Wastewater Treating	8,807,281
Subtotal - Gasification	$24,241,223
Plant Electrical	
Auxiliary Power - Low Voltage	$682,656
Auxiliary Power - 4.14kV	1,619,029
Auxiliary Power - 13.8kV	1,730,956
Generator Step-up Transformers	553,204
Temporary Power Substation	158,646
Subtotal - Electrical	$4,744,492
Plant Utilities	
General Wastewater Treating	$9,449,075
Plant & Instrument Air	531,290
Flare	4,430,302
Plant Monitoring & Control	2,485,351
Pipe Racks	1,168,958
Subtotal - Plant Utilities	$18,064,976
Total Investment	$102,713,885

B

GJK COPY

Rev. 2
06/18/93

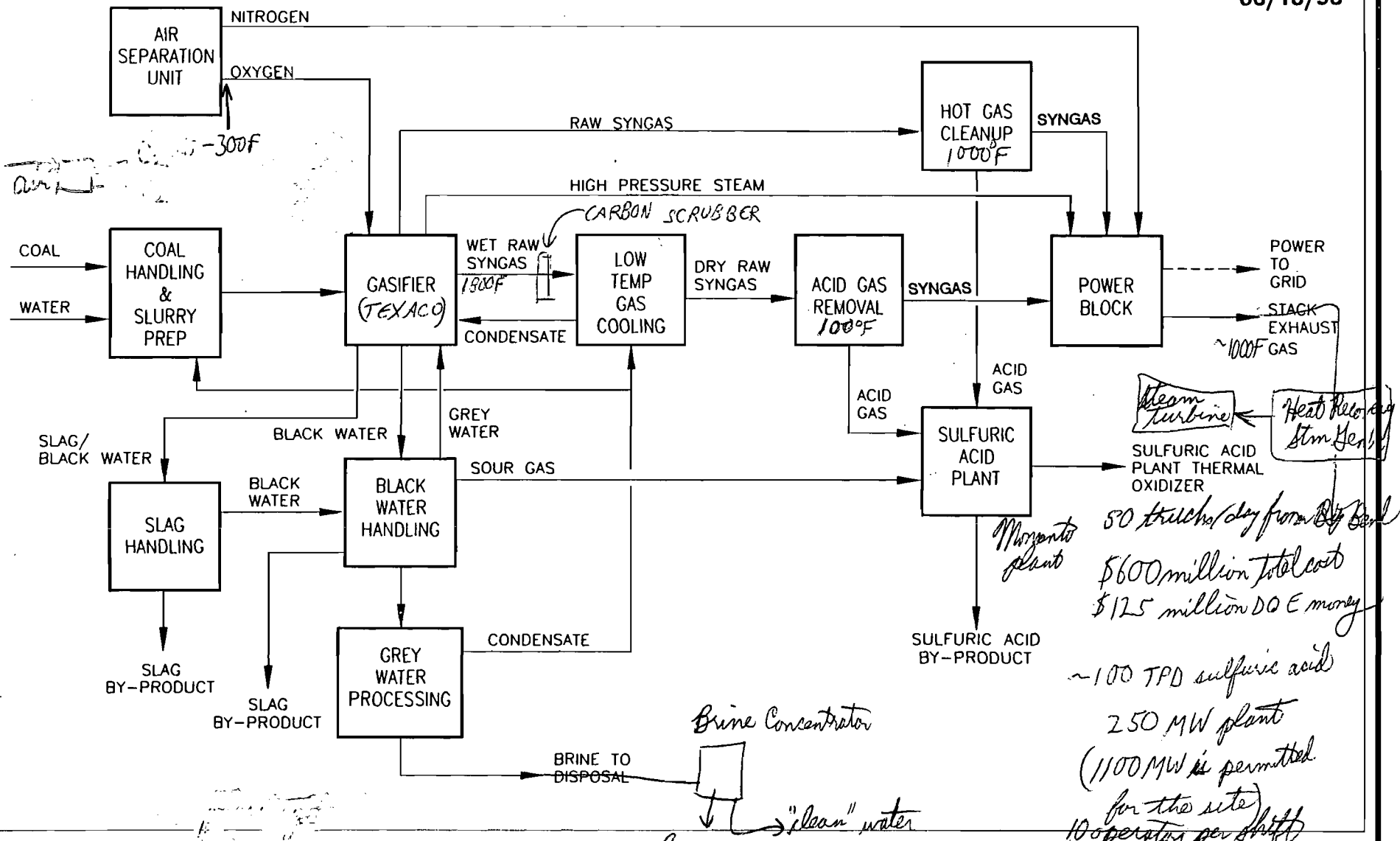

FIGURE 3.1.1-1.

GENERALIZED FLOW DIAGRAM OF IGCC SYSTEMS AND PROCESS

Source: ECT, 1993.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

Department of
Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

FACSIMILE TRANSMISSION SHEET

DATE 11/12/97

TO: B. BUTERA

DEPT:

PHONE:

FROM: Jerry K

DEPT.: DEP, SOUTHWEST DISTRICT
PHONE: (813) 744-6100 SUNCOM 542-6100 EXT. 107

OPERATOR: _____ EXT. _____

SUBJECT: _____

TOTAL NUMBER OF PAGES, INCLUDING COVER PAGE: 3

AIR PROGRAM FAX NUMBER IS (813) 744-6458
SUNCOM 542-6458

BOB: TECO IS CLAIMING $4.9 MILLION FOR "SLAG HANDLING" ① ~~GJK COPY~~

OUT OF A TOTAL OF $103. MILLION CLAIMED AS POLLUTION CONTROL EQP., SO IT'S A MINOR PORTION & DOESN'T WARRANT A LARGE TIME INVESTMENT ON YOUR PART - GK

Rev. 2
06/18/93

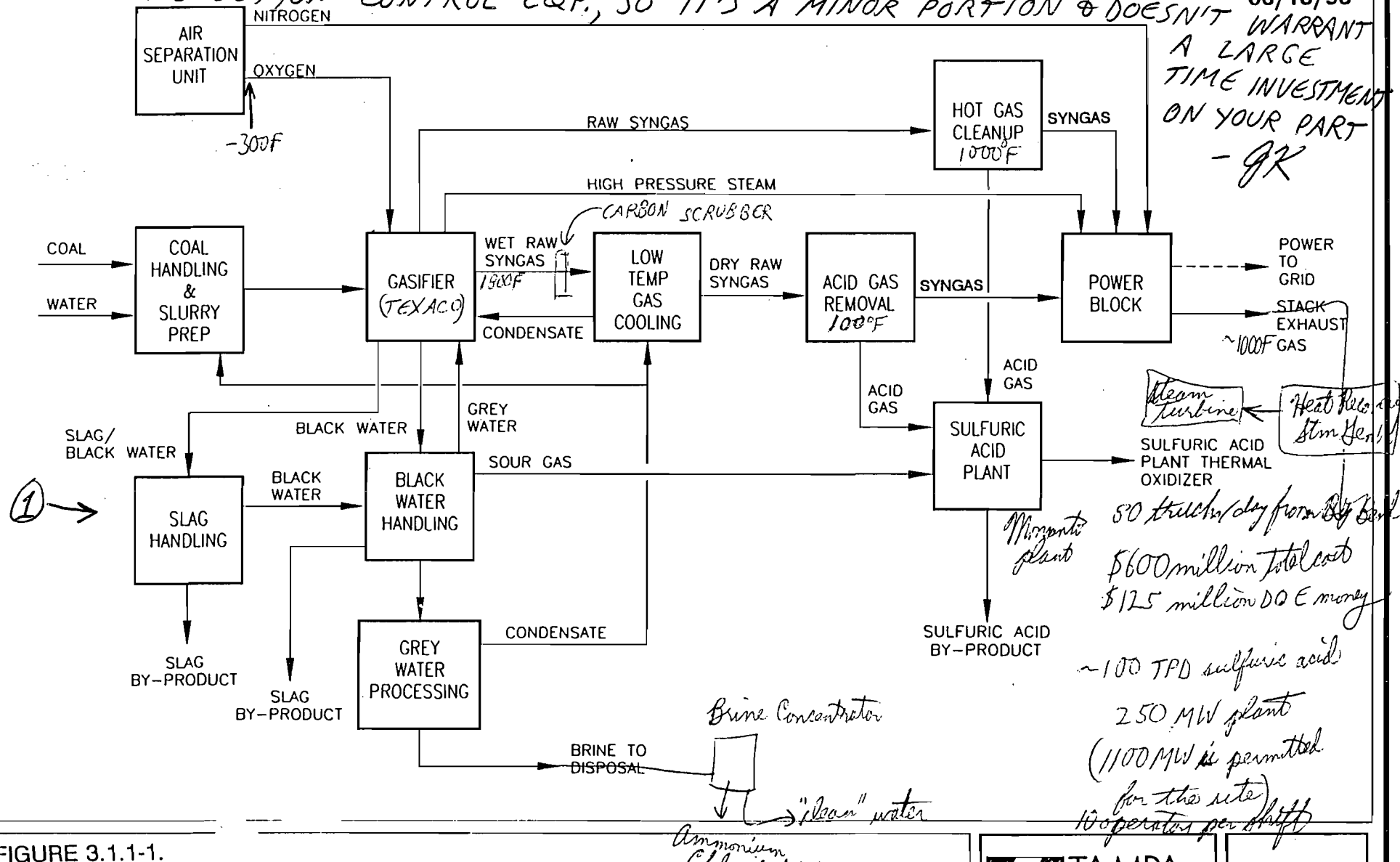

FIGURE 3.1.1-1.

GENERALIZED FLOW DIAGRAM OF IGCC SYSTEMS AND PROCESS

Source: ECT, 1993.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

193.621 Assessment of pollution control devices.—

(1) If it becomes necessary for any person, firm or corporation owning or operating a manufacturing or industrial plant or installation to construct or install a facility, as is hereinafter defined, in order to eliminate or reduce industrial air or water pollution, any such facility or facilities shall be deemed to have value for purposes of assessment for ad valorem property taxes no greater than its market value as salvage. Any facility as herein defined heretofore constructed shall be assessed in accordance with this section.

(2) If the owner of any manufacturing or industrial plant or installation shall find it necessary in the control of industrial contaminants to demolish and reconstruct that plant or installation in whole or part and the property appraiser determines that such demolition or reconstruction does not substantially increase the capacity or efficiency of such plant or installation or decrease the unit cost of production, then in that event, such demolition or reconstruction shall not be deemed to increase the value of such plant or installation for ad valorem tax assessment purposes.

(3) Notwithstanding the foregoing provisions, nothing in this section shall prevent an increase in the assessment of the plant or installation:

(a) In any year where the taxable property in the county is being reassessed or revalued; or

(b) If the assessed value of such plant or installation or parts thereof, during the year preceding the removal, was less than its just value as required by s. 4, Art. VII of the State Constitution, and s. 193.011; or

(c) In the 10th year after the completion of the reconstruction and replacement and thereafter. The provisions of this subsection shall apply only if the demolition or removal shall commence prior to September 1, 1969, and if the reconstruction and replacements, in lieu thereof are completed and installed prior to September 1, 1971.

(4) The terms "facility" or "facilities" as used in this section shall be deemed to include any device, fixture, equipment, or machinery used primarily for the control or abatement of pollution or contaminants from manufacturing or industrial plants or installations, but shall not include any public or private domestic sewerage system or treatment works.

(5) Any taxpayer claiming the right of assessments for ad valorem taxes under the provisions of this law shall so state in a return filed as provided by law giving a brief description of the facility. The property appraiser may require the taxpayer to produce such additional evidence as may be necessary to establish taxpayer's right to have such properties classified hereunder for assessments.

(6) If a property appraiser is in doubt whether a taxpayer is entitled, in whole or in part, to an assessment under this section, he or she may refer the matter to the Department of Environmental Protection for a recommendation. If the property appraiser so refers the matter, he or she shall notify the taxpayer of such action. The Department of Environmental Protection shall immediately consider whether or not such taxpayer is so entitled and certify its recommendation to the property appraiser.

(7) The Department of Environmental Protection shall promulgate rules and regulations regarding the application of the tax assessment provisions of this section for the consideration of the several county property appraisers of this state. Such rules and regulations shall be distributed to the several county property appraisers of this state.

given to W Thomas/J Russell at plant visit 10/97

Description of Facilities

for

Solid Waste Disposal

at

Polk Power Plant

Prepared for

Tampa Electric Company

December 12, 1996

Prepared By

Becon Corporation
Russell B. MacPherson, President
Joseph D. Malek, Vice President

ECO\POLK\COSTSUM4.WK4

TABLE 1

POLK POWER STATION
TAMPA ELECTRIC COMPANY

CODE	DESCRIPTION	TOTAL COST	SOLID WASTE COST	NOTES
1X	HOT GAS CLEANUP			
11	Hot Gas Cleanup	$29,699,798	$9,528,959	1,2,3
12	Sulfuric Acid Plant	$26,001,123	$650,028	4
	SUBTOTAL 1X:	$55,700,921	$10,178,988	
2X	COLD GAS CLEANUP			
20	CGCU - Common & Engineering	$2,693,165	$91,349	5
21	Syngas Scrubbing	$1,928,125	$48,203	4
22	Low Temp Gas Cooling	$1,272,956	$31,824	4
23	Acid Gas Removal	$7,190,301	$291,646	2,3,4
24	Sulfur Recovery - Claus	$78,204	$1,955	4
25	Tail Gas Treating	$65,207	$1,630	4
26	Clean Gas Heating	$2,010,577	$50,264	4
	SUBTOTAL 2X:	$15,238,535	$516,872	
3X	OXYGEN PLANT			
30	Air Separation Unit - Engineering	$352,914	$8,823	5
31	Air Separation Unit	$48,461,580	$1,211,539	4
	SUBTOTAL 3X:	$48,814,493	$1,220,362	
4X	GASIFICATION			
40	Gasification - Common & Engineering	$16,146,049	$4,158,537	5
41	Coal Supply	$7,869,042	$368,005	2,3,4
42	Slurry Prep & Coal Grinding	$14,757,669	$544,997	2,3,4
43	Gasification & High Temp Cooling	$70,876,465	$4,593,673	2,3,4
44	Slag Handling	$4,772,884	$4,772,884	
45	Blackwater Handling	$8,497,751	$7,023,027	2,3
46	Fines Filtration	$1,171,555	$1,171,555	
47	Process Wastewater Treating	$8,768,089	$8,768,089	
48	Auxiliary Boiler	$2,172,907	$0	
	SUBTOTAL 4X:	$137,034,412	$31,400,768	
5X	POWER GENERATION			
50	GT & ST - Common & Engineering	$6,477,241	$176,694	5
51	Combustion Turbine & Generator	$68,034,325	$1,700,858	4
52	Steam Turbine & Generator	$24,818,103	$620,453	4
53	Fuel Oil Supply	$1,918,365	$263,987	6

ECO\POLK\COSTSUM4.WK4

TABLE 1

POLK POWER STATION
TAMPA ELECTRIC COMPANY

CODE	DESCRIPTION		TOTAL COST	SOLID WASTE COST	NOTES
	SUBTOTAL 5X:		$101,248,034	$2,761,972	
6X	HEAT RECOVERY				
60	HRSG - Common & Enginnering		$1,974,016	$146,401	5
61	Heat Recovery Steam Generator		$34,066,066	$1,349,868	4,8
62	Condensate & Boiler Feedwater		$11,365,990	$450,377	4,8
63	Demineralized Water		$1,993,158	$77,903	2,4,8
64	Open & Closed Water Cooling Systems		$11,387,641	$2,483,665	2,3
	SUBTOTAL 6X:		$60,786,871	$4,508,214	
7X	TRANSMISSION & DISTRIBUTION				
70	Plant Electrical - Common & Engineering		$370,563	$56,346	5
71	Auxiliary Power - Low Voltage	$683K	$3,665,869	$811,123	
72	Auxiliary Power - 4.14KV	1,619	$7,662,930	$1,277,336	
73	Auxiliary Power - 13.8KV	1,730	$7,813,925	$1,302,629	
74	Generator Step-up Transformer	553	$2,898,602	$67,465	4
75	Miscellaneous Electrical		$5,032,836	$839,005	
76	Temporary Power Substation	158	$772,551	$106,303	6
	SUBTOTAL 7X:		$28,017,275	$4,260,208	
8X	SITEWORK & BUILDINGS				
80	Sitework - Common & Engineering		$2,227,963	$313,698	5
81	Site Development & Reclamation		$44,950,116	$9,148,580	7
84	Warehouse		$1,927,492	$265,223	6
85	Control Building		$3,704,401	$509,726	6
86	Maintenance Building		$2,528,454	$347,915	6
87	Land Acquisition		$19,839,913	$0	
	SUBTOTAL 8X:		$75,178,339	$10,585,142	
9X	GENERAL/COMMON				
90	General Wastewater Treating		$10,758,992	$4,014,994	1,2,3,6
92	Plant & Instrument Air		$2,616,485	$360,028	6
93	Plant Water Requirements		$6,588,653	$1,054,158	2,3,6
94	Chemical Fire Protection		$62,949	$8,662	6

ECO\POLK\COSTSUM4.WK4

TABLE 1

POLK POWER STATION
TAMPA ELECTRIC COMPANY

CODE	DESCRIPTION	TOTAL COST	SOLID WASTE COST	NOTES
95	Flare	$4,161,769	$103,936	4
97	Plant Monitoring & Communication	$987,734	$135,912	6
98	Plant Control & MIS	$11,547,440	$1,588,783	6
99	Pipe Racks	$5,533,675	$761,434	6
	SUBTOTAL 9X:	$42,257,697	$8,027,907	
	TOTAL - ALL AREAS:	$564,276,577	$73,460,433	
	IDC (Est.):		$5,589,846	
	BOND ISSUANCE COSTS (Max.):		$1,500,000	
	OTHER BOND COSTS (Est.):		$1,500,000	
	ESTIMATE BOND SIZE:		$75,000,000	
	EXCESS SOLID WASTE COSTS:		$7,050,279	

IMPERIAL

POLK COUNTY

BARTOW, FLORIDA 33830-3901
255 N. WILSON AVENUE
PH. 941/534-4777
FAX 941/534-4753

OFFICE OF
EDWIN H. COLEMAN, C.F.A.
PROPERTY APPRAISER

FACSIMILE TRANSMITTAL

TO: Bill Schroedor FAX #: 813-744-6458

FROM: Marsha Faux FAX #: 941-534-4753

DATE: 6-30-97 TIME: 3:30

PAGES, INCLUDING COVER SHEET: 2

COMMENTS: Please call if you have any further questions. Randy Barnes will return July 7th. Thank You -

Go thru Phil M w/ questions
P.O. Box 111
Tampa 33601-0111

Bob Howell
Kim Caruso } Teco sources

Bob Howell @ plant x39121

F.S. 193.621

Jim Nail 813-228-1111 x39109

State Road 37 So. of 60, ~14 miles So. of 60, on left hand side of rte 37, past intersection w/ 630 to 2nd plant entrance.

Tampa Electric Company
Polk Power Plant Unit 1
Pollution Control Facilities Estimate

HGCU & Sulfuric Acid Plant	
Hot Gas Cleanup	$16,515,924
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Subtotal - HGCU	$39,006,929
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Plant & Instrument Air	531,290
Flare	4,430,302
Plant Monitoring & Control	2,485,351
Pipe Racks	1,168,958
Subtotal - Plant Utilities	$18,064,976
Total Investment	$102,713,885

carbon scrubber theoretically TECO could burn the dirty gas - needs to be cleaned up for the turbine. Turbine could take the SO_2

compare to coal plant - would all the ash handling be considered pollution control?

per Telecon w/ P. Motonte not normally pollution control, but may be for O_2 plant getting power off grid; in any case .5% of total $ is all allocation conservative, so OK. - GK 12/8

need more data

need more data

accountant who made up this sheet Bill Wood 641-5149

Teco Acctant: David Keene 228-4752

B

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION
FACT SHEET

Description

■ A state-of-the-art "integrated coal gasification combined-cycle" power plant that will produce enough electricity to serve 56,000 homes. The facility will begin operation in 1996.

Location

■ A 4,300-acre tract of land (previously mined for phosphate) recommended by an independent citizens Power Plant Siting Task Force. About 11 miles west of Fort Meade and 11 miles south of Mulberry. Located just south of County Road 630 and east of State Road 37, with a portion crossing west over S.R. 37.

Technology

■ A 250-megawatt "Integrated Gasification Combined-Cycle" facility that will be among the nation's cleanest, most efficient and most economical power generation units.

The plant is a first-of-its-kind combination of two leading technologies. The first technology is called "coal gasification," which uses coal to create a clean-burning gas. This second technology is called "combined cycle," which is the most efficient method of producing electricity commercially available today. The integration of these technologies allows Tampa Electric to couple the high efficiency of the combined-cycle design with the low cost of coal for fuel.

Construction began in 1994. The complete 250-megawatt integrated facility will begin operation in the fall of 1996.

The gasification portion of the plant will produce a clean coal gas to be used in the combustion turbine. Coal is combined with oxygen in the gasifier to produce the gaseous fuel. The gas is then cleaned by a "gas cleanup" process. After cleaning, the coal gas is used in the combustion turbine to produce electricity.

Combined cycle is more efficient because it reuses exhaust heat to produce more electricity. Combined-cycle design consists of a combustion turbine/generator, a heat recovery steam generator, and a steam turbine/generator. The exhaust heat from the combustion turbine is recovered in the heat recovery steam generator to produce steam. This steam then passes through a steam turbine to power another generator, which produces more electricity.

All together, the plant will be about 10 to 12 percent more efficient than a conventional coal power plant.

(continued on back)

Technology cont'd.

Tampa Electric has been awarded $130-million in funding through the U.S. Department of Energy's Clean Coal Technology Program to demonstrate this special integration of technology.

Over the next 20 years, Tampa Electric will add to the plant to meet any additional Customer energy needs not served through conservation or cogeneration. The total capacity at this plant is expected to reach about 1,150 megawatts.

Environment

■ The coal gasification unit will provide clean, coal-fueled power, with the gas cleanup process removing a minimum of 95 percent of the sulfur in the coal gas. This is expected to exceed the performance of today's most advanced coal-fired generating units. The sulfuric acid and slag byproducts will then be sold for reuse in industry.

Existing "mine cuts" on the phosphate land will be modified to become the plant's cooling reservoir. Much of the power station's storm water will be reused in the plant or cooling reservoir. And, the combined-cycle technology requires much less cooling water than conventional technology.

Employment

■ Plant construction began in 1994 and will extend through 1996. About 1,200 contract construction workers will be employed by the general contractor at the site during the peak of construction activity. A team of full-time personnel employed by Tampa Electric Company will manage and operate the Polk Power Station plant once it begins service in mid-1996. Tampa Electric will recruit individuals that are multi-skilled, multi-functional, and demonstrate the ability to be part of a dynamic, high-performance team. Candidate selection was begun in the first half of 1995. If you would like more information on employment opportunities, contact Tampa Electric at 1-800-282-4667, extension 34637.

Tampa Electric Company

■ Tampa Electric Company is a regulated public utility that has been serving West Central Florida since 1899. Today it delivers electricity to more than 480,000 Customers in a 2,000-square-mile area that includes almost all of Hillsborough County and parts of Polk, Pasco, and Pinellas counties. Tampa Electric also supplies electricity to a variety of other communities through wholesale power arrangements with local municipals and cooperatives. Tampa Electric has four power plants that produce about 3,300 megawatts of electricity. The company has 3,200 employees.

For More Information

■ Please call our toll-free number 1-800-282-4667, Ext. 34269, or write: Tampa Electric Co., Polk Power Station, P.O. Box 111, Tampa, FL 33601.

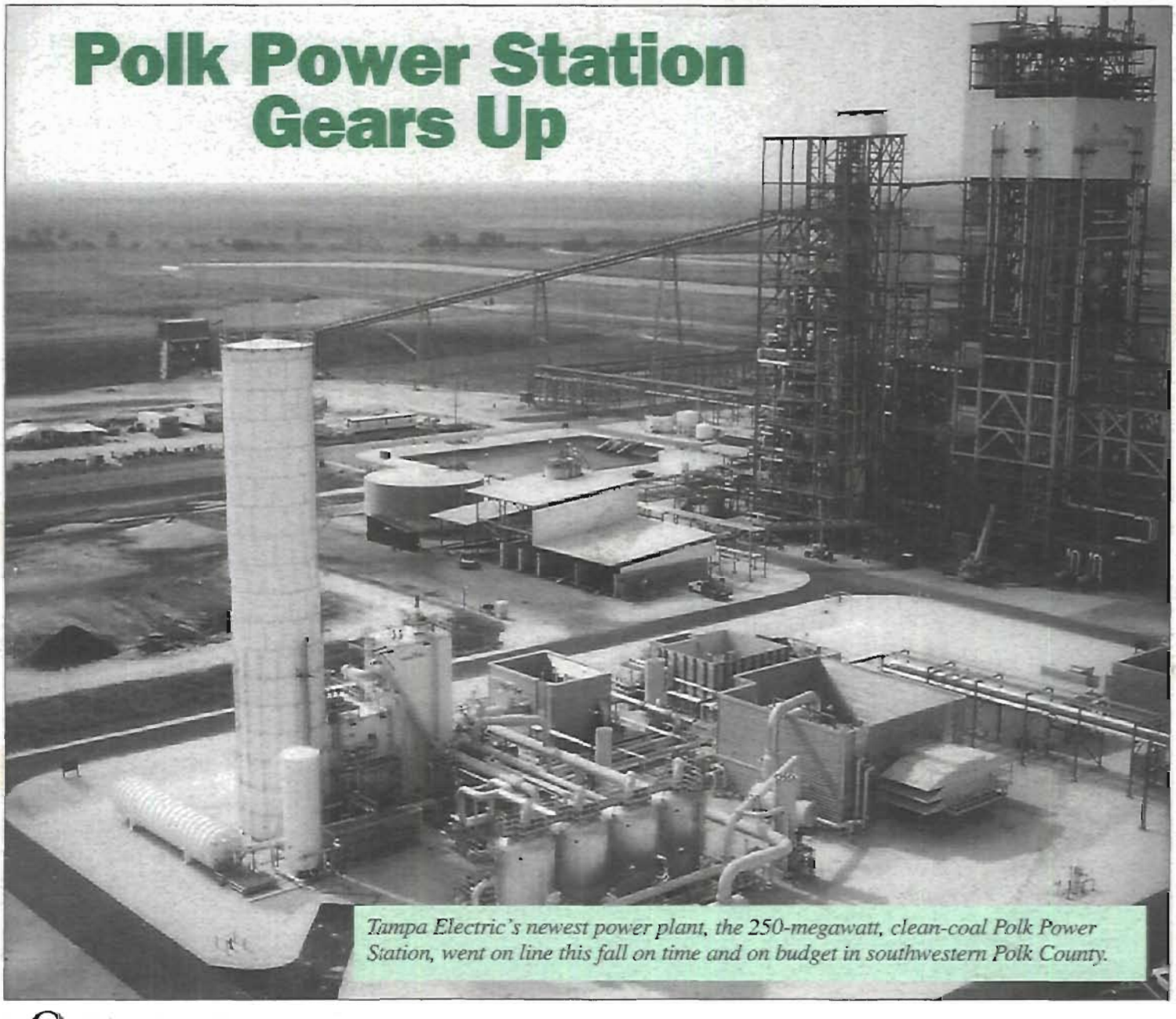
TAMPA ELECTRIC
A TECO ENERGY COMPANY

YOUR ENERGY CONNECTION

November 1996

An update on Tampa Electric's new Polk County power plant

Polk Power Station Gears Up



Tampa Electric's newest power plant, the 250-megawatt, clean-coal Polk Power Station, went on line this fall on time and on budget in southwestern Polk County.

On a 4,300-acre Polk County site previously mined for phosphate, sits Tampa Electric Company's new power plant, the Polk Power Station, a clean-coal, 250-megawatt gasification facility, ready to do its job.

The power plant, located just south of County Road 630 and east of State Road 37, began commercial operations in late September.

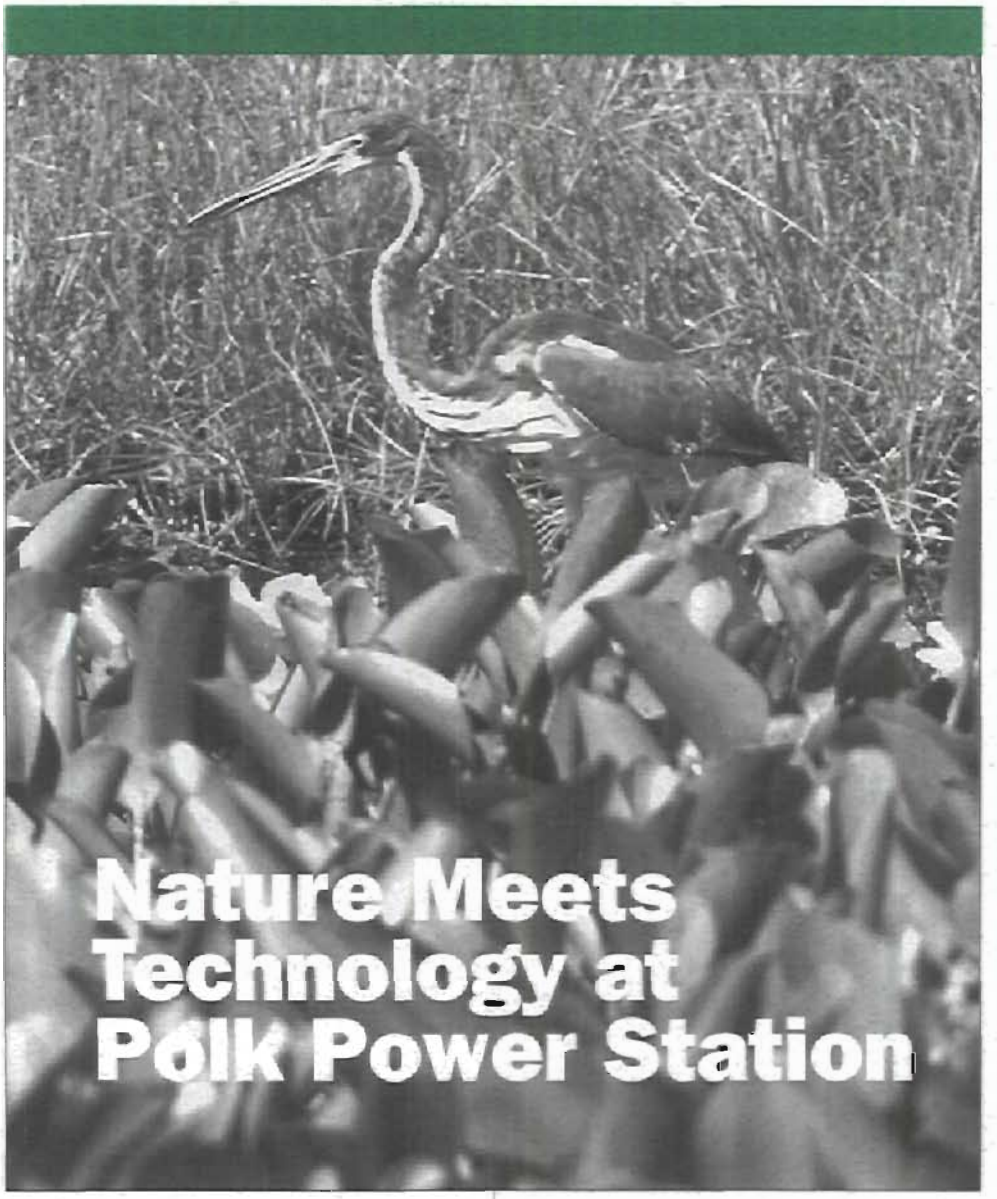
The project already has a seven-year history, which began in 1990 when a group of independent citizens were selected to form a Power Plant Siting Task Force.

The task force was made up of educators, business and community leaders and environmentalists to decide where the plant should be built. They combed through more than 30 sites in West Central Florida during a year-long site selection process.

Construction of the plant began in 1994 and nearly 25-million cubic yards of earth has been moved since that time.

Today, the Polk Power Station is capable of producing enough electricity to serve an estimated 56,000 homes. This power-generating facility boasts one of the cleanest, most efficient and most economical units

STARTUP *(Continued on page 4)*



Nature Meets Technology at Polk Power Station

▲ *Tampa Electric is creating a huge recreational preserve with fishing lakes and wetlands on the site of its Polk Power Station, including a sprawling natural habitat for a wide array of fish, wildlife and birds, like this heron.*

Nature and technology. A delicate balance between these two is being achieved to meet the needs of our Customers and the needs of our environment at the Polk Power Station.

A protected area designed to house a wide variety of plants and animals native to the area around Tampa Electric's new Polk Power Station site is nearing the final stages of approval after more than six years of work by Tampa Electric's Corporate Environmental Services Department.

If the final plan is approved later this year by the Florida Department of Environmental Protection (DEP), environmental, land and water management plans for the site will create a 1,511-acre recreational preserve.

The preserve will include five fishing lakes which the Florida Game and Fresh Water Fish Commission (FGFWFC) will manage, osprey nesting platforms, and an expansive natural habitat for birds and other wildlife.

In addition, a recreational and nature preserve is proposed for the west side of State Road 37 in conjunction with the FGFWFC.

Tampa Electric's environmental engineers and consultants worked closely with specialists from DEP and the FGFWFC to develop comprehensive revegetation, reclamation and water management plans for the site.

The Polk Power Station is the first utility power generation station ever built on former phosphate mining land.

When permitting the 4,300-acre Polk site, the reclamation work on this 1,511-acre portion of the land was part of Tampa Electric's environmental permit requirements.

As part of the plan, approximately 200 acres of trees, including pine and maple, have been planted. Some 608 acres of lakes have been created and will be used by the FGFWFC as a recreational fishing area for residents.

More than half of the 1,511-acre site will be reclaimed into uplands, wetlands and lakes.

Tampa Electric also worked with the National Audubon Society for assistance with designing the wetlands and the bird nesting islands that are proposed for the site.

This is a historic, first-of-its-kind project – one considered so progressive in its site selection process that it's been honored by state and national environmental groups.

The result? A clean, high-tech power plant that will have the lowest impact on its environment – and ours.

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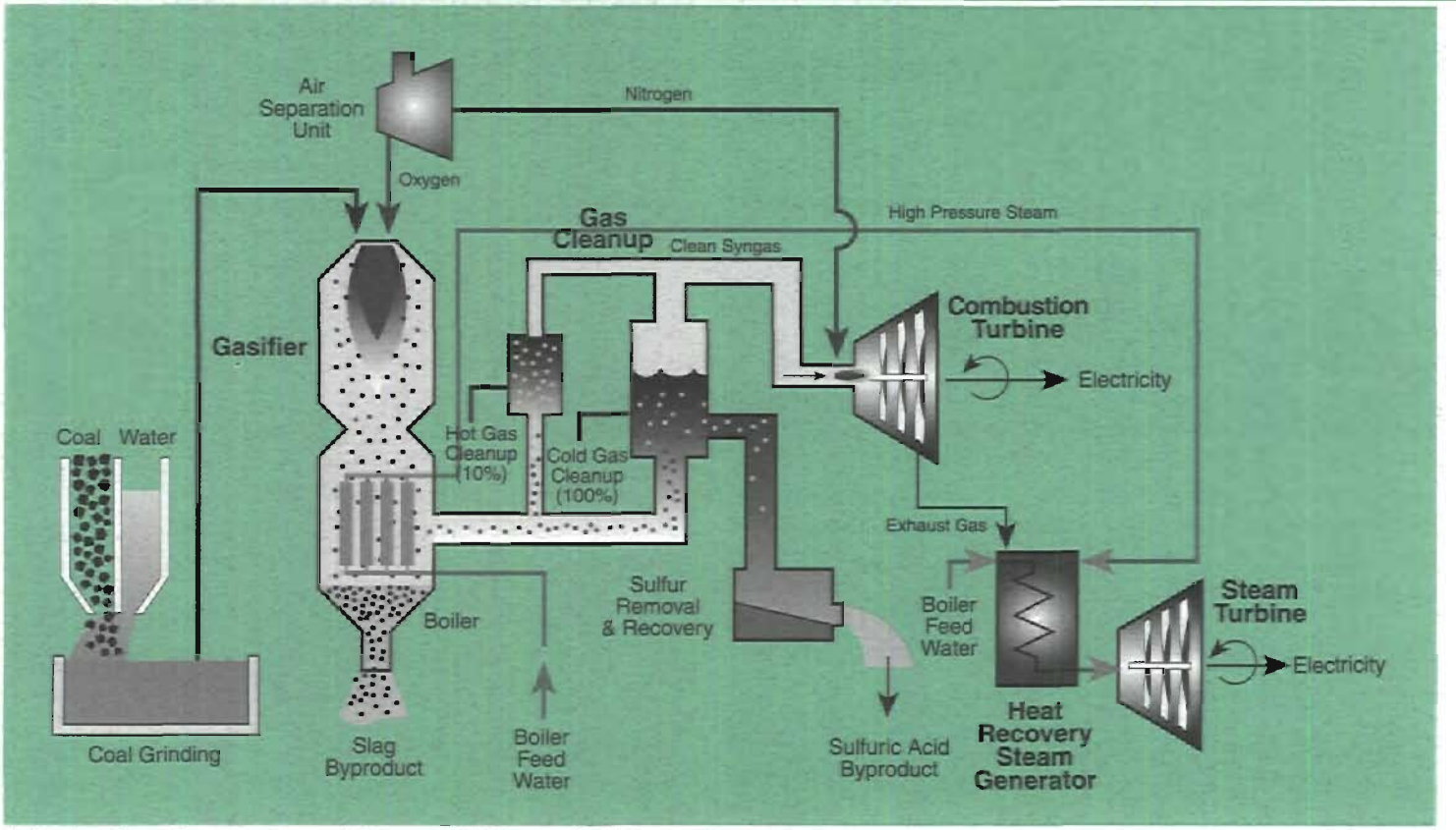
How It Works

An Inside Look at the Polk Power Station

Integrated Gasification Combined Cycle Facility



A look at how the new, state-of-the-art Polk Power Station produces power

Nearly seven years since conception, a new state-of-the-art Tampa Electric power plant in Polk County, the Polk Power Station, is now in operation.

The environmentally friendly technology that powers the 250-megawatt plant is capable of serving an additional 56,000 Tampa Electric homes.

As one of the first coal-powered plants in the nation able to remove most of the emissions from its fuel, the Polk Power Station received $140-million in co-funding from the U.S. Department of Energy to offset the project's cost. This project is part of the U.S. Clean Coal Technology Program.

Here's how it works:

The Polk power plant uses coal to create synthetic gas which is then cleaned of sulfur-bearing compounds.

The resulting mixture powers a combustion turbine engine similar to the kind used in large jets.

Special devices capture heat from the exhaust of this process, which in turn is used to make steam, which then drives a steam turbine engine that produces even more energy.

Sulfur extracted from the synthetic gas is captured and sold separately as sulfuric acid to the local phosphate industry.

The plant is a first-of-its kind green-field combination of two leading technologies: Combined cycle, which is the most efficient commercially available method of producing electricity, and coal gasification, which uses coal to create a clean-burning gas.

Combined cycle is more efficient because it allows us to produce more electricity by using the same heat twice.

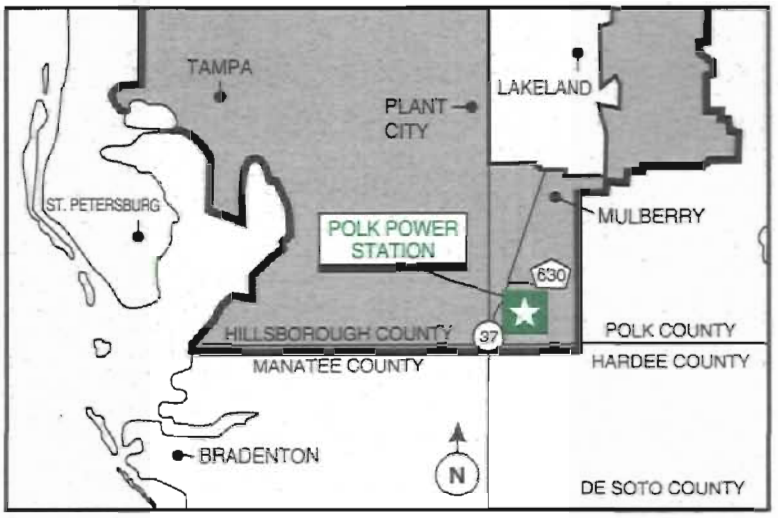
Bringing these two technologies together will allow us to integrate the high efficiency of the combined-cycle design with the low costs of coal as fuel in an environmentally superior method.

The Polk plant will be 10-to-12 percent more efficient than a conventional coal-fired power plant, making it among the nation's cleanest, most efficient and most economical power generation units.

Who is Tampa Electric?

Tampa Electric Company is a regulated investor-owned utility which has been serving the energy needs of West Central Florida since 1899.

Today, Tampa Electric provides reliable electricity and energy services to more than 500,000 Customers in a 2,000-square-mile area that includes almost all of Hillsborough County, and parts of Polk, Pasco and Pinellas counties.



Tampa Electric also supplies electricity to a variety of other communities in Florida through wholesale power arrangements with local municipal utilities and cooperatives, including the utility that serves Walt Disney World.

Tampa Electric's five power plants, including the new Polk Power Station, produce more than 3,600 megawatts of electricity. The company has more than 2,800 employees.

Tampa Electric is the principal subsidiary of TECO Energy, a diversified, energy-related holding company headquartered in Tampa.

TECO Energy has companies engaged in water transportation, coal mining, natural gas production, independent power production, oil and gas exploration, and advanced energy management and communication systems.

For more information about the Polk Power Station, please call our toll-free number at 1-800-282-4667, Ext. 34269. Write us at: Tampa Electric Co., Polk Power Station, P.O. Box 111, Tampa, FL 33601. Or visit our World Wide Web site online on the Internet at: **http://www.teco.net**

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TAMPA ELECTRIC
A TECO ENERGY COMPANY
PO Box 111
Tampa FL 33601-0111

YOUR ENERGY CONNECTION

Inside:

An Update on Tampa Electric's Polk Power Station

Take a "Virtual" Tour of Our Polk Plant

If you have access to the Internet, you can now take an online tour of the new Polk Power Station, whether you're in Tampa, Toledo or Timbuktu!

Just check out "Tampa Electric Online," our site on the World Wide Web (**http://www.teco.net**), and go to the Polk Power Station home page in the "News & Information" section to explore this new, state-of-the-art power plant.

When you click on the images in this virtual tour, you'll have a chance to get a closeup, interactive look at some of the key components and innovative equipment in this first-of-its-kind power generating facility.

Surf's up at the Polk Power Station. Visit us on the Net!

Questions & Comments Welcome

If you have any questions or comments about the Polk Power Station, please call Al Dorsett in Tampa Electric's Mulberry Customer Service Office at (941) 425-4988.

Reliability Goes Up While Prices Go Down

Tampa Electric has achieved its goal of bringing online our clean, highly efficient Polk Power Station without increasing prices.

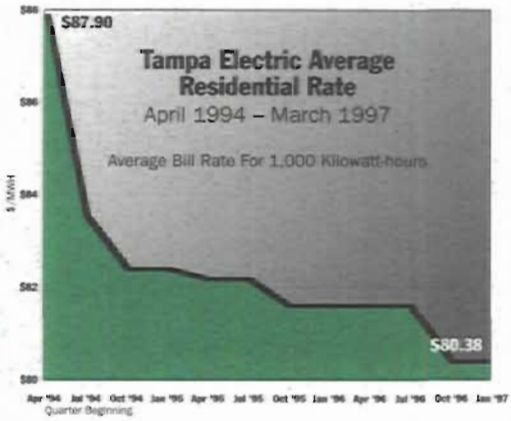
Through a series of agreements with the Florida Office of Public Counsel and the Florida Industrial Power Users Group, and after approval by the Florida Public Service Commission, Tampa Electric Company has brought into service its Polk Power Station without increasing base rates through 1999.

In addition, a refund of a portion of the revenues that previously were deferred to offset the costs of the new Polk plant will appear as a credit on Customers' electric bills.

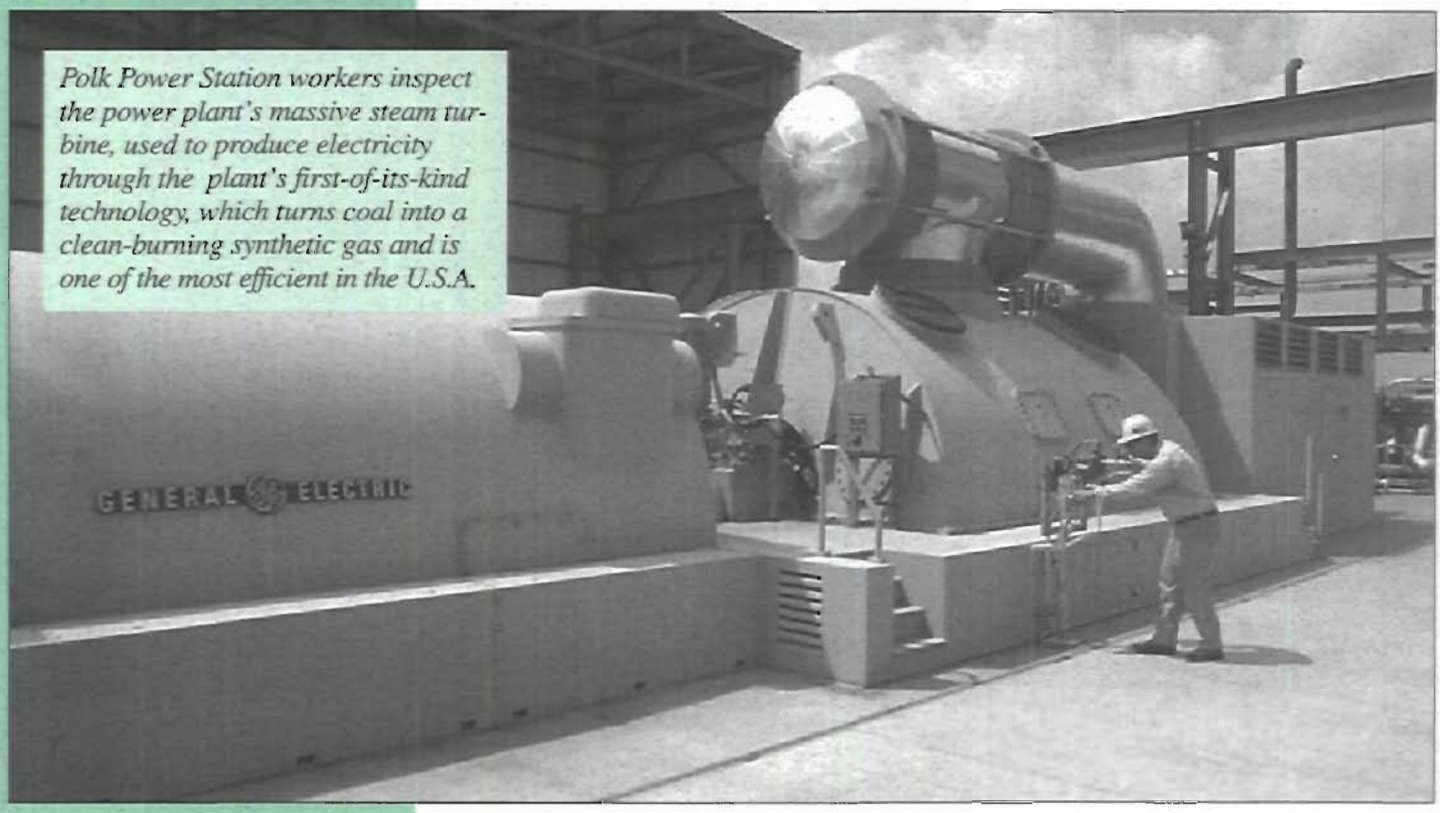
The rate reduction will continue to be issued as a credit on our Customers' electric bills each month for the next 27 months.

For a typical Tampa Electric residential Customer using 1,000 kilowatt-hours per month, the refund amounts to $1.73. When combined with the company's fuel adjustment, the actual monthly credit results in a $1.20 decrease per 1,000 KWH for the next six months.

So, while we're also increasing our ability to deliver reliable power to West Central Florida, we've managed to reduce our Customers' monthly electric bills while freezing base rates for the next three years.



▲ *This chart shows how Tampa Electric's average monthly residential rate has steadily declined over the past three years.*



Polk Power Station workers inspect the power plant's massive steam turbine, used to produce electricity through the plant's first-of-its-kind technology, which turns coal into a clean-burning synthetic gas and is one of the most efficient in the U.S.A.

Polk's Economy to Benefit from Power Plant

The new power plant we're operating in Polk County will contribute to the local economy by generating 75 new jobs and adding as much as $4 million a year to Polk's tax base.

Here's how this investment in Polk County's future will help support efforts to enhance the quality of life in Polk County and ensure a brighter tomorrow:

Providing jobs – A team of nearly 75 full-time personnel employed by Tampa Electric will manage and operate the Polk Power Station. The company has recruited individuals who are multi-skilled and multi-functional to be part of a high-performance operations team. Annual payroll in 1997 is expected to exceed $4 million.

Contributions to the economy – In addition to growing Polk County's tax base, the wage and tax contributions will have a further positive impact as they work their way through the local economy.

Specifically, the monies provided to local government in the form of property taxes will be spent on community-related projects and services which will be provided primarily by area businesses and citizens. This income, in turn, will be respent, creating further local business activity.

The same is true of wages received by the employees of the Polk plant, which will be used locally to purchase food and gasoline, plus other goods and services.

The effects of the initial contributions and the secondary impacts are estimated to have a final total economic impact on the Polk community of around $16 million.

Integrated-gasification, combined-cycle process specialists monitor the Polk Power Station's generation output inside the power plant's computerized control room.

STARTUP *(Continued from page 1)*

operating in the United States today.

In fact, the new plant uses state-of-the-art technology which will contribute to saving Customers nearly $62 million in costs compared to Tampa Electric's next best alternative for meeting Customers' power needs.

"The Polk Power Station sets the nation's standard for the clean use of coal in generating electricity," said Polk Power Station general manager Charles Shelnut. "All the major equipment, including the power block and the coal gasification equipment, is now in operation."

Already, fuel shipments are being delivered to the plant site. The fuel is being transported from Tampa Electric's Big Bend Station in South Hillsborough County, using trucks which are traveling primarily on State Roads 674 and 672.

"We've made efforts to minimize the effect of the truck traffic through these areas by making round-the-clock deliveries to the Polk site," said Shelnut. "This will help spread out the traffic so residents and businesses won't notice a significant traffic increase."

Tampa Electric also worked closely with the Florida Department of Transportation to complete roadway improvements in the Polk plant area to further reduce the impact of truck traffic bringing coal to the site.

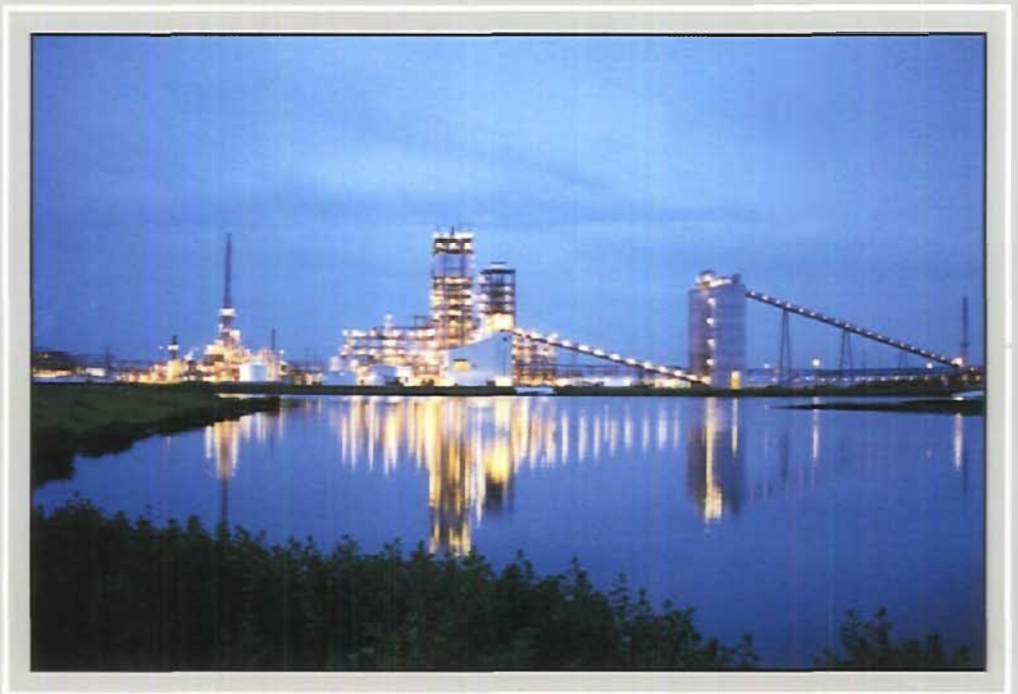
"I appreciate the support the local community has shown us as this project has progressed," said Shelnut. "Their interest and cooperation has been tremendous, and we owe them a big 'thank you' for helping make this project a success and for the welcome mat they extended to Tampa Electric."

POLK POWER STATION

TOPICAL REPORT NUMBER 6

OCTOBER 1996

CLEAN COAL TECHNOLOGY



The Tampa Electric Integrated Gasification Combined-Cycle Project

The Tampa Electric Integrated Gasification Combined-Cycle Project

Demonstration of an Advanced 250 Megawatt Integrated Gasification Combined-Cycle Power Plant

A report on a project conducted jointly
under a cooperative agreement between:

The U.S. Department of Energy and Tampa Electric Company

Cover image: The Polk Power Plant site as seen from across the lake in early evening.
Photography courtesy of Lee Schmoe, Bechtel Power Corporation.

TAMPA ELECTRIC
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Preparation and printing of this document conforms to the general funding provisions of a cooperative agreement between Tampa Electric Company and the U.S. Department of Energy. The funding contribution of the industrial participant permitted inclusion of multicolored artwork and photographs at no additional expense to the U.S. Government.

CLEAN COAL TECHNOLOGY

The Tampa Electric Integrated Gasification Combined-Cycle Project

Introduction and Executive Summary

Coal is America's most abundant fossil fuel. Its combustion creates the steam that produces 65 percent of this country's electricity. The burning of coal, however, liberates two types of gases that have been linked to the formation of acid rain: nitrogen oxides (NO_x) and sulfur dioxide (SO_2).

With the passage of each successive piece of clean air legislation over the years, the electric utility industry has been made increasingly aware that it would eventually have to reduce both types of emissions from existing and new power plants to environmentally acceptable levels.

The Clean Coal Technology (CCT) Demonstration Program is a government and industry co-funded program to furnish the U.S. energy marketplace with advanced, more efficient and environmentally responsible coal-utilizing technologies.

A multi-phased effort consisting of five separate solicitations was administered by the U.S. Department of Energy (DOE). Projects selected are a new generation of innovative coal utilization processes that are being demonstrated in "showcase" projects conducted across the country.

These projects are on a scale sufficiently large to demonstrate commercial worthiness and generate data for design, construction, operation and technical/economic evaluation of full-scale commercial applications.

Integrated Gasification Combined Cycle

Among the technologies being demonstrated in the CCT program is Integrated Gasification Combined Cycle (IGCC). IGCC is an innovative electric power generation technology that combines modern coal gasification with gas turbine and steam power generation technologies. Syngas produced by a gasifier is cleaned and burned in a gas turbine to produce electric power. Heat recovered from the hot turbine's exhaust produces steam that turns a steam turbine generator to produce more electricity.

IGCC power plants are environmentally acceptable and easily sited. Atmospheric emissions of pollutants are low. Water use is lower than conventional coal-based generation because gas turbine units require no cooling water, an especially important consideration in areas of limited water resources.

Due to their high efficiency, less coal is used per megawatt-hour of output, causing IGCC power plants to emit less carbon dioxide (CO_2) to the atmosphere, thereby decreasing global warming concerns. Less coal use also reduces disposal requirements for ash or slag if there is no market for these materials.

Repowering is an excellent application for IGCC. Such applications utilize an existing power plant site and are more economical than greenfield applications. Costs are lower because an existing steam turbine is used, less site development is required, and the permitting process is accelerated.

Both greenfield and repowering IGCC applications could provide the flexibility needed for utility compliance planning for sulfur dioxide (SO_2) emissions in the next century. Providing 25 percent of coal-based electricity by IGCC would result in emissions less than 0.4 million of the 11.8 million tons/yr of SO_2 emissions allowable under the Clean Air Act Amendments (CAAA).

Modularity and fuel flexibility are other important attributes of IGCC power plants. Before the gasifier is constructed, the combined cycle unit can be operated on other fuels, such as natural gas or fuel oil, to provide early power. The size of gas turbine units can be chosen to meet specific power requirements. The ability to operate on multiple fuels allows continued operation of the gas turbine unit if the gasifier island is shut down for maintenance or repairs, or if warranted by fuel costs.

IGCC power plants use plentiful and relatively inexpensive coal as their fuel. In the United States there are several hundred years of reserves, and use of coal helps to reduce dependence on foreign oil.

IGCC has potential for significant reduction in capital costs over today's technologies, per kW of generation. These, in part, arise from higher possible efficiencies compared to today's impressive IGCC values.

Efficiency improvements are expected to result from design improvements which increase overall steam and thermal integration, use of higher firing temperature gas turbines, and other technology enhancements such as hot-gas cleanup and nitrogen injections. Other contributors to reduced capital costs are: economies of scale, reduced engineering costs, and improvements resulting from operating experience.

Executive Summary

The Tampa Electric Integrated Gasification Combined-Cycle Project (the Project) was selected by DOE as a CCT Program Round III demonstration project. Demonstration of this advanced IGCC power plant was initiated in October, 1996.

The Participant is Tampa Electric Company (TEC), headquartered in Tampa, Florida. TEC signed a Cooperative Agreement with DOE to conduct the Project in July 1992. Its service area includes the city of Tampa and covers a 2000 square mile area in west-central Florida.

The greenfield site is located south of Lakeland, Polk County, Florida. The Project is demonstrating use of Texaco's coal gasification process to fuel an advanced General Electric gas turbine generator whose exhaust is integrated with a heat recovery steam generator (HRSG) and a steam turbine generator to produce electric power.

About 96 percent of sulfur contaminants are removed by a combination of advanced hot-gas cleanup and conventional cold-gas cleanup technologies. Ninety percent of the gasification product gas, termed syngas, is cleaned by cold-gas cleanup and 10 percent by hot-gas cleanup. Sulfur is recovered as sulfuric acid and sold, as is the slag by-product of gasification.

TEC is demonstrating an advanced moving bed hot-gas desulfurization technology because of its potential for improving IGCC performance and costs.

A primary potential advantage of hot-gas cleanup is an increase in power plant efficiency because cleaning does not require the syngas to be cooled to near-ambient temperature (used for cold-gas cleanup) and resultant energy losses are eliminated. Further, there is no process waste water condensate.

The hot moving bed desulfurization system being demonstrated in this Project captures residual dust contained in the fuel gas, and downstream sintered metal barrier filters capture the balance.

In contrast to cold-gas cleanup, the hot-gas cleanup technologies have not yet been commercially demonstrated.

The combined cycle unit is based on an advanced General Electric gas turbine unit that produces 192 MWe. The steam turbine produces 121 MWe. Parasitic power consumes 63 MWe with the net power output being 250 MWe.

The demonstration also includes integration of nitrogen from the air separation plant with the gas turbine. Steam produced at various gas cooling stages is integrated with the HRSG and supplies various process needs. The facility processes approximately 2300 tons per day of Pittsburgh No. 8 bituminous coal, with a sulfur content of 2.5–3.5 percent.

SO_2 emissions will be 0.21 lb/million Btu input; NO_x emissions will be 0.27 lb/million Btu input. The design heat rate of the plant is an impressive 8600 Btu/kWh (40 percent net thermal efficiency) on a higher heating value basis. The cost of the Project including land acquisition, site development and allowance for funds used during construction (AFUDC) is about $506 million. DOE is providing about $142 million.

The first two-year demonstration period began in October, 1996 and will involve testing four Eastern U.S. bituminous coals. The following two-year period will involve continued development of operating/maintenance and reliability data on fuels selected by TEC.

IGCC Advantages

- A Clean Environment
- High Efficiency
- Low Cost Electricity
- Potential for Low Capital Costs
- Repowering of Existing Plants
- Modularity
- Fuel Flexibility
- Phased Construction
- Low Water Use
- Low CO_2 Emissions
- Public Acceptability

The Tampa Electric Integrated Gasification Combined-Cycle Project

Background

Coal gasification has been used for many years. Primitive coal gasification provided town gas worldwide more than 100 years ago, and a gasification industry produced coal-based transportation fuels for Germany in World War II.

Today coal gasification is seeing increasing use. In the United States, Texaco's gasification technology is utilized at Eastman Chemical's Kingsport, Tennessee facility. The product is a synthesis gas for production of methanol. The Dakota Gasification plant in North Dakota produces synthetic natural gas and chemicals based on an advanced World War II gasification technology.

Overseas, a major chemical and transportation fuel industry exists in the Republic of South Africa, mostly based upon advancements of World War II gasification technologies. An IGCC power plant is in operation in The Netherlands. There are several German gasifiers that are commercially available. Texaco gasifiers are in commercial operation, or planned operation, in the People's Republic of China and other nations.

Advanced gasification and IGCC technology development began in the U.S. about 25 years ago, the stimuli being the desire for: (1) development of coal-based replacements for natural gas and oil due to shortages and price increases; and (2) more efficient, clean coal-based power plants.

Modern IGCC technology is a response of the U.S. government and industry to these needs. Such systems use advanced pressurized coal gasifiers to produce a fuel for gas turbine-based electric power generation; the hot turbine exhaust produces steam to generate additional electricity.

Texaco coal gasification technology stems from its partial oxidation technology that was developed following World War II, in which natural gas and refinery bottoms were partially oxidized

at high temperatures to produce a synthesis gas for refinery use.

The first commercial scale use of a Texaco gasifier in a U.S. IGCC project was the Cool Water project. This project received major support from the U.S. Synthetic Fuels Corporation, Southern California Edison Company, U.S. DOE, Electric Power Research Institute, Bechtel Power Corporation, and others. The Cool Water project was instrumental in proving the feasibility of IGCC, including its exceptionally good performance in reducing atmospheric emissions.

Gas turbines for power generation have been one of the outgrowths of jet aircraft engine development. At the end of 1994, gas turbines contributed about 12 percent (59,600 MWe) of the fossil fuel-based generating capability of U.S. electric utilities. Gas turbine generation capability increased by 23 percent over the period 1990–1994 even though the total fossil-based generation capability increased by only one percent.

This increasing use is due to technology advances, relatively low cost per kW, and shorter construction time than conventional generation. Advances in design and materials have led to major increases in the size and performance capability of gas turbine units. Still more efficient models are expected to be available in the near future.

DOE projects that, over the period of 1994–2015, the proportion and amount of gas turbine and combined-cycle based generation will increase. These will constitute 78 percent (197,000 MWe) of the projected total new capacity of utility plus non-utility generators (252,000 MWe).

IGCC technologies demonstrated in the CCT program are expected to provide a significant share of this new generation.

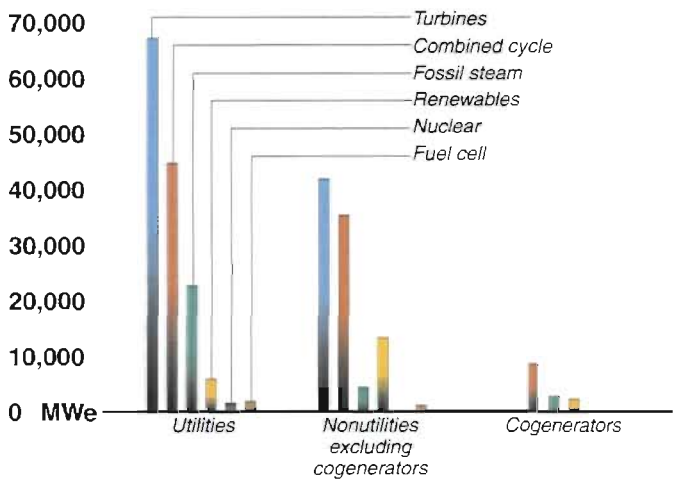
Today's IGCC is efficient because of major improvements that have taken place in coal gasification and gas turbine technologies, and a high degree of system integration that efficiently recovers and uses waste heat.

Atmospheric emissions are low due to the availability of proven technologies for highly effective removal of sulfur and other contaminants from the fuel gas.

The Texaco gasifier is in the largest structure, which also contains the radiant syngas cooler. The hot gas cleanup system is installed in the smaller of the two large structures. In the foreground is the air separation unit.

The sulfuric acid plant is located in the foreground and the gasifier and radiant syngas cooler are in the tall midground structure.

New Generating Capacity Forecast 1994–2015



DOE projects that over the period 1994–2015, gas turbine and combined-cycle based generation will be 78 percent (197,000 MWe) of the total new capacity additions of utility plus non-utility generators (252,000 MWe).

Source: U.S. Energy Information Administration, 1996

Project Benefits

The Tampa Electric Integrated Gasification Combined-Cycle Project is expected to demonstrate very low environmental impacts and will be one of the most efficient power plants operating in the United States.

The 250 MWe output of the power plant will help Tampa Electric Company (TEC), the participant in this project with the U.S. Department of Energy (DOE), meet its customers' needs and provide low-cost base load power. Benefits will be realized by both the customers and the environment—customers through low-cost reliable power and the environment because of very low emissions and relatively low use of natural resources.

A successful demonstration will help to provide the impetus for future use of IGCC technology throughout the U.S. The Project participants will benefit through sales and licensing of their products.

The Project will also benefit the local area. Approximately 1500 acres of the plant site have been converted by TEC from phosphate mining spoils to wetlands and uplands.The restoration provides habitat for native plants and animals.

A peak total of 1400 construction jobs were created, and 75 full-time new jobs were created for operation and maintenance of the IGCC power plant. Contract labor is utilized as required for additional maintenance.

There are new jobs for coal truck drivers, and other secondary employment related to plant operation. The economy will benefit through payment of as much as $7.0 million per year in additional taxes by TEC.

Project Description

Project Participant

TEC is an investor owned electric utility headquartered in Tampa, Florida. It is the principal wholly owned subsidiary of TECO Energy, Inc., an energy related holding company heavily involved in coal mining, transportation and power generation.

TEC presently has about 3400 MWe of generating capacity, about 99 percent from coal-fired units. TEC serves an area of about 2000 square miles in west central Florida. TECO Power Services (TPS), another subsidiary of TECO Energy, operates a 295 MWe natural gas fired combined cycle power plant in Florida, with the electric power being sold under long-term power sales agreements.

TPS developed the Project and has been performing project management throughout. Under terms of the Cooperative Agreement TPS plans to commercialize the Project IGCC technology.

Major Participants

TEC has selected major technology suppliers for this project that are experienced and successful in their respective industries. They include Texaco Development Corporation, as the licensor of the coal gasification technology and related services; Bechtel Power Corporation, for detailed engineering, procurement, start-up and construction management; General Electric, as the supplier of combined cycle equipment; and GE Environmental Services, Inc., designer of the hot-gas cleanup system.

Site Description

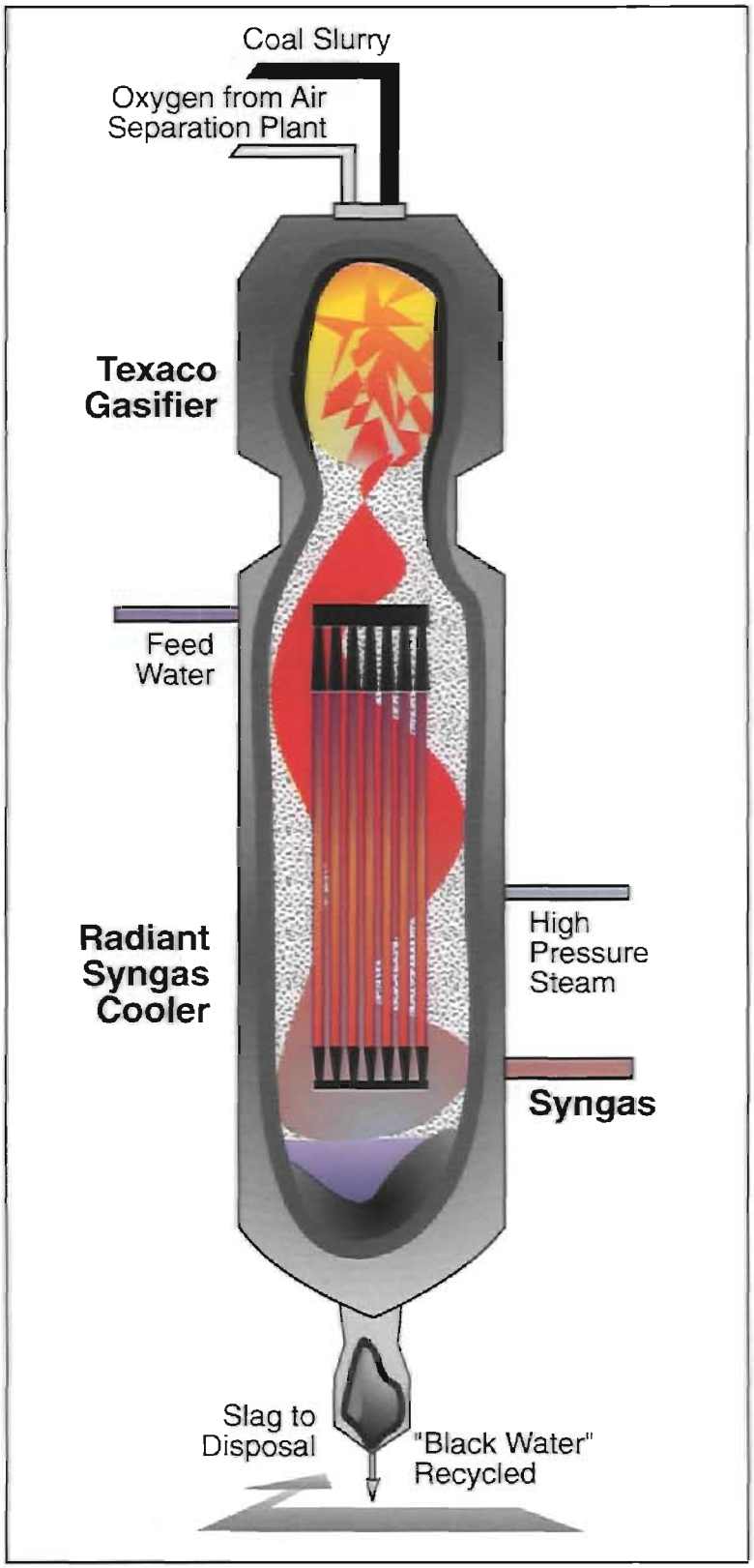
The Project is Unit 1 of the new Polk Power Plant, located in south central Polk

IGCC Inputs and Outputs

Inputs	Quantity, tons/day
Coal	2000
Oxygen	1974
Slurry water (recycled)	884
Nitrogen to gas turbine	6024
Solids Output	
Slag/fines from dewatering pit	311
Dry solids from brine concentrator	2.8
98% Sulfuric Acid	218
Net Electrical Output	250 MWe

Major Participants

Tampa Electric Company	Owner/operator
TECO Power Services Corporation	Project management and commercialization
Texaco Development Corporation	Licensor of gasification technology
General Electric Corporation	Supplier of gas turbine/combined cycle equipment
GE Environmental Services, Inc.	Designer of hot-gas cleanup system
Bechtel Power Corporation	Detailed engineering/construction management services, procurement , and startup
MAN Gutehoffnüngshutte AG	Supplier of radiant syngas cooling system
L. & C. Steinmüller Gmbh	Supplier of convective syngas cooling system
Air Products & Chemicals, Inc.	Turnkey supplier for air separation unit
Monsanto Enviro-Chem Systems, Inc.	Turnkey supplier for sulfuric acid plant
H.B. Zachry Company	Power block construction
The Industrial Company	Gasification area construction
Johnson Brothers Corporation	Site development and civil contractor
Aqua-Chem, Inc.	Supplier of brine concentration plant
Davenport Mammoet Heavy Transport	Transportation/erection of radiant syngas cooler



A single Texaco gasifier processes 2000 tons per day of coal at about 2500°–2700°F (1371°–1482°C) to produce a raw syngas and molten slag. The gas flows downward into the radiant syngas cooler where it is partly cooled and high pressure steam for power generation is produced. Slag is collected in a water pool at the bottom of the radiant syngas cooler and removed.

County, central Florida. The 4348 acre site is located about 45 miles southeast of Tampa and 17 miles south of Lakeland in the heart of central Florida's phosphate mining region.

The Polk site is on a tract of land that was previously mined for phosphate rock and has been redeveloped and revegetated by TEC for this project.

The site area is predominantly rural. Polk County is an important citrus-raising and phosphate mining center, each being important Florida industries.

About a third of the site is used for power generation facilites. Another third is used to enhance the environment by creation of public fishing lakes for the Florida Fish and Game Commission. Transfer of these 1511 acres is expected to take place before April 1997. The final third of the site is primarily for access and providing a visual buffer.

The site contains an 850 acre cooling reservoir. State Highway 37 crosses the site about one mile from the IGCC power plant.

Power Plant Description

The Project is demonstrating advanced IGCC technology for production of 250 MWe in a commercial, electric utility environment on a greenfield site. It is demonstrating the integrated performance of a Texaco gasifier, metal oxide hot-gas cleanup system, conventional cold-gas cleanup, and an advanced gas turbine with nitrogen injection (from the air separation plant) for power augmentation and NO_x control.

Makeup water for the power plant is provided from on-site wells. All process water is recycled.

Texaco gasifier

Coal is delivered to the site by truck from a transloading facility at TEC's Big Bend Station in Apollo Beach, Florida. Once on site, the coal is conveyed from coal silos and fed to the grinding mill

with recycled process water and makeup water from on-site wells.

The project gasifies about 2000 tons per day of coal in a single gasifier. The Texaco gasifier has been commercially proven in several applications and the scaleup, of less than a factor of two, to this throughput is not considered to pose a high level of risk.

Coal is slurried in water, and reacted in the gasifier with 95 percent pure oxygen (from the air separation unit) to produce a high temperature, high pressure, medium-Btu synthesis gas, also known as syngas.

The raw syngas is partly cooled by a high temperature radiant heat recovery unit prior to subsequent cooling stages. Molten coal ash flows from the bottom of the radiant syngas cooler into a water-filled quench chamber where it solidifies into a marketable slag by-product. The slag has been found by the U.S. Environmental Protection Agency (EPA) to be non-leaching.

After additional cooling of the raw syngas stream in parallel convective heat exchangers the stream is split into streams for both hot- and cold-gas cleanup to remove sulfur compounds and other contaminants.

Cold-gas cleanup

Cold-gas clean-up is the primary method because the specific technologies utilized are proven effective, reliable and commercially available.

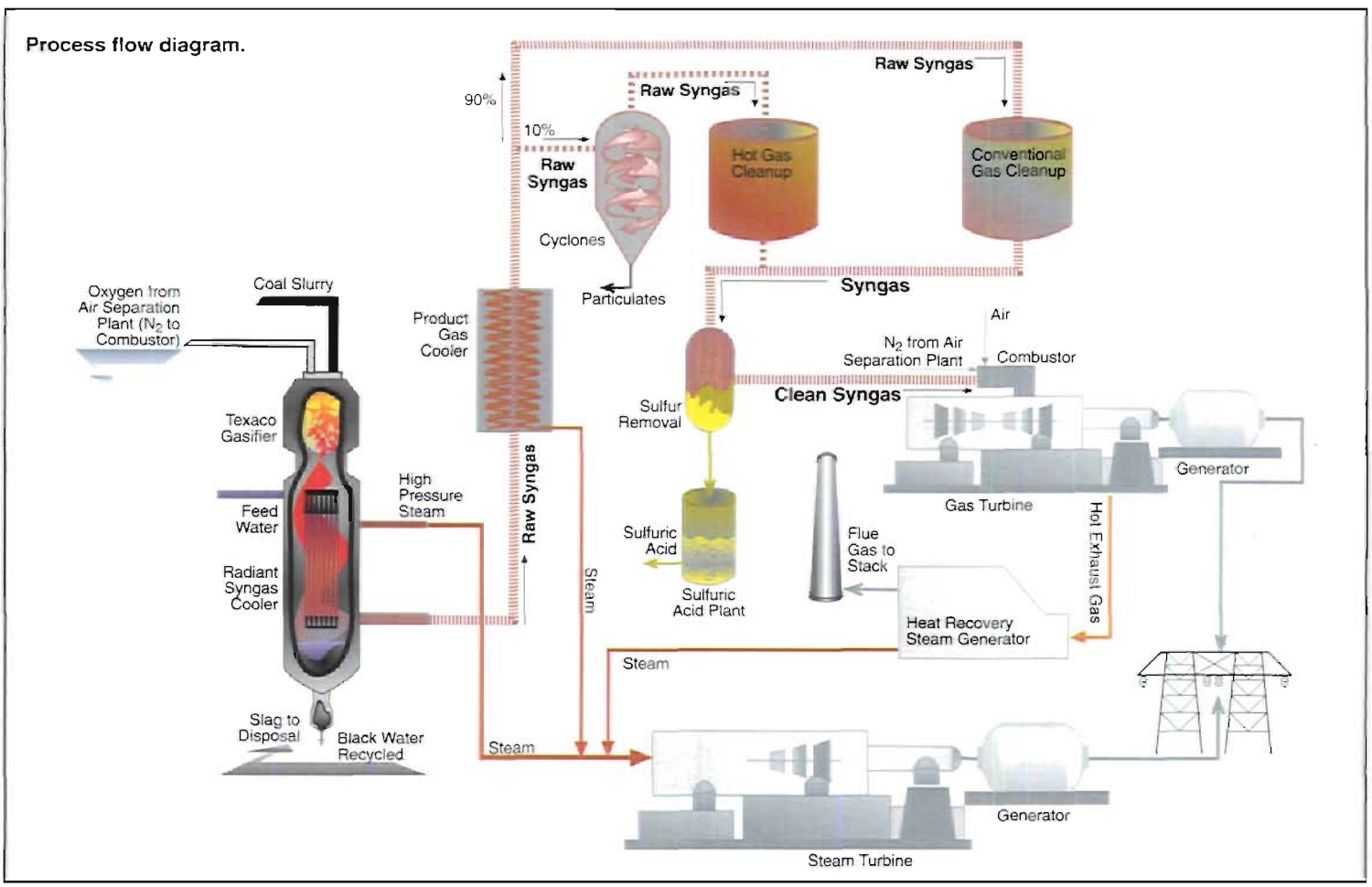
Ninety percent of the syngas is cleaned by the cold-gas cleanup, but the system is designed to accommodate the full production of syngas if performance of the hot-gas cleanup system is unacceptable.

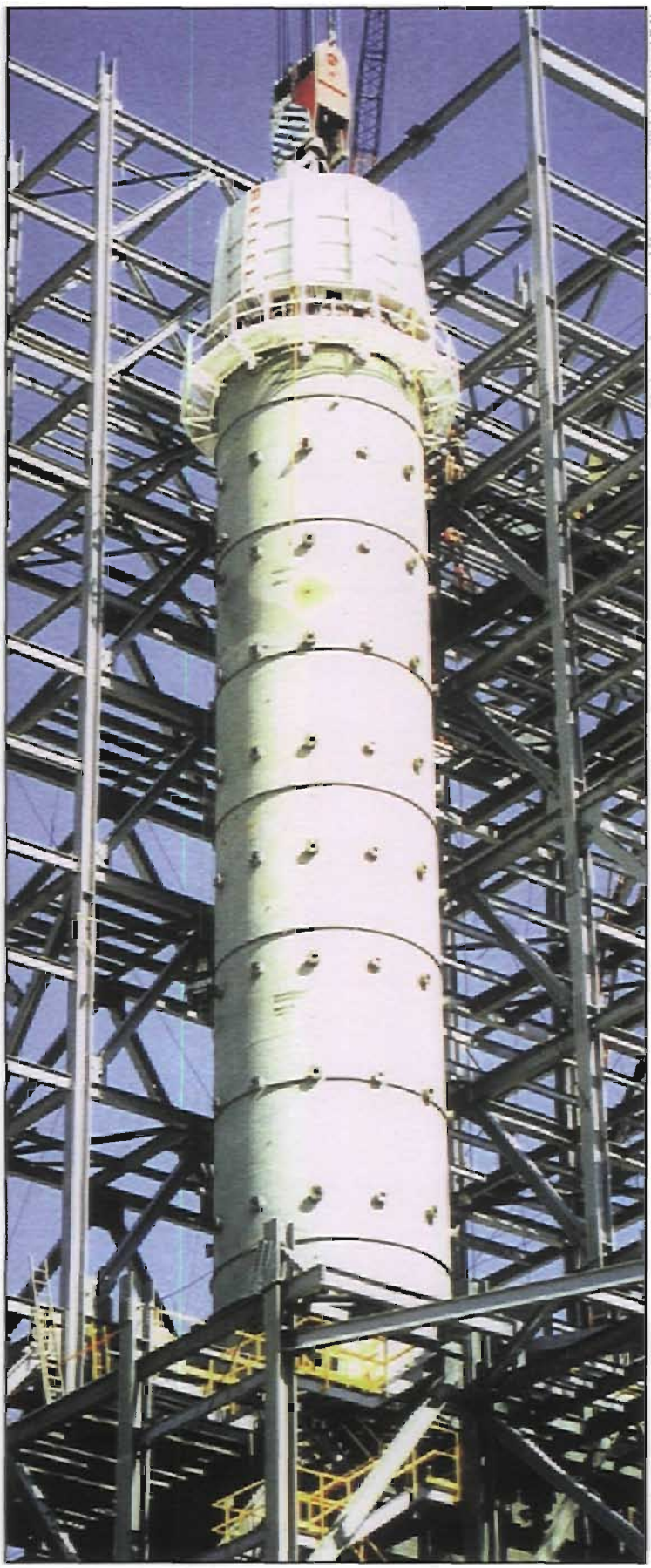
Typical Coal Analysis
(Pittsburgh No. 8 Seam)

Ultimate Analysis	*As-Received, wt%*
Moisture	4.74
Carbon	73.76
Hydrogen	4.72
Nitrogen	1.39
Chlorine	0.10
Sulfur	2.45
Ash	7.88
Oxygen	4.96
Total	**100.0**

As-Received
Higher Heating Value, Btu/lb 13,290

Process flow diagram.





Photograph courtesy of Mammoet Decalift International B.V.

Installation of radiant syngas cooler.

The raw hot syngas is cooled to 100°F for cold-gas cleanup by conventional acid gas removal technology. This portion of the plant is based upon absorption of H_2S by a liquid amine compound and is capable of processing 100 percent of the syngas produced by the gasifier. Steam stripping removes the absorbed H_2S which then flows to the sulfuric acid plant.

Hot-gas cleanup

The potential advantage of hot-gas cleanup is that it increases overall power plant thermal efficiency because energy losses in cooling the syngas to near ambient temperature (used for cold-gas cleanup) are eliminated. Costs are reduced compared to cold-gas cleanup because less gas cooling and other process equipment is needed.

To evaluate these potential benefits, TEC included hot-gas cleanup to clean 10 percent of the syngas. GE Environmental Services' advanced intermittently moving bed hot-gas cleanup system is utilized. This technology and the sorbents used show important promise but are not yet proven in commercial operation.

In the hot-gas cleanup system, the syngas first passes through two cyclones to remove entrained dust. Sodium bicarbonate ($NaHCO_3$) is added before the second cyclone to capture trace amounts of chlorides and fluorides in the syngas for protection of gas turbine components.

The hot-gas desulfurization unit operates at 900°F (482°C). It is an intermittently moving bed of a metal oxide based sorbent that removes sulfur-containing compounds (mainly hydrogen sulfide [H_2S]) and residual dust in the syngas.

Regeneration of the metal sulfides produced by syngas desulfurization takes place in a separate vessel utilizing oxygen and nitrogen. The original metal oxide is restored and the product sulfur dioxide (SO_2) flows to the sulfuric acid plant.

This is the first unit to demonstrate advanced moving bed metal oxide hot-gas desulfurization technology on a commercial scale.

Power island

Combined, the cleaned syngas streams have a heating value of about 265 Btu per standard cubic foot (higher heating value basis). It is sent to the advanced General Electric model MS 7001F gas turbine of the combined cycle power island where it is burned. About 192 MWe of electric power is produced. The pressure of the gasifier was selected to match the inlet pressure requirement of the gas turbine.

Nitrogen from the air separation unit (at 98 percent purity) is mixed with the syngas at the gas turbine combustor to give the following benefits to the power plant: (1) the enhanced mass flow through the gas turbine produces more power than without the nitrogen; (2) the overall efficiency of the system is enhanced; and (3) low levels of NO_x emissions are obtained.

Hot exhaust from the gas turbine unit passes through a heat recovery steam generator (HRSG) where three pressure levels of steam are produced. The majority of the steam is at high pressure and, with high pressure steam produced in the gasification stage, drives a reheat steam turbine-generator to produce about 121 MWe. Flue gas exits through a 150 foot stack. A flare is provided to dispose of syngas produced during startup, shutdown, and during transient operations.

Power consumption within the facility is 63 MWe, resulting in a net power output of 250 MWe.

The net power plant heat rate is an impressive 8600 Btu/kWh (about 40 percent efficiency), higher heating value basis. A 230 kV, five-mile transmission line connects the power plant to the TEC grid.

Simplified Chemistry

TEXACO GASIFIER

C (coal)	+	O_2	$\xrightarrow{2700^\circ F}$	CO_2	+	Heat
C (coal)	+	H_2O (steam)	$\xrightarrow{2700^\circ F}$	CO	+	H_2

HOT GAS CLEANUP

Desulfurization

MO (metal oxide)	+	H_2S	$\xrightarrow{900^\circ F}$	MS (metal sulfide)	+	H_2O
MO	+	COS	$\xrightarrow{900^\circ F}$	MS	+	CO_2

Regeneration

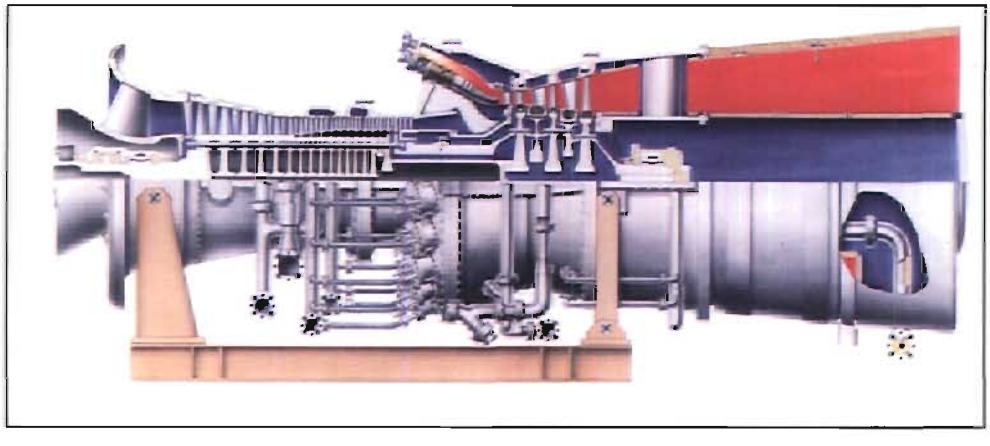
MS	+	1.5 O_2	$\xrightarrow{1200^\circ F}$	MO	+	SO_2

Other operations

The sulfuric acid plant converts the SO_2 and H_2S from the hot- and cold-gas cleanup systems to sulfuric acid which is sold in the sulfuric acid trading market. Production is about 200 tons per day.

A brine concentration unit processes a blowdown stream discharged from the process water systems and discharges a reusable water stream for slurry preparation and salts which will be marketed or disposed of in a permitted landfill.

General Electric model MS 7001F gas turbine



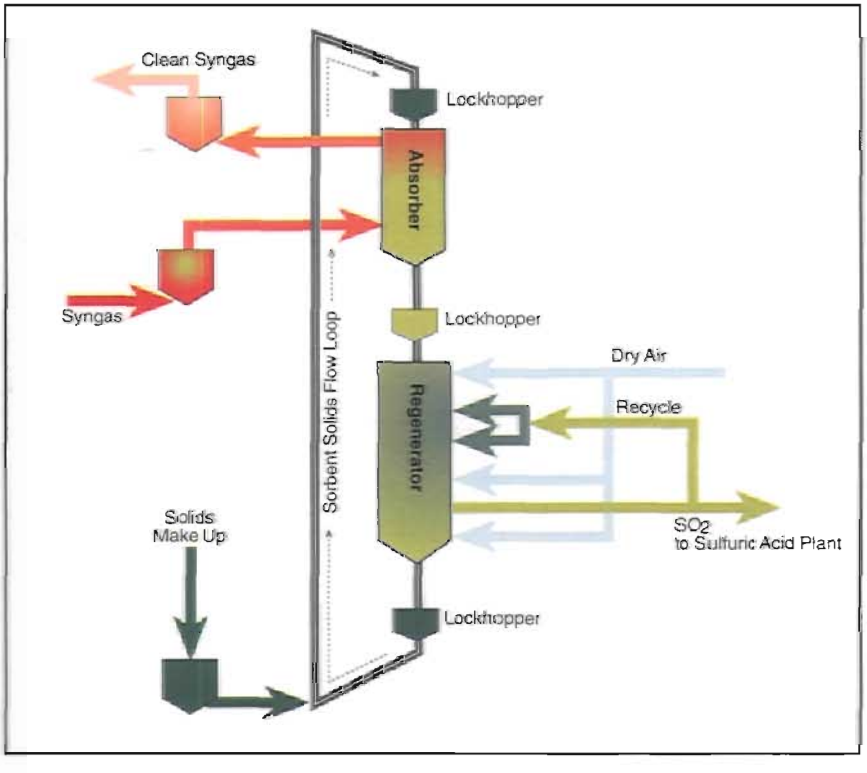
Cleaned Syngas Composition

Delivered to Gas Turbine, Volume %

Constituent	*Hot-Gas Cleanup*	*Cold-Gas Cleanup*
Carbon monoxide	35.6	48.3
Hydrogen	27.0	33.8
Carbon dioxide	12.6	10.0
Methane	0.1	0.2
Water	18.6	0.5
Nitrogen	5.8	6.1
Argon	0.0	1.1
Hydrogen sulfide	94.0 ppmv	8.4 ppmv
Carbonyl sulfide	0.0	127.0 ppmv
Ammonia	0.1 ppmv	0.0 ppmv

About 10 percent of the syngas is cleaned by hot-gas cleanup and up to 100 percent by cold-gas cleanup.

General Electric Intermittent Moving Bed Hot Gas Desulfurization System.



Process Description

Texaco Gasification

Texaco coal gasification technology uses a single-stage, downward-firing, entrained-flow coal gasifier in which a coal/water slurry (60–70 percent coal) and 95 percent pure oxygen are fed to a hot gasifier. At a temperature of about 2700°F (1482°C), the coal reacts with oxygen to produce raw fuel gas (syngas) and molten ash.

The hot gas flows downward into a radiant syngas cooler where high pressure steam is produced. The syngas passes over the surface of a pool of water at the bottom of the radiant syngas cooler and exits the vessel. The slag drops into the water pool and is fed from the radiant syngas cooler sump to a lockhopper. The radiant syngas cooler is about 17 feet in diameter, 100 feet long, and weighs about 900 tons. The "black" water flowing out with the slag is separated and recycled after processing in the dewatering system.

Gas Cleanup

Gas cleanup equipment in an IGCC power plant is relatively inexpensive compared to flue gas cleanup in a conventional coal-steam power plant. Smaller equipment is required because a much smaller volume of gas is cleaned.

The gas volume is smaller because contaminants are removed from the pressurized fuel gas before combustion. In contrast, the volume of flue gas from a coal-steam power plant is 40–60 times greater because the flue gas is cleaned at atmospheric pressure.

Cold-Gas Cleanup

The raw syngas exiting the radiant syngas cooler is first sent to parallel convective syngas coolers. Ninety percent of the syngas flows to the cold-gas cleanup system where it is first treated in water scrubbers for removal of entrained solids and the gas then flows to the low temperature syngas cooling

system. The scrubber bottoms are routed to the "black" water handling system where the solids are separated. The effluent is concentrated and crystallized as a solid form that is shipped off-site either for reuse or disposal in a permitted landfill. The separated water is recycled for slurry coal feed.

The particulate-free gas is water-washed to remove contaminants that would degrade the sorbent in the absorber. The wash water is sent to the ammonia stripper. The washed syngas flows to the amine absorber where the H_2S and some of the CO_2 (acid gases) are absorbed. The "rich" amine is stripped of acid gas in the stripper. The amine is recycled and the separated acid gas is routed to the sulfuric acid plant.

The cold-gas cleanup system is designed to accept 100 percent of the raw syngas.

Hot-Gas Cleanup

This unit is designed to handle 10 percent of the hot, raw syngas. Entrained fine particles in the hot syngas are removed in the primary cyclone and sent to the "black" water handling system. The exiting gas is injected with sodium bicarbonate and then enters a secondary cyclone where halogen compounds (primarily chlorides and fluorides) in the gas are chemically absorbed. Halogens are removed to minimize corrosion of the gas turbine. Solids collected from the second cyclone are sent off-site for disposal in a permitted landfill and the gas flows to the absorber.

A large fraction of any remaining particulate matter entering the absorber is captured by the bed of mixed metal oxide sorbent.

The absorber is an intermittently moving bed reactor. Syngas, containing H_2S and carbonyl sulfide (COS), enters the bottom of the absorber and flows countercurrent to the moving bed of sorbent pellets. The sulfur compounds react with sorbent to form metal sulfides. Syngas exiting the absorber is expected to contain a maximum of 30 parts per million of H_2S and COS.

Regeneration of the spent sorbent is important to avoid excessive sorbent replacement costs. In this part of the hot gas cleanup process the sulfide is converted back to the oxide.

Sulfided sorbent is fed from the absorber lockhopper to the top of the regenerator where oxidation occurs. The sorbent moves down the regenerator in concurrent flow with the regeneration gas.

Temperature control is important to prevent damage to the sorbent structure at temperatures that are too high. Conversion of metal sulfide to the inactive sulfate occurs at temperatures that are too low.

The final regeneration step occurs at the lower stage of the regenerator where nitrogen flows countercurrent to the sorbent. This stream cools the sorbent, purges the SO_2-rich off gas and ensures complete regeneration without sulfate formation.

Recycled regenerator effluent gas is used as a diluent for air to control the temperature by means of a heat exchanger in the loop. Steam is generated and utilized in the combined cycle unit. A small amount of sorbent fines is entrained in the gas stream and collected in a high efficiency barrier filter that removes fines larger than five microns (99.5 percent removal of particulates). Collected solids are sent offsite for disposal.

Larger sorbent particles entrained in the gas stream are collected on screens at the regenerator sorbent outlet; fugitive fines from the screens are collected in a small baghouse.

Combined Cycle Power Generation

The gas turbine is a General Electric model MS 7001F, designed for low-NO_x emissions when firing sygnas and with low sulfur fuel oil that is used for startup and backup. Rated output from the hydrogen cooled generator on syngas is 192 MWe. The gas turbine is an advanced turbine that has been proven in a utility environment.

Nitrogen is used as a syngas diluent to reduce NO_x formation and also to increase mass flow, resulting in a higher gas turbine power output.

The HRSG is a three-pressure design with natural circulation and reheat. The steam turbine is a double flow reheat unit with low pressure extraction. Nominal steam inlet conditions are 1450 psig and 1000°F with 1000°F reheat temperature. Expected generator output during normal operation is 121 MWe.

Air Separation Unit

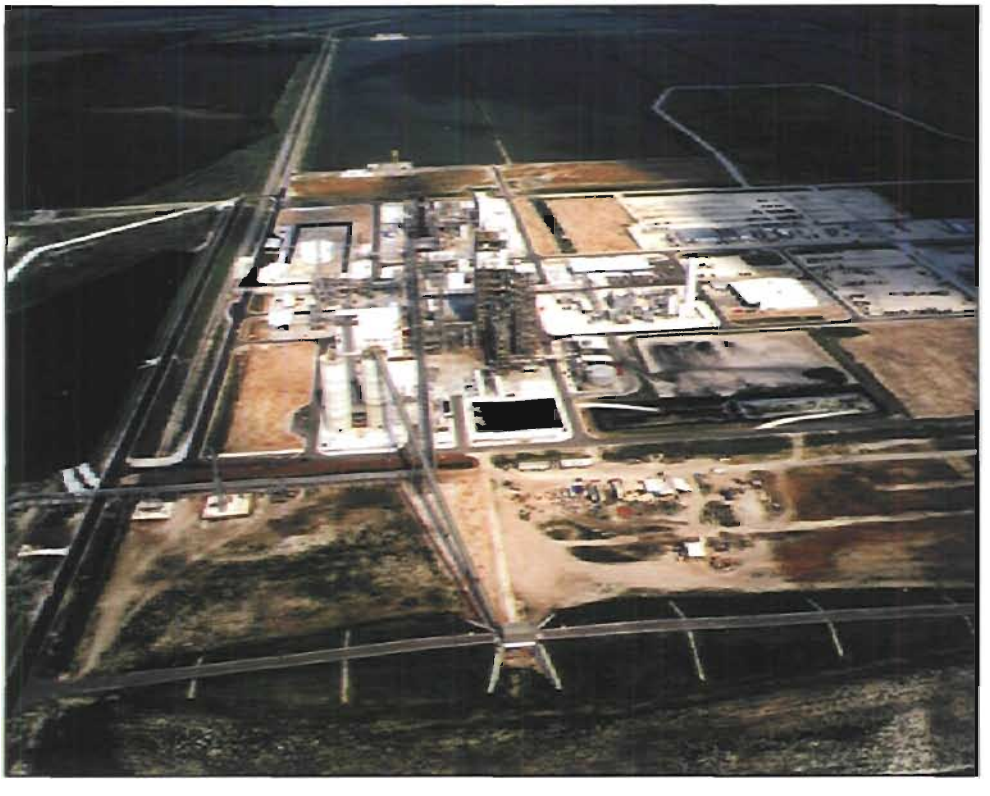
The air separation unit provides 95 percent pure oxygen for the gasifier operation, and warmed compressed nitrogen for the gas turbine. Low pressure 95 percent oxygen is also supplied to the sulfuric acid plant.

Sulfuric Acid Plant

In the sulfuric acid plant, the sulfur containing gases from the hot- and cold-gas cleanup systems are converted to 98 percent sulfuric acid for sale to the local Florida fertilizer industry. The H_2S from the cold-gas cleanup unit is combusted to SO_2 and mixed with hot gases containing SO_2 from the hot-gas cleanup unit. The combustion product gas stream, which also contains sulfur trioxide (SO_3) and sulfuric acid (H_2SO_4), is cooled.

The gas is converted to 98 percent H_2SO_4 (about 200 tons per day are produced) after passing through three catalyst beds charged with vanadium pentoxide catalyst. Oxygen is utilized for conversion of SO_2 to SO_3 in the process. After separation of H_2SO_4, the concentration of SO_2 remaining in the gas stream is low enough to permit direct discharge to the atmosphere through a 200 foot stack.

Polk Site before (above) and after (below) construction.



Environmental Considerations

The Tampa Electric Integrated Gasification Combined-Cycle Project is designed to have low environmental impacts. Emissions to the atmosphere are low because they are controlled by technologies that are very effective.

The site was selected by an independent Community Siting Task Force, commissioned by TEC. Members included environmentalists, educators, economists, and community leaders. Environmental impact was a primary driver in the choice of acceptable sites for the plant. Economic factors were also considered. The Task Force considered 35 sites in six counties and recommended three in southwestern Polk County that had previously been mined for phosphate.

The U.S. Environmental Protection Agency (EPA), the lead federal agency, issued the final Environmental Impact Statement for this project in June, 1994. Favorable records of decision were issued by EPA, U.S. Army Corps of Engineers, and DOE by August, 1994. Some of the inputs for this comprehensive document were provided by TEC and its environmental consultants .

All federal, state, and local environmental permits have been obtained. An Environmental Monitoring Plan developed by TEC gives details of the performance monitoring of environmental control equipment, stack emissions, and also for the site and surrounding area.

Costs/Schedule/ Demonstration Milestones

The estimated cost of the Tampa Electric Integrated Gasification Combined-Cycle Project including the operation and testing phase is approximately $506 million. DOE is providing about $142 million.

Work on the project was initiated with the completion of an agreement between TEC and DOE in July 1992. Site, environmental and permitting, engineering, procurement and construction activities were completed since then. Groundbreaking took place in November, 1994, and the facility was released to operations in October 1996.

The four-year demonstration program began in October, 1996. Data are being gathered on power plant performance, including environmental performance. Operation will be on four Eastern U.S. bituminous coals. Data will be collected involving systems performance and operating and maintenance costs. Information on startup, shut down and ramp rates will be gathered and evaluated. Behavior of the gas cleanup systems will be established and emissions monitored.

Selected Startup Milestones Achieved

- Initial roll of the steam turbine: June, 1996
- Sulfuric acid plant and gasifier completion: June, 1996
- Completion of the hot-gas cleanup system: July, 1996
- Start demonstration program: October, 1996

Allowed Stack Emissions

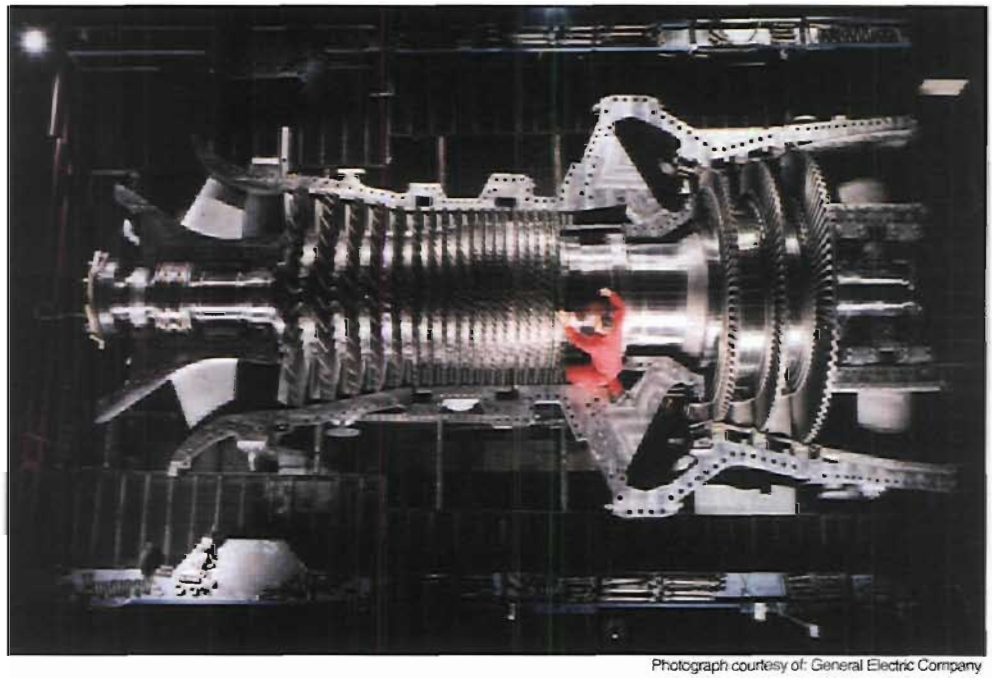
(at 15 percent excess oxygen)

	Allowed Emissions, pounds/hour	
Pollutant	*During First Two Years of Demonstration*	*After First Two Years of Demonstration*
SO_2	518	357
NO_x	664	223
CO	99	98
VOC	3	3
PM/PM-10	17	17

Power Output

Gas Turbine	192 MWe
Steam Turbine	121 MWe
Gross	***313 MWe***
Auxiliaries Power Use	63 MWe
Net Power Output	***250 MWe***

Gas turbine, model MS 7001F, during manufacture.



Photograph courtesy of: General Electric Company

Gasifier Run Summary

Start Date	Major Accomplishments
7/96	First production of syngas
8/96	Achieved steady state in process water system
8/96	First utilization of low temperature gas cooling system
9/96	Achieved 100% gasifier load, first syngas to gas turbine, and first production of brine crystals
9/96	First integration of steam drums
10/96	First run >100 hours, full load gas turbine and combined cycle operation on syngas, and first production of sulfuric acid.

The sulfuric acid plant is in the foreground and the combined-cycle unit is in the background. The large black object (left center) is the heat recovery steam generator.

Preliminary Results

All construction activities at the Polk Power Plant have been completed. TEC also completed the reclamation of wetlands on both sides of State Highway 37 that crosses the site.

The Project power plant entered the demonstration phase in October 1996. Operating on a Pittsburgh No. 8 bituminous coal, results achieved have been positive and encouraging.

A 101.6 hour run of the IGCC system was conducted in mid-October. Long term stable operation and full capacity were achieved. These are critical elements of the demonstration since they are necessary precursors to the conduct of acceptance tests for the coal-gas cleanup and sulfuric acid plant systems downstream of the gasifier.

Operating on syngas as well as distillate fuel, the unit has achieved full load on the combustion turbine and steam turbine. As planned, the combustion turbine achieved the design values of 192 MWe on syngas, and 121 MWe from the steam turbine, for a total output of 313 MWe. The nitrogen injection system operated as expected.

As of the end of October, 1996 the unit was operated only in the cold-gas cleanup mode. Work continues on check-out of the hot-gas cleanup systems and equipment; as of the publication date sorbent was loaded and attrition testing underway.

Controls tuning continues and when completed, performance testing of the IGCC system and equipment will be conducted.

As a result of its solid operating experience in the test program, the combined cycle unit has been made available for operation on distillate fuel to help meet TEC's load on an as-needed basis.

By-product evaluation is in progress. The brine concentration system has produced chloride crystals which will be evaluated by potential purchasers for reuse. The sulfuric acid plant has produced sulfuric acid which will be sold through the sulfuric acid trading market in Florida. The slag is being evaluated by the purchaser to determine how it will be utilized.

Testing of the IGCC system is planned to optimize operation, improve overall cycle efficiency and achieve emission targets. TEC will begin with parametric testing of key subsystems, including the hot-gas cleanup system. Four types of coals will be used in accordance with the demonstration test plan.

Future Developments

The achievements and knowledge gained from the Tampa Electric Integrated Gasification Combined-Cycle Project demonstration are expected to benefit future users of this technology. Evaluation of advanced features of the Project will determine their viability for future commercial applications. Future commercial offerings of the technology would be expected to be lower in cost and improved in performance.

DOE believes that future IGCC greenfield power plants, based upon mature and improved technology, will cost in the range of $1000–1350/kW (1995 basis). Heat rate is expected to be in the range of 7000–7500 Btu/kWh (46–49 percent efficiency), higher heating value basis. Costs will be further reduced if an existing steam turbine is repowered and existing site infrastructure utilized.

Dawn arrives over the reclaimed wetlands surrounding the Tampa Electric Integrated Gasification Combined-Cycle Project

The Clean Coal Technology Program

The Clean Coal Technology (CCT) Program is a unique partnership between the federal government and industry that has as its primary goal the successful introduction of new clean coal utilization technologies into the energy marketplace.With its roots in the acid rain debate of the 1980s, the program is on the verge of meeting its early objective of broadening the range of technological solutions available to eliminate acid rain concerns associated with coal use. Moreover, the program has evolved and has been expanded to address the need for new, high-efficiency power-generating technologies that will allow coal to continue to be a fuel option well into the 21st century.

Begun in 1985 and expanded in 1987 consistent with the recommendation of the U.S. and Canadian Special Envoys on Acid Rain, the program has been implemented through a series of five nationwide competitive solicitations. Each solicitation has been associated with specific government funding and program objectives. After five solicitations, the CCT Program comprises a total of 40 projects located in 18 states with a capital investment value of nearly $6.0 billion. DOE's share of the total project costs is about $2.0 billion, or approximately 34 percent of the total. The projects' industrial participants (i.e., the non-DOE participants) are providing the remainder—nearly $4.0 billion.

Clean coal technologies being demonstrated under the CCT Program are establishing a technology base that will enable the nation to meet more stringent energy and environmental goals. Most of the demonstrations are being conducted at commercial scale, in actual user environments, and under circumstances typical of commercial operations.These features allow the potential of the technologies to be evaluated in their intended commercial applications. Each application addresses one of the following four market sectors:

- Advanced electric power generation
- Environmental control devices
- Coal processing for clean fuels
- Industrial applications

Given its programmatic success, the CCT Program serves as a model for other cooperative government/industry programs aimed at introducing new technologies into the commercial marketplace.

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This report is available on the Internet
at the U.S. DOE, Office of Fossil Energy's homepage: www.fe.doe.gov

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List of Acronyms and Abbreviations

Btu	British thermal unit
CCT	Clean Coal Technology
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
HRSG	heat recovery steam generator
IGCC	integrated gasification combined cycle
kV	kilovolt
kWh	kilowatt hour
MWe	megawatt electric
ppmvd	parts per million by volume, dry
TEC	Tampa Electric Company
TPS	TECO Power Services Corporation
PM	particulate matter
PM-10	particulate matter less than 10 micometers in diameter
VOC	volatile organic compounds

1050233

DEP Lead 1/5/94

Intent Draft BACT - No Changes on Final. Copy of Signed Final Page Attached DE 3/17/94

Best Available Control Technology (BACT) Determination
Tampa Electric Company
Polk County
PSD-FL-194
PA-92-32

The applicant is proposing to construct, in phases, a 1,150 MW power plant in Polk County. The proposed facilities will be known as the Tampa Electric Company Polk Power Station. The first phase will consist of an Integrated Coal Gasification Combined Cycle (IGCC) unit with heat recovery steam generator (HRSG) and steam turbine (ST) for a nominal net 260 MW IGCC unit. The coal-fueled advanced CT will be capable of baseload operations (i.e., 100 percent capacity factor) on syngas, while retaining the option to fire fuel oil as backup (maximum 10 percent capacity factor). Units proposed to be added at Polk Power Station include two combined cycle (CC) units totaling 440 MW (nominal) and six simple cycle (SC) CTs totaling 450 MW (nominal). All of these units will be fired with natural gas as the primary fuel and No. 2 fuel oil as backup. The phased schedule for construction and operation of the proposed generating units at the Polk Power Station is presented in Table 1.

Table 1

Proposed Schedule for Construction and Operation of Generating Units for ultimate capacity at the Polk Power Station Site

Activity/Unit	Start Construction	Completion/ In-Service
Advanced CT, CG & HRSG/ST for 260-MW IGCC unit[a]	First Half 1994	July 1995
75-MW CT	April 1998	January 1999
75-MW CT	April 1999	January 2000
HRSG/ST for conversion of two 75-MW CTs for 220-MW CC unit	April 2000	January 2001
75-MW CT	April 2001	January 2002
220-MW CC	April 2001	January 2003
75-MW CT	April 2005	January 2006
75-MW CT	April 2006	January 2007
75-MW CT	April 2007	January 2008
75-MW CT	April 2008	January 2009
75-MW CT	April 2009	January 2010

a - 220 MW when fired on fuel oil and operated in CC mode.

The IGCC unit will be supported in part through funding from the U.S. Department of Energy (DOE) under the Clean Coal Technology Demonstration Program. Under the program, the IGCC unit will be used to demonstrate the integration of coal gasification (CG) and CC technologies and to demonstrate a more efficient method for removal of sulfur from syngas. The new cleanup technology is called hot gas clean up (HGCU). Conventional methods for sulfur removal for IGCC units require that the gas be cooled prior to cleaning, called cold gas cleanup (CGCU), and then reheated. By comparison, the HGCU technology efficiently cleans the gas at high temperatures, thereby increasing the overall plant efficiency. Under the agreement with DOE, Tampa Electric Company will demonstrate the HGCU system for a 2-year period.

The projected maximum tonnage of regulated air pollutants emitted from the proposed facility based on a 100 percent capacity factor and 8,760 hours per year are shown in Table 2. A simplified flow chart for the operation of the IGCC systems at the site is attached (Figures 1 - 3).

Table 2

Projected Maximum Annual Emissions (tpy)
for ultimate site capacity

Pollutant	IGCC[a]	+	CC[b]	+	SC[c]	=	Total	Significance Rate (tpy)
PM (TSP)	399		260		246		905	25
PM (PM_{10})	399		260		246		905	15
SO_2	2469		720		654		3843	40
NO_x	2923		1308		1014		5245	40
CO	453		1092		978		2523	100
VOC	45		180		168		393	40
Pb	0.15		0.28		0.17		0.6	0.6
H_2SO_4	241		80		72		393	7
Fluorides	0.92		0.17		0.10		1.2	3
Hg	0.12		0.21		0.19		0.5	0.1
Be	0.007		0.013		0.008		0.03	0.0004
Total reduced sulfur (including H_2S)	6.2		0		0		6.2	10

Rev. 2
06/18/93

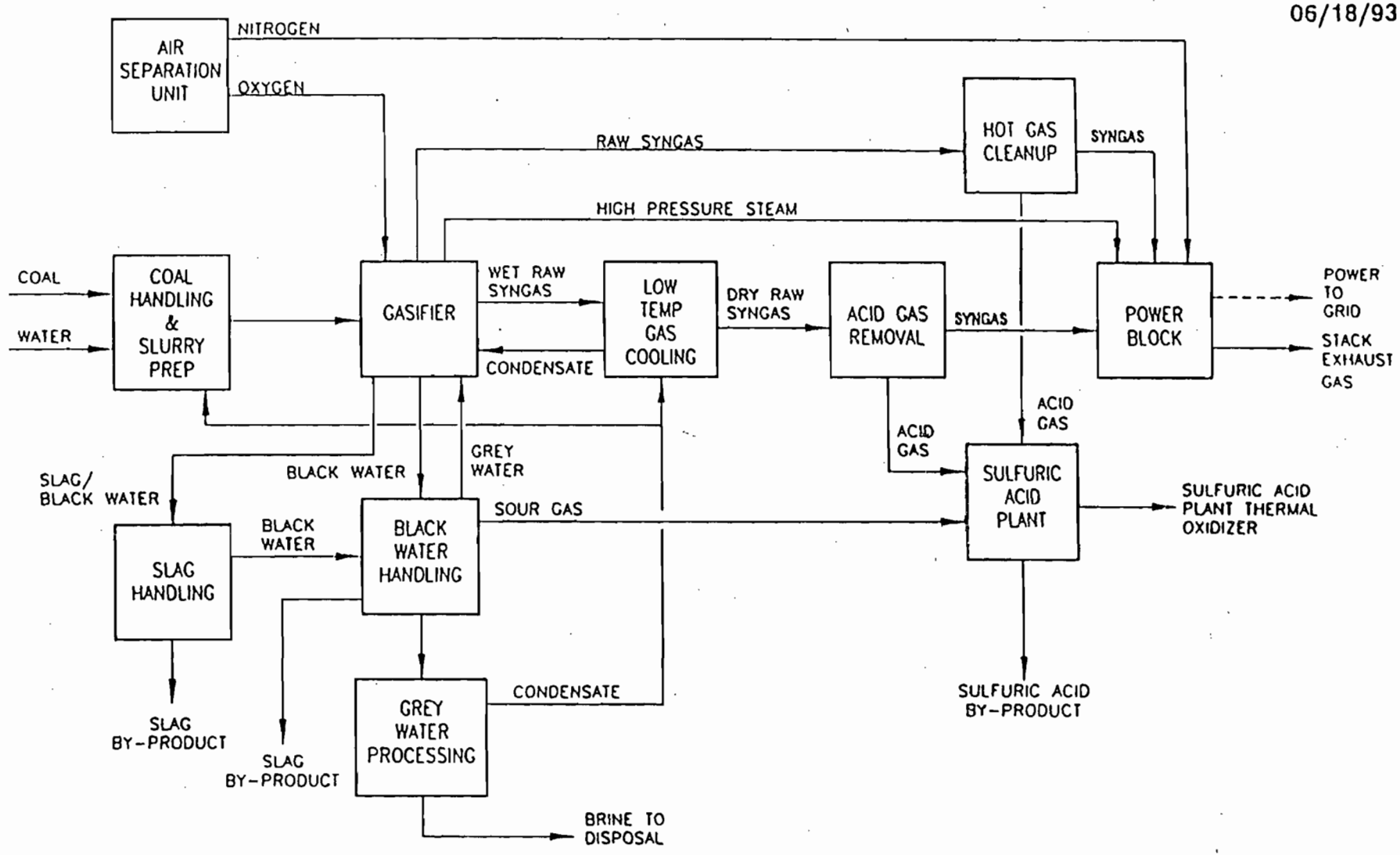

FIGURE 2-2.

GENERALIZED FLOW DIAGRAM OF IGCC SYSTEMS AND PROCESS

Source: ECT, 1993.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

FIGURE 2

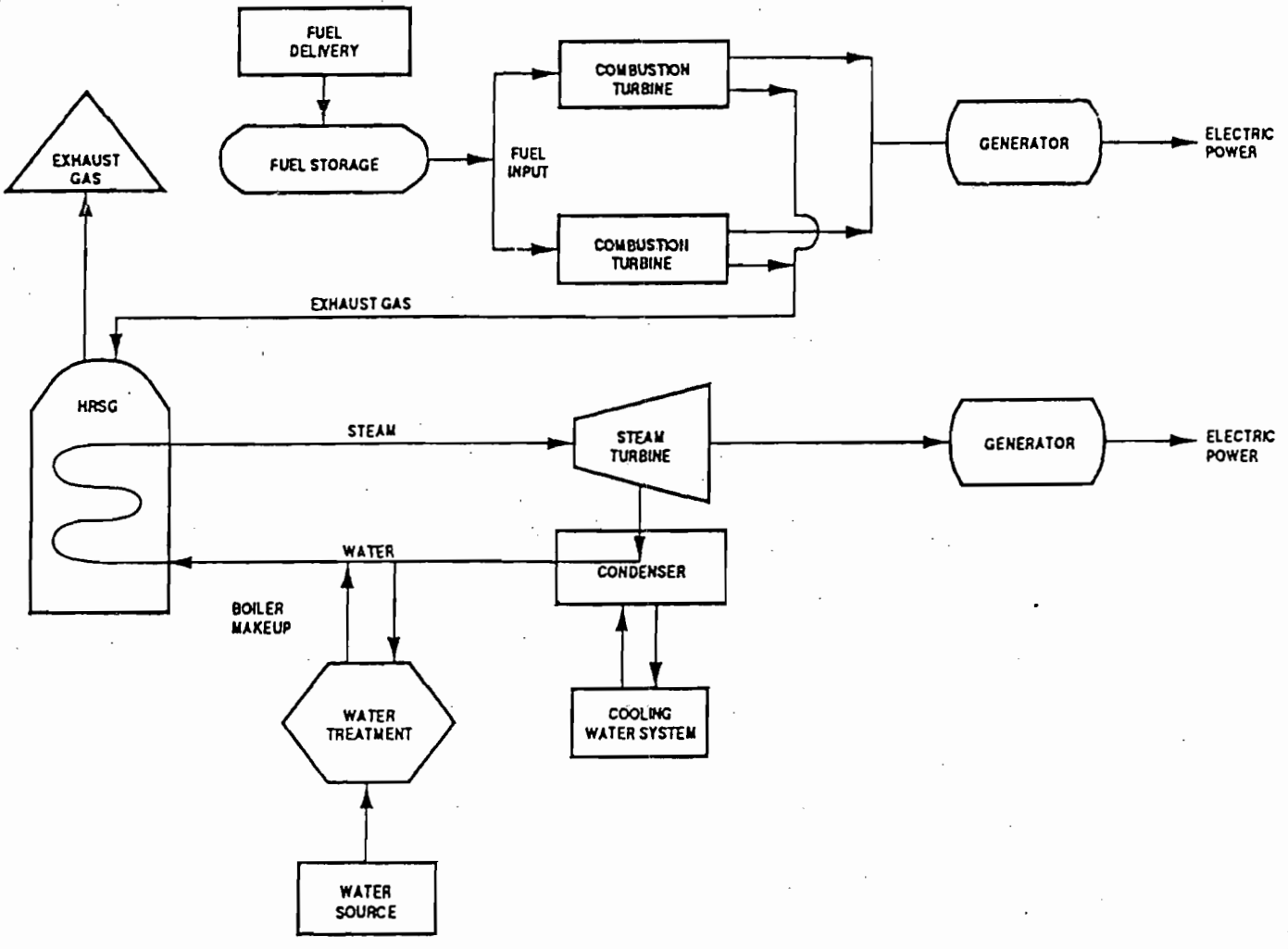

FIGURE 1.5.2-1.

SIMPLIFIED FLOW DIAGRAM OF COMBINED CYCLE POWER SYSTEM

Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

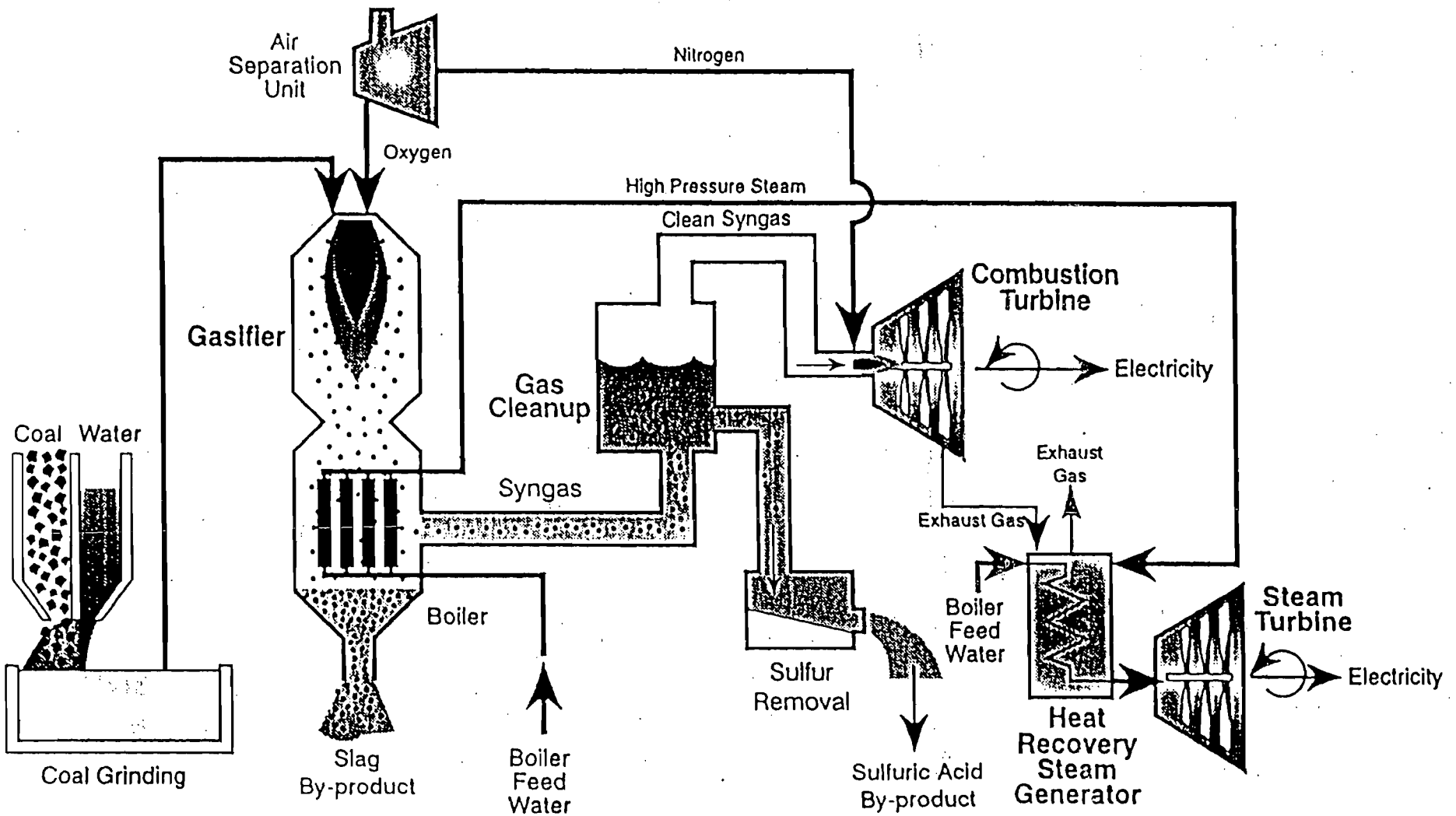

FIGURE 1.5.3-1.

SIMPLIFIED FLOW DIAGRAM OF INTEGRATED COAL GASIFICATION COMBINED CYCLE UNIT

Source: Texaco, 1992. Tampa Electric Company, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

a - IGCC emissions include the highest annual emissions estimates from the 7F CT (based on the larger of 100 percent CGCU or 50/50 CGCU/HGCU), plus related combustion emissions (e.g., thermal oxidizer), plus other associated process and fugitive emissions (PM, CO, VOC, and H_2S).

b - CC emissions represent the totals for four stand-alone CTs in CC mode.

c - SC emission represent the totals for six stand-alone CTs in simple cycle mode.

The proposed facility will also include one 49.5 MMBtu/hr auxiliary boiler fired with low sulfur (0.05% or less by weight) distillate fuel oil. The auxiliary boiler will operate only during startup and shutdown of the IGCC unit, or when steam from the IGCC unit's HRSG is unavailable. The auxiliary boiler will operate a maximum of 1,000 hours per year.

The coal gasification facility will serve as a source of medium Btu, low sulfur (0.07% or less, by weight, sulfur bearing compounds) coal-derived gas. The coal used in the gasification facility will have a maximum sulfur content of 3.05% and have a minimum heating value of approximately 11,035 Btu/lb. The coal gasification plant will consist of coal receiving, storage and process facilities, air separation unit, gasifier, product gas cleaning facilities, acid gas removal unit, and auxiliary equipment. The coal gasification unit will have two stacks, one flare stack used during startup, shutdown and emergency conditions and one thermal oxidation unit stack which will be used continuously.

The applicant has indicated the maximum tonnage of regulated air pollutants emitted from the IGCC unit CT during the initial phase, demonstration and post demonstration periods to be as shown in Table 3.

Table 3

Maximum Annual Emissions from IGCC Unit CT for Various Operating Configurations

Pollutant	Demonstration Period (tpy)[a]	Post-Demonstration Period (tpy)[b]
PM[c]	74.5	74.5
SO_2	2,269	1,564
NO_x	2,908	1,044
CO	430	430
VOC	38.5	38.5

H_2SO_4	241	241
Pb	0.13	0.067
Fluorides	0.92	0.92
Hg	0.11	0.017
Be	0.0029	0.0029

a - Based on baseload operations firing syngas, with a maximum of 8,760 hr/yr utilization of HGCU and up to 10 percent annual capacity factor firing fuel oil.

b - Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

c - Excluding sulfuric acid mist.

Florida Administrative Code Rule 17-212.400 requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in Table 1.

Date of Receipt of A BACT Application

September 21, 1992

BACT Determination Requested by the Applicant

Combined Cycle Units

Pollutant	Determination
NO_X	9 ppmvd (NG) 25 ppmvd (Syngas firing) 42 ppmvd (No. 2 fuel oil firing)
SO_2	Firing of NG or Syngas Fuel oil with a maximum sulfur content of 0.05 % by weight, 0.048 lb/MMBtu
CO	Combustion control 25 ppmvd (NG) 40 ppmvd (No. 2 fuel oil firing) 25 ppmvd (Syngas firing)
VOC	Combustion control 7 ppmvd (NG) 7 ppmvd (No. 2 fuel oil firing) 1 ppmvd (Syngas firing)

Particulates	Good combustion, and type of fuels fired
Pb	Good combustion, and type of fuels fired
H_2SO_4	Firing of NG, Syngas and No. 2 fuel oil
Be	Firing of NG, Syngas and No. 2 fuel oil
AS	Firing of NG, Syngas and No. 2 fuel oil

Coal Gasification Plant

Raw Product Gas

Pollutant	Control Technology
Sulfur	Acid Gas Removal (95.6%)
Particulates	Water scrubbing

The raw product gas is fired in the combined cycle combustion turbine units and emissions of product gas are included in the BACT determination for those units.

CG Emission (Thermal Oxidizer)

Pollutant	Control Technology
SO_2	Fuel oil firing with a sulfur content not to exceed 0.05% by weight. (45.3 lb/hr)
NO_x	Combustion controls
CO	Combustion controls
Pb	Efficient Operation
H_2SO_4	Efficient Operation
Mercury	Efficient Operation
Beryllium	Efficient Operation
Inorganic Arsenic	Efficient Operation

	Materials Handling and Storage
Fugitive Dust Source	Control Technology
Coal Unloading	Enclosed - including a Collection System
Conveyers and Transfer Points (Coal, Slag)	Transfer points enclosed with Collection System. Conveyers enclosed
Coal Storage and Reclaiming	Crusting Agent Application Wet Suppression Systems or Crusting Agents Surfactant Application[1]
Fuel Oil Storage	Bottom Loaded/Submerged Filling
	Auxiliary Boiler
NO_x	Low NOx Burners and Combustion Controls, limited operation[2] (0.159 lb/MMBtu)
SO_2	Fuel oil firing with a sulfur content not to exceed 0.05 % by weight, and limited operation (0.053 lb/MMBtu)
CO	Combustion Controls (0.087 lb/MMBtu)
VOC	Combustion Controls (0.0485 lb/MMBtu)
Particulates	Combustion Controls (0.061 lb/MMBtu)
Pb	Combustion Controls
Mercury	Combustion Controls
Beryllium	Combustion Controls
Inorganic Arsenic	Combustion Controls

1 - Total Coal Handling Sources PM Emissions are 11.2 tpy
2 - Maximum of 1000 hours of operation per year

Annual pollutant emissions are shown in Table 1 for all sources. Pollutant emission rates are listed in the section entitled "BACT Determination by DEP".

Flare Stacks

This source did not propose a BACT since its operation is expected to be infrequent (startup and shutdown, and emergencies).

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-296, Stationary Sources - Emission Standards, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from combined cycle power plants and coal fired power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- Combustion Products (Particulates and Heavy Metals). Controlled generally by good combustion of clean fuels and/or fabric filters.
- Products of Incomplete Combustion (CO, VOC, Toxic Organic Compounds). Control is largely achieved by proper combustion techniques.
- Acid Gases (SOx, NOx, HCL, Fl). Controlled generally by gaseous control devices.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

Combustion Products

The IGCC facility's projected emissions for combustion products (Particulate Matter (PM) and trace heavy metals) exceed the significant emission rates given in Florida Administrative Code Rule 17-212.410, Table 212.400-2. A review of the BACT/LAER Clearinghouse indicates that the proposed PM/PM_{10} emission level of 0.013 lbs/MMBtu (excluding H_2SO_4) for syngas for the IGCC unit is consistent with the particulate limit for recent determinations of coal fired boilers. The applicant proposed PM/PM_{10} emission level of 0.009 lbs/MMBtu for No. 2 oil firing for the IGCC unit is consistent with previous BACT determinations in Florida.

In general, the BACT/LAER Clearinghouse does not contain specific emission limits for beryllium, mercury and arsenic from turbines. BACT for heavy metals is typically represented by the level of particulate control. The emission factors for PM/PM_{10} when firing the IGCC with syngas and No. 2 fuel oil are judged to represent BACT for beryllium, arsenic and mercury.

PM/PM_{10} emissions are controlled for the auxiliary boiler by firing with No. 2 fuel oil with a sulfur concentration not to exceed 0.05%, by weight. This fuel sulfur level is consistent with recent BACT determinations for similar facilities.

Products of Incomplete Combustion

The emissions of carbon monoxide, volatile organic compounds and other organics from combustion turbines are largely dependent upon the completeness of combustion and the type of fuel used. The applicant has indicated that the carbon monoxide emissions from the proposed turbines are based on exhaust concentrations of 25 ppmvd for syngas and 30 ppmvd for No. 2 fuel oil. Volatile organic compound emissions have been based on exhaust concentrations of 7 and 1 ppmvd for fuel oil firing and syngas, respectively.

A review of the BACT/LAER clearinghouse indicates that several of the largest combustion turbines (those with heat inputs greater that 1,000 MMBtu/hour) have been permitted with CO limitations which are similar to those proposed by the applicant. For VOC, the clearinghouse also indicates that the proposed emissions are consistent with that established for other turbines of similar size, thereby suggesting that the proposed emission levels for both CO and VOC are reasonable. Although the majority of BACT emissions limitations have been based on combustion controls for carbon monoxide and volatile organic compounds minimization, additional control is achievable through the use of catalytic oxidation.

Catalytic oxidation is a post-combustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection for NO_x control. These installations have been required to utilize LAER technology, and typically have CO limits in the 10 ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, thereby reducing the amount of thermal energy required compared to thermal oxidation. For CC combustion turbines, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature and desired efficiency. Most gas turbine applications have been limited to smaller cogeneration facilities burning natural gas in nonattainment areas.

The application of oxidation catalyst is not being required as BACT for the IGCC unit due to high content of sulfur in the fuel. Syngas fuel which will be utilized at 100 percent capacity factor contains up to 0.07% by weight sulfur content. These sulfur compounds are oxidized to SO_2 in the combustion process and will be further oxidized by the catalyst to sulfur trioxide (SO_3). SO_3 will, in turn, combine with moisture in the gas stream to form H_2SO_4 mist. Therefore, the use of an oxidation catalyst system for the IGCC unit is not BACT due to corrosion problems.

Acid Gases - Sulfur Dioxide

The emissions of sulfur dioxide, nitrogen oxides, fluorides, and sulfuric acid mist, as well as other acid gases which are not "regulated" under the PSD Rule, represent a significant proportion of the total emissions and need to be controlled if deemed appropriate. Sulfur dioxide emissions from combustion turbines are directly related to the sulfur content of the fuel being combusted.

The IGCC facility's projected emissions for SO_2 exceed the significant emission rates given in Florida Administrative Code Rule 17-212.410, Table 212.400-2. A review of the BACT/LAER Clearinghouse indicates that the proposed post-demonstration SO_2 emission level of 0.17 lbs/MMBtu for syngas is consistent with the SO_2 limit for recent determinations of coal fired boilers.

For the IGCC combustion turbine, the applicant has proposed the use of Syngas, No. 2 fuel oil with a maximum sulfur content of 0.05%, by weight, and coal gasification to control sulfur dioxide emissions. In accordance with the "top down" BACT review approach, only two alternatives exist that would result in more stringent SO_2 emissions. These include the use of a lower sulfur content syngas and fuel oil or the use of wet lime or limestone-based scrubbers, otherwise known as flue gas desulfurization (FGD).

In developing the NSPS for stationary gas turbines, EPA recognized that FGD technology was inappropriate to apply to these combustion units. EPA acknowledged in the preamble of the proposed NSPS that "Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) to control SO_2 emissions from stationary gas turbines is considered unreasonable." EPA reinforced this point when, later on in the preamble, they stated that "FGD... would cost about two to three times as much as the gas turbine." The economic impact of applying FGD today would be no different.

Furthermore, the application of FGD would have negative environmental and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and water) costs associated with the operation

of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

Coal gasification sulfur content is controlled through fuel-production process controls. Sulfur removal stages in the coal gasification process include acid gas removal, and sulfuric acid plant thermal oxidizer. Acid gas removal systems remove hydrogen sulfide, carbonyl sulfide and carbon dioxide from the fuel gas using an acid gas absorbent solution. The acid gases are stripped from the adsorbent solution and sent to the sulfuric acid plant for introduction into a thermal oxidizer, where the remaining sulfur compounds are converted to SO_2, and finally converted to commercial grade liquid H_2SO_4. The overall sulfur removal efficiency is 95.6%. The sulfur bearing compounds content of the syngas is reduced to 0.07% by weight, or less.

The elimination of flue gas control as a BACT option then leaves the use of NG, CG with the sulfur removal process or low sulfur coal as the options to be investigated. The applicant has proposed the use of syngas, CG with sulfur removal or No. 2 fuel oil (maximum of 876 hours per year per IGCC combustion turbine) with a maximum sulfur content of 0.05%, by weight, as BACT for this project.

Although the applicant's proposed coal gasification acid gas cleanup process is an existing technology, development is continuing on coal gasification systems. The data base to determine whether the proposed post-demonstration sulfur bearing compounds level of 0.07% by weight is reasonable for a coal gasification facility with resulting proposed emissions of 0.17 lbs/MMBtu is limited. A commercial scale demonstration of an IGCC 100 MW power plant has been conducted adjacent to Southern California Edison's Cool Water generating station. During the Cool Water demonstration project, high sulfur coals, Illinois #6 and Pittsburgh #8, with a sulfur content of about 3.1 percent were tested. The SO_2 emission rate was 0.11 lbs/MMBtu for the Pittsburgh #8 coal and was even lower for the Illinois #6 coal (Technical Brief, Cool Water Coal Gasification Program: Commercial Scale Demonstration of IGCC Technology Completed, Electric Power Research Institute). The Polk Power Station IGCC unit has been designed for a larger capacity and is expected to be capable of using coals from various sources not included in the Cool Water demonstration project tests. Although, emission rates from the Cool Water tests are representative of the SO_2 emission range that can be achieved using IGCC units, the study was conducted as a demonstration project and the unit was later converted to another fuel source.

The Polk Power Station IGCC coal gasification system includes an option for both cold gas and hot gas cleanup and emissions from the Cool Water demonstration project are not directly comparable to the hot gas cleanup system. However, an objective of the hot gas cleanup system test is to demonstrate the efficiency in decreasing sulfur emissions compared to cold gas cleanup system.

Acid Gases - Nitrogen Oxides

The applicant has stated that BACT for nitrogen oxides for the IGCC unit will be met by using nitrogen diluent injection to limit emissions to 25 ppmvd at 15% oxygen when burning syngas, and water injection to achieve 42 ppmvd at 15% oxygen when burning No. 2 fuel oil. The emission limit of 25 ppmvd when burning syngas is higher compared to 9 ppmvd when burning NG in a combustion turbine due to the difference in composition and heat content between the two fuels. In contrast to natural gas which is predominately methane, syngas is composed of a variety of constituents including CO, hydrogen, CO_2, nitrogen, and water. The combustible components of syngas are primarily CO and hydrogen instead of methane. CO and hydrogen burn at a higher adiabatic flame temperature than methane and therefore can produce approximately three times as much NO_X as natural gas.

A review of EPA's BACT/LAER Clearinghouse indicates that the lowest NO_X emission limit established to date for a combustion turbine is 4.5 ppmvd at 15 percent oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system. The two 25 MW combustion turbines are located in Kern County, California and the degree of control at this facility exceeds BACT requirements.

Selective catalytic reduction is a post-combustion method for control of NO_X emissions. The SCR process combines vaporized ammonia with NO_X in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed.

The applicant has indicated that the cost effectiveness for the application of SCR technology to the Polk Power Station IGCC project was determined to be $4,935 per ton of NO_X removed for a 50% reduction of NO_X concentration from 25 ppmvd to 12.5 ppmvd. The cost impact analysis was conducted using the OAQPS factors and project-specific economic factors. An assessment of economics impacts was performed by comparing control costs between a baseline case of advanced combustion and nitrogen injection and baseline technology with the addition of SCR controls. Baseline technology is expected to achieve NO_X exhaust concentrations of 25 and 42 ppmvd at 15% oxygen for syngas and oil-firing, respectively. Based

on Japanese experience, SCR technology was premised to achieve NO_x concentration of 12.5 and 21 ppmvd at 15% oxygen for syngas and oil-firing, respectively, representing a 50% NO_x removal efficiency.

Since SCR has been determined to be BACT for several combined cycle facilities firing natural gas, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics. In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products Inc.), the following statement is made:

"In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

The auxiliary boiler is expected to operate 1,000 hours per year or less. The applicant is proposing to control SO_2 and acid gas emissions by firing with No. 2 fuel oil with a sulfur content of 0.05% or less, by weight, and by using combustion controls. Therefore, limited operation and low sulfur distillate oil represents BACT for the auxiliary boiler.

H_2SO_4 Plant Thermal Oxidizer

The predominant emission from the thermal oxidizer is sulfur dioxide. The sulfur dioxide emissions proposed for the facility are based on the highest removal efficiency that is now being maintained at other coal gasification facilities. This is accomplished by using an acid gas removal system followed by a sulfuric plant thermal oxidizer. This process is capable of providing an overall sulfur removal rate of 95.6 percent.

Fugitive Sources

The applicant has indicated that fugitive particulate emissions may result from the storage and handling of coal, slag, and sulfur. BACT for controlling these activities is good engineering design and practices. Control measures shall include the following:

- Minimize number of material transfer points
- Apply crusting agent application to inactive storage areas
- Enclose conveyers and transfer points
- Provide induced collection systems for dust

- Provide wet suppression systems (surfactant)
- Cover by-product storage areas (upon completion of cell)
- Handle and store sulfur in a molten or continuous crystalline state

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions.

Environmental Impact Analysis

The predominant environmental impacts associated with this proposal are related to the use of SCR for NO_x control. The use of SCR results in emissions of ammonia, which may increase with increasing levels of NO_x control. In addition, some catalysts may contain substances which are listed as hazardous waste, thereby creating an additional environmental burden. Although the use of SCR does have some environmental impacts, the disadvantages do not outweigh the benefit which would be provided by reducing nitrogen oxide emissions by 50 percent. The benefits of NO_x control by using SCR is substantiated by the fact that a number of BACT determinations have established SCR as the control measure for nitrogen oxides over the last five years for combustion turbines.

In addition to the criteria pollutants, the impacts of toxic pollutants associated with the combustion of syngas and No. 2 fuel oil have been evaluated. Beryllium and Mercury exceeds the PSD significant level. Other toxics are expected to be emitted in minimal amounts, with the total emissions combined to be less than one ton per year.

Although the emissions of the toxic pollutants could be controlled by particulate control devices such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense for firing with natural gas or fuel oil. Therefore, the Department does not believe that the BACT determination would be affected by the emissions of the toxic pollutants associated with the firing of syngas or No. 2 fuel oil.

Potentially Sensitive Concerns

With regard to controlling NOx emissions from SCR the applicant has expressed concerns regarding SCR catalyst deactivation due to poisoning, oxidation of SO2 to SO3, formation of H_2SO_4, formation of ammonium bisulfate and ammonium sulfate, risk due to potential leaks from storage of NH_3 and disposal of spent catalyst which may be considered hazardous.

A review of permitting activities for combined cycle proposals across the nation indicates that SCR has been required or proposed for installations with a variety of operating conditions including firing with fuel oil. SCR also has been accepted as BACT for boilers fired with pulverized coal. Although the concerns expressed by the applicant were valid at one time, the most recent experiences indicate that these problems have been resolved through advances in catalysts and experiences gained in operation.

BACT Determination by DEP

1. Combustion Products - PM/PM_{10} (excluding H_2SO_4)

During the two year demonstration period for the IGCC unit at the Polk Power Station, the applicant's proposed PM/PM10 emission limit of 0.013 lb/MMBtu is accepted for IGCC hot cleanup testing conducted under the Cooperative agreement with the US DOE.

For IGCC operation following the 2-year demonstration period particulate emissions control for the IGCC unit will be limited to 0.013 lb/MMBtu.

2. Products of Incomplete Combustion - CO and VOC

The use of an oxidation catalyst system for the IGCC system is not found to be BACT due to the high sulfur content in the syngas and resulting corrosion problems. Emissions are to be controlled by good combustion practices during demonstration and post demonstration periods.

3. Acid Gases - Sulfur Dioxides

During the 2-year demonstration period for the IGCC unit at the Polk Power Station, the applicant's proposed SO_2 emissions limit of 0.247 lbs/MMBtu is accepted for IGCC demonstration testing conducted under the Cooperative Agreement with the US DOE. The proposed emissions limit will allow for testing of coals with a broad range of sulfur content and for evaluation of the IGCC unit design.

For IGCC operations following the demonstration period, SO_2 emissions shall not exceed the 0.17 lbs/MMBtu limit established in a recent BACT determination for the Indiantown Cogeneration facility.

The SO_2 emissions shall be limited to 0.17 lbs/MMBtu for the IGCC unit by the use of low sulfur coal and the integral IGCC sulfur removal and recovery processes.

Acid Gases - Nitrogen Oxides

The annualized cost per ton for NO_X removal of $4,935 for the IGCC SCR estimated by the applicant exceeds recent estimates for other applications. Recent published estimates for a pulverized coal plant (Selective Catalytic Reduction for a 460 MW coal fueled unit: Overview of a NO_X Reduction System Selection, EPRI, 1993) with a NO_X reduction of 47 percent was $3,265 per ton in 1997 dollars. Costs per ton in this range indicate SCR is a reasonable alternative. However, there are significant differences between a pulverized coal-fired power plant and an IGCC unit in the design and operation of SCR NO_X control systems.

Due to the uncertainty in actual system performance and high cost of a SCR control system, NO_X BACT for the IGCC CT will be determined following a data collection period. After the demonstration phase, NO_X emission testing will be conducted on the CT every two months over a 12 to 18 month period. Test results will be provided to the Department within thirty (30) days after each test is performed. During the test period, the CT shall be operated to achieve the lowest possible NO_X emission rate and shall not exceed 25 ppmvd NO_X corrected to 15 percent oxygen and ISO conditions. This concentration limitation, equivalent to an emission rate of 0.099 lb NO_X/MMBtu, is 42 percent lower than rates recently established as BACT for other pulverized coal-fired power plant applications. One month after the test period ends, the applicant will submit a recommended BACT determination for NO_X using the test results, data obtained from other similar facilities, and research conducted by the CT manufacturer. The Department will then make a BACT determination for NO_X only and adjust the NO_X emission limits as appropriate.

The emission limits for the IGCC unit for firing with syngas and No. 2 fuel oil for the Polk Power Station are thereby established as follows:

Pollutant	Emission Limitations - 7F CT							
	IGCC Post Demonstration				IGCC 2-year Demonstration			
	Fuel	Basis	lb/hr	tpy[a]	Fuel	Basis	lb/hr	tpy[b]
NO_x	Oil	42 ppmvd[f]	311	N/A	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd[f]	222.5	1,044	Syngas	81 ppmvd	664.2	2,908.3
VOC[c]	Oil	0.028 lb/MMBtu	32	N/A	Oil	0.028 lb/MMBtu	32	N/A
	Syngas	0.0017 lb/MMBtu	3	38.5	Syngas	0.0017 lb/MMBtu	3	38.5
CO	Oil	40 ppmvd	99	N/A	Oil	40 ppmvd	99	N/A
	Syngas	25 ppmvd	98	430.1	Syngas	25 ppmvd	99	430.1
PM/PM_{10}[d]	Oil	0.009 lb/MMBtu	17	N/A	Oil	0.009 lb/MMBtu	17	N/A
	Syngas	0.013 lb/MMBtu	17	74.5	Syngas	0.013 lb/MMBtu	17	74.5
Pb	Oil	5.30E-5 lb/MMBtu	0.101	N/A	Oil	5.30E-5 lb/MMBtu	0.101	N/A
	Syngas	2.41E-6 lb/MMBtu	0.0035	0.067	Syngas	1.10E-5 lb/MMBtu	0.023	0.13
SO_2	Oil[e]	0.048 lb/MMBtu	92.2	N/A	Oil	0.048 lb/MMBtu	92.2	N/A
	Syngas	0.17 lb/MMBtu	357	1563.7	Syngas	0.247 lb/MMBtu	518	2,269

NOTES: a - Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

b - Based on baseload operations firing syngas, with a maximum of 8760 hrs/yr utilization of HGCU operations; up to 10 percent annual capacity factor firing fuel oil.

c - Exclusive of background concentrations.

d - Excluding sulfuric acid mist.

e - Sulfur dioxide emissions based on a maximum of 0.05 percent sulfur, by weight.

f - ppmvd at 15% O_2 and ISO conditions.

Auxiliary Boiler

For the auxiliary boiler, BACT will be represented by a limitation on hours of operation and the use of clean fuel (maximum 1,000 hours per year firing No. 2 fuel oil with 0.05% sulfur, by weight).

H_2SO_4 Plant Thermal Oxidizer

A review of the proposed emission rates for the thermal oxidizer indicates that equipment in and of itself represents BACT for these sources.

Fugitive Sources

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions and is representative of BACT.

Details of the Analysis May be Obtained by Contacting:
Doug Outlaw, P.E., BACT Coordinator
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

_____ 1993
Date

Approved by:

Virginia B. Wetherell, Secretary
Dept. of Environmental Protection

_____ 1993
Date

Fugitive Sources

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions and is representative of BACT.

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Tallahassee, Florida 32399-2400

Recommended by:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

February 18 1994
Date

Approved by:

Virginia B. Wetherell, Secretary
Dept. of Environmental Protection

February 24 1994
Date

Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

file

February 28, 1995

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. G. F. Anderson
Tampa Electric Company
P. O. Box 111
Tampa, Florida 33601-0111

Dear Mr. Anderson:

RE: Amendment for a Modification to the Auxiliary Boiler and Expiration Date Extension
PSD-FL-194(A)

The Department received your requests of May 12 and June 9, 1994, to modify the auxiliary boiler by increasing the heat input rate, which will require changing some existing specific conditions, and to extend the expiration date of the PSD permit referenced below. The permit is amended as shown:

Permit No. PA-92-32, PSD-FL-194, Tampa Electric Company.

Current Expiration Date: June 1, 1996

New Expiration Date: June 30, 2000

The Department is also modifying the specific conditions as follows:

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed ~~49.5~~ 120.0 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content by weight. All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

G. Fugitive Dust

Fugitive dust emissions during the construction period shall be minimized by covering or watering dust generation areas. Particulate matter emissions from the coal handling equipment shall be controlled by enclosing all coal storage, conveyors and conveyor

transfer points (~~except those directly associated with the coal stacker/reclaimer for which an enclosure is operationally infeasible~~). Fugitive emissions shall be tested as specified in Condition No. J. ~~Inactive coal storage shall be shaped, compacted, and oriented to minimize wind erosion.~~ Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. ~~When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.~~

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

Pollutant	Fuel	Basis	Emissions Limitations 7F CT Postdemonstration Period lb/hr	tpy
NO_X	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd	~~222.5~~ 220.25	~~1,044~~ 1,032.9

I. Auxiliary Boiler Operation

Normal operation of the auxiliary boiler shall be limited to a maximum of ~~1,000~~ 3,000 hours per year ~~and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable.~~ The auxiliary boiler may operate continuously (i.e. 8,760 hrs/yr) in the standby mode. The following emission limitations shall apply:

1. NO_X emissions shall not exceed ~~0.16~~ 0.10 lbs/MMBtu for oil firing.
2. Sulfur dioxide emissions shall be limited by firing low sulfur oil with a maximum sulfur content of 0.05 percent by weight.
3. Visible emissions shall not exceed 20 percent opacity (6-minute average) ~~except for one six-minute period per hour during which opacity shall not exceed 27 percent~~, while burning low sulfur fuel oil.

L. Monitoring Requirements

1. IGCC Combustion Turbine

A continuous emission monitoring system (CEMS) shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO_2 or O_2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75, if applicable, when those requirements become effective within the state.

~~1.~~ a Each CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

~~2.~~ b CEMS data shall be recorded and reported in accordance with Rule ~~Chapter~~ 62-297.500, F.A.C.~~;~~, 40 CFR 60~~;~~ and, 40 CFR 75, if applicable. The record shall include periods of startup, shutdown, and malfunction.

~~3.~~ c A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition, or preventable equipment breakdown shall not be considered malfunctions.

~~4.~~ d The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

~~5.~~ e For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Condition No. H.4 herein, which exceeds the applicable emission limits in Condition No. H.1.

2. Auxiliary Boiler

A CEMS shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the auxiliary boiler to monitor nitrogen oxides emissions and in accordance with 40 CFR 60.13 to monitor opacity.

a. The CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

b. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C., and 40 CFR 60. The record shall include periods of startup, shutdown and malfunction.

c. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

d. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of the CEMS.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 62-212 and 62-4, F.A.C., and 40 CFR 60, Subparts A, Db and GG.

A copy of this letter shall be attached to the above mentioned permit, No. PSD-FL-194(A), and shall become a part of the permit.

Sincerely,

Howard L. Rhodes

Howard L. Rhodes
Director
Division of Air Resources
Management

HLR/sa/b

cc: B. Thomas, SWD
J. Harper, EPA
J. Bunyak, NPS
H. Oven, PPS
T. Davis, P.E., ECT

Final Determination

The permit amendment to reflect modifications and extension of the expiration date for Tampa Electric Company's 260 MW integrated coal gasification combined cycle source, located in Polk county, Florida, was distributed on November 16, 1994. The Notice of Intent to Issue was published in the Lakeland Ledger on December 3, 1994. Copies of the amendment were available for public inspection at the Department offices in Tampa and Tallahassee.

No comments were submitted by the National Park Service, U.S. Environmental Protection Agency or the applicant.

The final action of the Department will be to issue the permit amendment as proposed.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF PERMIT

In the matter of an
Application for Permit by:

DEP File No. PSD-FL-194
Polk County

Mr. G. F. Anderson
Tampa Electric Company
P. O. Box 111
Tampa, FL 33601-0111

/

Enclosed is Permit Number PSD-FL-194 to construct a power plant facility at County Road 630 approximately 13 miles southwest of Bartow, Polk County, Florida, issued pursuant to Section (s) 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on 2/28/94 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Cynthia A. Doyle (Clerk) 2/28/94 (Date)

Copies furnished to:
W. Thomas, SWD
D. Martin, Polk Co.
J. Harper, EPA
J. Bunyak, NPS
L. Curtin, Holland & Knight

Final Determination

Tampa Electric Company
Polk County, Florida

260 MW INTEGRATED COAL GASIFICATION
COMBINED CYCLE UNIT

File No: PSD-FL-194
PA-92-32

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

February 17, 1994

Final Determination

The Technical Evaluation and Preliminary Determination for the permits to construct a 260 megawatt (MW) integrated coal gasification combined cycle (IGCC) combustion turbine, coal gasification facilities, an auxiliary boiler and a fuel oil storage tank at an electrical power plant site in Bartow, Polk County, Florida, was distributed on December 20, 1993. The Notice of Intent to Issue was published in the Tampa Tribune on December 27, 1993. Copies of the evaluation were available for public inspection at the Department offices in Tampa and Tallahassee.

No adverse comments on the evaluation and proposed permits were submitted by the National Park Service (NPS) and the U.S. Environmental Protection Agency (EPA) in their letters dated January 27 and January 26, 1994 respectively.

Tampa Electric Company submitted comments on the Technical Evaluation and Preliminary Determination for the Polk Power Station. The applicant noted that the fuel bound nitrogen adjustment should also apply to oil firing during the two year hot gas clean up demonstration period. The Department agrees with the applicant's comment, and includes the language in the permit to reflect that.

The final action of the Department will be to issue the PSD permit (PSD-FL-194) with the changes noted above.

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:
Tampa Electric Company
702 North Franklin Street
Tampa, Florida 33602

Permit Number: PA-92-32
PSD-FL-194
Expiration Date: June 1, 1996
County: Polk
Latitude/Longitude: 27°43'43"N
81°59'23"W
Project: 260 MW Integrated Coal Gasification Combined Cycle Combustion Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-212 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For one 260 MW integrated coal gasification combined cycle (IGCC) combustion turbine (GE 7F CT or equivalent) with maximum heat input at 59°F of 1,755 MMBtu/hr (syngas) and 1765 MMBtu/hr (oil) to be located at the Polk County site near Bowling Green, Florida. The coal gasification facility will consist of coal receiving, storage and process facilities, air separation unit, gasifier, product gas cleaning facilities, acid gas removal unit, and auxiliary equipment. The first phase will also include a 49.5 MMBtu/hr auxiliary boiler and a 71,450 barrel fuel oil storage tank.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Tampa Electric Company (TECO) application received July 30, 1992.
2. Department's letter dated September 22, 1992.
3. TECO's letter dated April 12, 1993.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a. Have access to and copy any records that must be kept under the conditions of the permit;

b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a. A description of and cause of non-compliance; and

b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

GENERAL CONDITIONS:

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

(X) Determination of Best Available Control Technology (BACT)
(X) Determination of Prevention of Significant Deterioration (PSD)
(X) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

GENERAL CONDITIONS:

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

A. Operation and Construction

The construction and operation of Polk Power Station (Project) shall be in accordance with all applicable provisions of Chapter 17, F.A.C. The following emission limitations reflect final BACT determinations for Phase I (integrated gasification, combined cycle (IGCC) combustion turbine and auxiliary equipment) of the project fired with syngas or fuel oil. BACT determinations for the remaining phases will be made upon review of supplemental applications. In addition to the foregoing, the Project shall comply with the following conditions of certification as indicated.

B. Heat Input

The maximum heat input to the IGCC combustion turbine (CT) shall neither exceed 1,755 MMBtu/hr while firing syngas, nor 1765 MMBtu/hr while firing No. 2 fuel oil at an ambient temperature of 59° F. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the heat input correction to other temperatures shall be provided to DEP for review 120 days after the siting board approval of the site certification. Subject to approval by the Department, the manufacturer's curve may be used to establish heat input rates over a range of temperature for the purpose of compliance determination.

SPECIFIC CONDITIONS:

C. Hours of Operation

The IGCC unit in Phase I may operate continuously, i.e., 8,760 hrs/year.

D. Fuel

Only syngas and low sulfur fuel oil shall be fired in the IGCC combustion turbine. Only low sulfur fuel oil shall be fired in the auxiliary boiler. The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent, by weight.

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed 49.5 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content (by weight). All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

F. Fuel Consumption

The maximum coal input to the coal gasification plant shall not exceed 2,325 tons per day, on a dry basis.

G. Fugitive Dust

Fugitive dust emissions during the construction period shall be minimized by covering or watering dust generation areas. Particulate emissions from the coal handling shall be controlled by enclosing all conveyors and conveyor transfer points (except those directly associated with the coal stacker/reclaimer for which an enclosure is operationally infeasible). Fugitive emissions shall be tested as specified in Specific Condition No. J. Inactive coal storage piles shall be shaped, compacted, and oriented to minimize wind erosion. Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.

SPECIFIC CONDITIONS:

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

POLLUTANT	FUEL	BASIS[a]	EMISSIONS LIMITATIONS - 7F CT Post Demonstration Period LB/HR*	TPY[b]
NOx	Oil	42 ppmvd**	311	N/A
	Syngas	25 ppmvd	222.5	1,044
VOC[c]	Oil	0.028 lb/MMBtu	32	N/A
	Syngas	0.0017 lb/MMBtu	3	38.5
CO	Oil	40 ppmvd	99	N/A
	Syngas	25 ppmvd	98	430.1
PM/PM_{10}[d]	Oil	0.009 lb/MMBtu	17	N/A
	Syngas	0.013 lb/MMBtu	17	74.5
Pb	Oil	5.30E-5 lb/MMBtu	0.101	N/A
	Syngas	2.41E-6 lb/MMBtu	0.0035	0.067
SO_2	Oil	0.048 lb/MMBtu	92.2	N/A
	Syngas	0.17 lb/MMBtu	357	1563.7

Visible Emissions Syngas 10 percent opacity
Oil 20 percent opacity

(*) Emission limitations in lbs/hr are 30-day rolling averages. "Pollutant emission rates may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the emission rate correction to other temperatures at different loads shall be provided to DEP for review 120 days after the siting board approval of the site certification. Subject to approval by the Department, the manufacturer's curve may be used to establish pollutant emission rates over a range of temperature for the purpose of compliance determination."

(**) The emission limit for NO_x is adjusted as follows for higher fuel bound nitrogen contents up to a maximum of 0.030 percent by weight:

SPECIFIC CONDITIONS:

FUEL BOUND NITROGEN (% by weight)	NO_x EMISSION LEVELS (ppmvd @ 15% O_2)
0.015 or less	42
0.020	44
0.025	46
0.030	48

using the formula STD = 0.0042 + F where:

STD = allowable NO_x emissions (% by volume at 15% O_2 and on a dry basis).

F = NO_x emission allowance for FBN defined by the following table:

FUEL BOUND NITROGEN (% by weight)	F (NO_x % BY VOLUME)
0 < N < 0.015	0
0.015 < N < 0.03	0.04 (N-0.015)

N = nitrogen content of the fuel (% by weight).

NO_x emissions are preliminary for the fuel oil specified in Specific Condition D of Conditions of Certification. The permittee shall submit fuel bound nitrogen content data for the low sulfur fuel oil prior to commercial operation to the Bureau of Air Regulation in Tallahassee, and on each occasion that fuel oil is transferred to the storage tanks from any other source to the Southwest District office in Tampa. The % FBN (Z) following each delivery of fuel shall be determined by the following equation:

$x(Y) + m(n) = (x+m)(Z)$

where x = amount fuel in storage tank
y = % FBN in storage tank
m = amount fuel added
n = % FBN of fuel added
Z = % FBN of composite

(a) Syngas lb/MMBtu values based on heat input (HHV) to coal gasifier and includes emissions from H_2SO_4 plant thermal oxidizer. Pollutant concentrations in ppmvd are corrected to 15% oxygen.

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

$\frac{\text{Load (\%)}}{100} \times \text{hours of operation} \leq 876$ for fuel oil.

SPECIFIC CONDITIONS:

(c) Exclusive of background concentrations.

(d) Excluding sulfuric acid mist.

2. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and No. 2 fuel oil **during the two year demonstration period**, shall not exceed the following:

		EMISSIONS LIMITATIONS 7FCT	
POLLUTANT	**FUEL**	**LB/HR***	**TPY[a]**
NO_x	Oil**	311	N/A
	Syngas	664.2	2,908.3
VOC[b]	Oil	32	N/A
	Syngas	3	38.5
CO	Oil	99	N/A
	Syngas	99	430.1
PM/PM_{10}[c]	Oil	17	N/A
	Syngas	17	74.5
Pb	Oil	0.101	N/A
	Syngas	0.023	0.13
SO_2	Oil	92.2	N/A
	Syngas	518	2,269
Visible Emissions		Syngas 10 percent opacity Oil 20 percent opacity	

(*) Emission limitations in lbs/hr are 30-day rolling averages.

(**) Footnote ** as shown in Specific Condition H.1. for fuel bound nitrogen adjustment also applies to oil firing during the Demonstration Period.

(a) Annual emission limits (TPY) based on 10-percent annual capacity factor firing No. 2 fuel oil.

$$\frac{\text{Load (\%)}}{100} \times \text{hours of operation} \leq 876 \text{ for oil.}$$

(b) Exclusive of background concentrations.

(c) Excluding sulfuric acid mist.

SPECIFIC CONDITIONS:

3. The following allowable turbine emissions, were determined by BACT, and are also tabulated for PSD and inventory purposes:

ALLOWABLE EMISSIONS

POLLUTANT	FUEL	IGCC POST DEMONSTRATION LB/HR	IGCC POST DEMONSTRATION TPY[a]	IGCC 2-YEAR DEMONSTRATION LB/HR	IGCC 2-YEAR DEMONSTRATION TPY[b]
Sulfuric Acid[c]	Syngas	55	241	55	241
Inorganic Arsenic	Syngas	0.0006	0.019	0.08	0.35
Beryllium	Syngas	0.0001	0.0029	0.0001	0.0029
Mercury	Syngas	0.0034	0.017	0.025	0.11

(a) Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

(b) Based on baseload operations firing syngas, with a maximum of 8760 hrs/yr of HGCU operations; up to 10 percent annual capacity factor firing fuel oil.

(c) Sulfuric acid mist emissions assume a maximum of 0.05 percent sulfur in the fuel oil.

4. Excess emissions from the turbine resulting from startup, shutdown, malfunction, or load change shall be acceptable providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24-hour period unless specifically authorized by the Department for a longer duration. Best operating practices shall be documented in writing and a copy submitted to the Department along with the initial compliance test data. The document may be updated as needed with all updates submitted to the Department within thirty (30) days of implementation and shall include time limitations on excess emissions caused by turbine startup.

5. After the demonstration period, permittee shall operate the combustion turbine to achieve the lowest possible NO_x emission limit but shall not exceed 25 ppmvd corrected to 15% oxygen and ISO conditions.

SPECIFIC CONDITIONS:

6. The combustion turbine will be operated for 12-18 months after the demonstration period (estimated to be from Mid 1998 until December 31, 1999). During that period NO_X emission testing will be performed on the turbine at a regular interval of every 2 months. The Department shall be provided with a test protocol including a time schedule 15 days prior to the initial test. The permittee will provide the Department the emission test results 30 days after the test is performed. These results are not for compliance purposes. The Department shall be notified and the reasons provided if a scheduled test is delayed or canceled.

7. One month after the test period ends (estimated to be by February 2000), the permittee will submit to the Department a NO_X recommended BACT Determination as if it were a new source using the data gathered on this facility, other similar facilities and the manufacturer's research. The Department will make a determination on the BACT for NO_X only and adjust the NO_X emission limits accordingly.

I. Auxiliary Boiler Operation

Operation of the auxiliary boiler shall be limited to a maximum of 1,000 hours per year and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable. The following emission limitations shall apply:

1. NO_X emissions shall not exceed 0.16 lbs/MMBtu for oil firing.

2. Sulfur dioxide emissions shall be limited by firing low sulfur fuel oil with a maximum sulfur content of 0.05 percent by weight.

3. Visible emissions shall not exceed 20 percent opacity (except for one six-minute period per hour during which opacity shall not exceed 27 percent), while burning low sulfur fuel oil.

J. Performance Testing

Initial (I) compliance tests shall be performed on the turbine using both fuels and on the auxiliary boiler using fuel oil. The stack test for the turbine and the auxiliary boiler shall be performed with the sources operating at capacity (maximum heat rate input for the tested operating temperature). Capacity is defined as 90 - 100 percent of permitted capacity. If it is impracticable to test at capacity, then sources may be tested at less than capacity; in this case subsequent source operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for purposes of

SPECIFIC CONDITIONS:

additional compliance testing to regain the rated capacity in the permit, with prior notification to the Department. Annual (A) compliance tests shall be performed on the turbine and the auxiliary boiler with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests for the applicable emission limitations shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Rule 17-297, F.A.C., and the requirements of 40 CFR 75:

1. Combustion Turbine

   a. Reference Method 5B for PM (I, A, for oil only).

   b. Reference Method 8 for sulfuric acid mist (I, for oil only).

   c. Reference Method 9 for VE (I, A).

   d. Reference Method 10 for CO (I, A).

   e. Reference Method 20 for NO_x (I, A).

   f. Reference Method 18 for VOC (I, A).

   g. Trace elements of Lead (Pb), Beryllium (Be) and Arsenic (As) shall be tested (I, for oil only) using Emission Measurement Technical Information Center (EMTIC) Interim Test Methods. As an alternative, Method 104 for Beryllium (Be) may be used; or Be and Pb may be determined from fuel analysis using either Method 7090 or 7091, and sample extraction using Method 3040 as described in the EPA solid waste regulations SW 846.

   h. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I,A).

   i. ASTM D 1072-80, D 3031-81, D 4084-82, or D 3246-81 for sulfur content of natural gas (I, and A if deemed necessary by DEP).

   j. Reference Method 22 for fugitive emissions (I,A).

2. Auxiliary Boiler

   a. Reference Method 9 of VE (I,A).

   b. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I,A).

SPECIFIC CONDITIONS:

c. Reference Methods 7, 7A, 7C, 7D, or 7E for NO_x (I,A).

Other DEP approved methods may be used for compliance testing after prior departmental approval.

K. Sulfur Content of Fuel

The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334 by testing for sulfur content of the fuel oil in the storage tanks once per day when firing oil. Testing for fuel oil heating value, shall also be conducted on the same schedule.

L. Monitoring Requirements

A continuous emission monitoring system (CEMS) shall be installed, operated, and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO_2 or O_2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75 when those requirements become effective within the state.

1. Each CEMS shall meet performance specifications of 40 CFR 60, Appendix B.

2. CEMS data shall be recorded and reported in accordance with Chapter 17-297.500, F.A.C., 40 CFR 60 and 40 CFR 75. The record shall include periods of startup, shutdown, and malfunction.

3. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

4. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Specific Condition No. H.4. herein, which exceeds the applicable emission limits in Condition No. H.1.

SPECIFIC CONDITIONS:

M. Notification, Reporting and Recordkeeping

To determine compliance with the syngas and fuel oil firing heat input limitation, the permittee shall maintain daily records of syngas and fuel oil consumption for the turbine and the heating value for each fuel. All records shall be maintained for a minimum of two years after the date of each record and shall be made available to representatives of the Department upon request.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 17-209 through 17-297, F.A.C., and 40 CFR 60 Subparts A and GG. The requirements shall include:

1. 40 CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

2. 40 CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial startup of each turbine and the auxiliary boiler not more than 60 days nor less than 30 days prior to such date.

3. 40 CFR 60.7(a)(3) - By postmarking or delivering notification of the actual startup of each turbine and the auxiliary boiler within 15 days of such date.

4. 40 CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMSs performance, no less than 30 days prior to such date.

5. 40 CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

6. 40 CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any startup, shutdown or malfunction of a turbine and the auxiliary boiler, of the air pollution control equipment, and when the CEMS is inoperable.

7. 40 CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days of the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d).

8. 40 CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine and boiler firing rates, but not more than 180 days after the initial startup of each turbine and the auxiliary boiler.

SPECIFIC CONDITIONS:

9. 40 CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

10. 17-297.345 - By providing stack sampling facilities for the combustion turbine and the auxiliary boiler.

All notifications and reports required by this specific condition shall be submitted to the Department's Air Program, within the Southwest District office. Performance test results shall be submitted within 45 days of completion of such test.

O. Submission of Reports

The following information shall be submitted to the Department's Bureau of Air Regulation within 12 months of issuance of this permit:

1. Description of the final selection of the turbine and the auxiliary boiler to be installed at the facility. Descriptions shall include the specific make and model numbers, any changes in the proposed method of operation, fuels, emissions or equipment.

2. Description of the CEMS selected. Description shall include the type of sensors, the manufacturer and model number of the equipment.

3. If construction has not commenced within 18 months of issuance of this permit, then the permittee shall obtain from DEP a review and, if necessary, a modification of the BACT determination and allowable emissions for the unit(s) on which construction has not commenced [40 CFR 52.21(r)(2)]. Units to be constructed or modified in later phases of the project will be reviewed and limitations revisited under the supplementary review process of the Power Plant Siting Act.

P. Protocols

The following protocols shall be submitted to the Department's Air Program, within the Southwest District office, for approval:

1. CEMS Protocol - Within 60 days of selection of the CEMS, but prior to the initial startup, a CEMS protocol describing the system, its installation, operating and maintenance characteristics and requirements. The Department shall approve the protocol provided that the system and the protocol meet the requirements of 40 CFR 60.13, 60.334, Appendix B and Appendix F. This condition of certification shall be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75 when those requirements become effective within the State.

SPECIFIC CONDITIONS:

2. Performance Test Protocol - At least 90 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Air Program, within the Southwest District office, a protocol outlining the procedures to be followed, the test methods and any differences between the reference methods and the test methods proposed to be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

Q. Modifications

The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change.

Issued this 24th day
of February, 1994

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Virginia B. Wetherell

Virginia B. Wetherell, Secretary

Best Available Control Technology (BACT) Determination
Tampa Electric Company

Polk County
PSD-FL-194
PA-92-32

The applicant is proposing to construct, in phases, a 1,150 MW power plant in Polk County. The proposed facilities will be known as the Tampa Electric Company Polk Power Station. The first phase will consist of an Integrated Coal Gasification Combined Cycle (IGCC) unit with heat recovery steam generator (HRSG) and steam turbine (ST) for a nominal net 260 MW IGCC unit. The coal-fueled advanced CT will be capable of baseload operations (i.e., 100 percent capacity factor) on syngas, while retaining the option to fire fuel oil as backup (maximum 10 percent capacity factor). Units proposed to be added at Polk Power Station include two combined cycle (CC) units totaling 440 MW (nominal) and six simple cycle (SC) CTs totaling 450 MW (nominal). All of these units will be fired with natural gas as the primary fuel and No. 2 fuel oil as backup. The phased schedule for construction and operation of the proposed generating units at the Polk Power Station is presented in Table 1.

Table 1

Proposed Schedule for Construction and Operation of Generating Units for ultimate capacity at the Polk Power Station Site

Activity/Unit	Start Construction	Completion/ In-Service
Advanced CT, CG & HRSG/ST for 260-MW IGCC unit[a]	First Half 1994	July 1995
75-MW CT	April 1998	January 1999
75-MW CT	April 1999	January 2000
HRSG/ST for conversion of two 75-MW CTs for 220-MW CC unit	April 2000	January 2001
75-MW CT	April 2001	January 2002
220-MW CC	April 2001	January 2003
75-MW CT	April 2005	January 2006
75-MW CT	April 2006	January 2007
75-MW CT	April 2007	January 2008
75-MW CT	April 2008	January 2009
75-MW CT	April 2009	January 2010

a - 220 MW when fired on fuel oil and operated in CC mode.

The IGCC unit will be supported in part through funding from the U.S. Department of Energy (DOE) under the Clean Coal Technology Demonstration Program. Under the program, the IGCC unit will be used to demonstrate the integration of coal gasification (CG) and CC technologies and to demonstrate a more efficient method for removal of sulfur from syngas. The new cleanup technology is called hot gas clean up (HGCU). Conventional methods for sulfur removal for IGCC units require that the gas be cooled prior to cleaning, called cold gas cleanup (CGCU), and then reheated. By comparison, the HGCU technology efficiently cleans the gas at high temperatures, thereby increasing the overall plant efficiency. Under the agreement with DOE, Tampa Electric Company will demonstrate the HGCU system for a 2-year period.

The projected maximum tonnage of regulated air pollutants emitted from the proposed facility based on a 100 percent capacity factor and 8,760 hours per year are shown in Table 2. A simplified flow chart for the operation of the IGCC systems at the site is attached (Figures 1 - 3).

Table 2

Projected Maximum Annual Emissions (tpy)
for ultimate site capacity

Pollutant	IGCC[a]	+	CC[b]	+	SC[c]	=	Total	Significance Rate (tpy)
PM (TSP)	399		260		246		905	25
PM (PM_{10})	399		260		246		905	15
SO_2	2469		720		654		3843	40
NO_x	2923		1308		1014		5245	40
CO	453		1092		978		2523	100
VOC	45		180		168		393	40
Pb	0.15		0.28		0.17		0.6	0.6
H_2SO_4	241		80		72		393	7
Fluorides	0.92		0.17		0.10		1.2	3
Hg	0.12		0.21		0.19		0.5	0.1
Be	0.007		0.013		0.008		0.03	0.0004
Total reduced sulfur (including H_2S)	6.2		0		0		6.2	10

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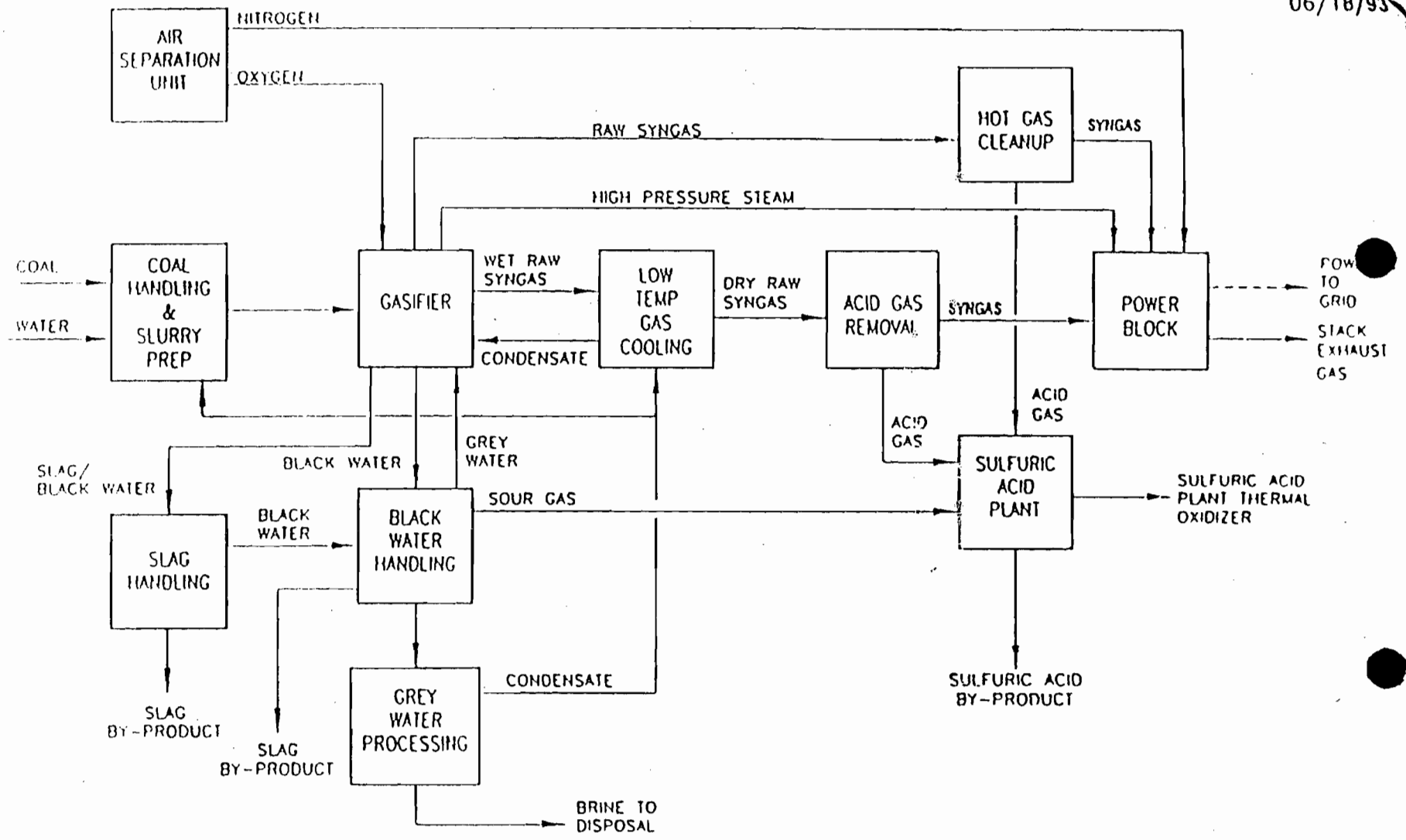

FIGURE 2-2.

GENERALIZED FLOW DIAGRAM OF IGCC SYSTEMS AND PROCESS

Source: ECT, 1993.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

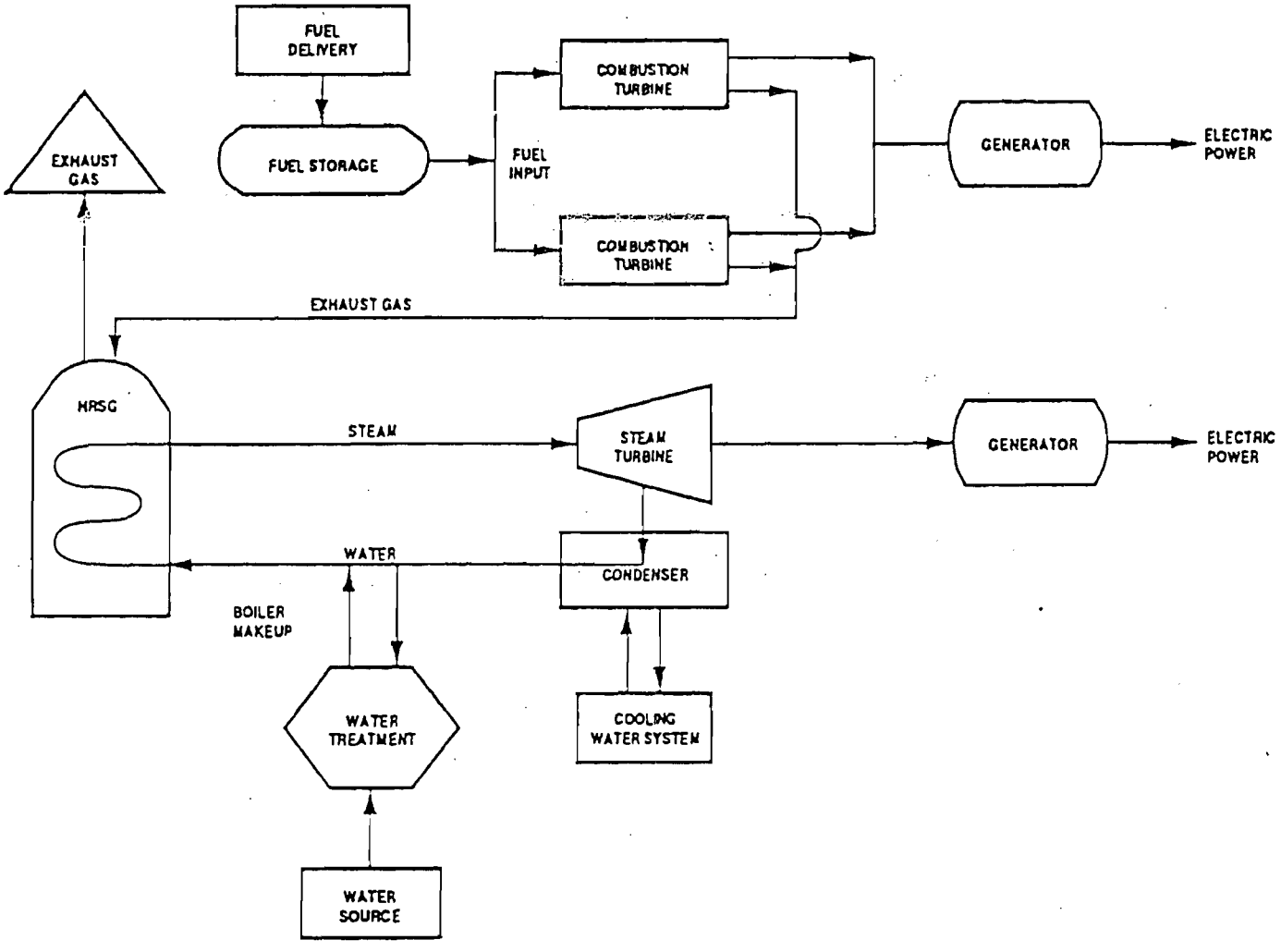

FIGURE 1.5.2-1.

SIMPLIFIED FLOW DIAGRAM OF COMBINED CYCLE POWER SYSTEM

Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

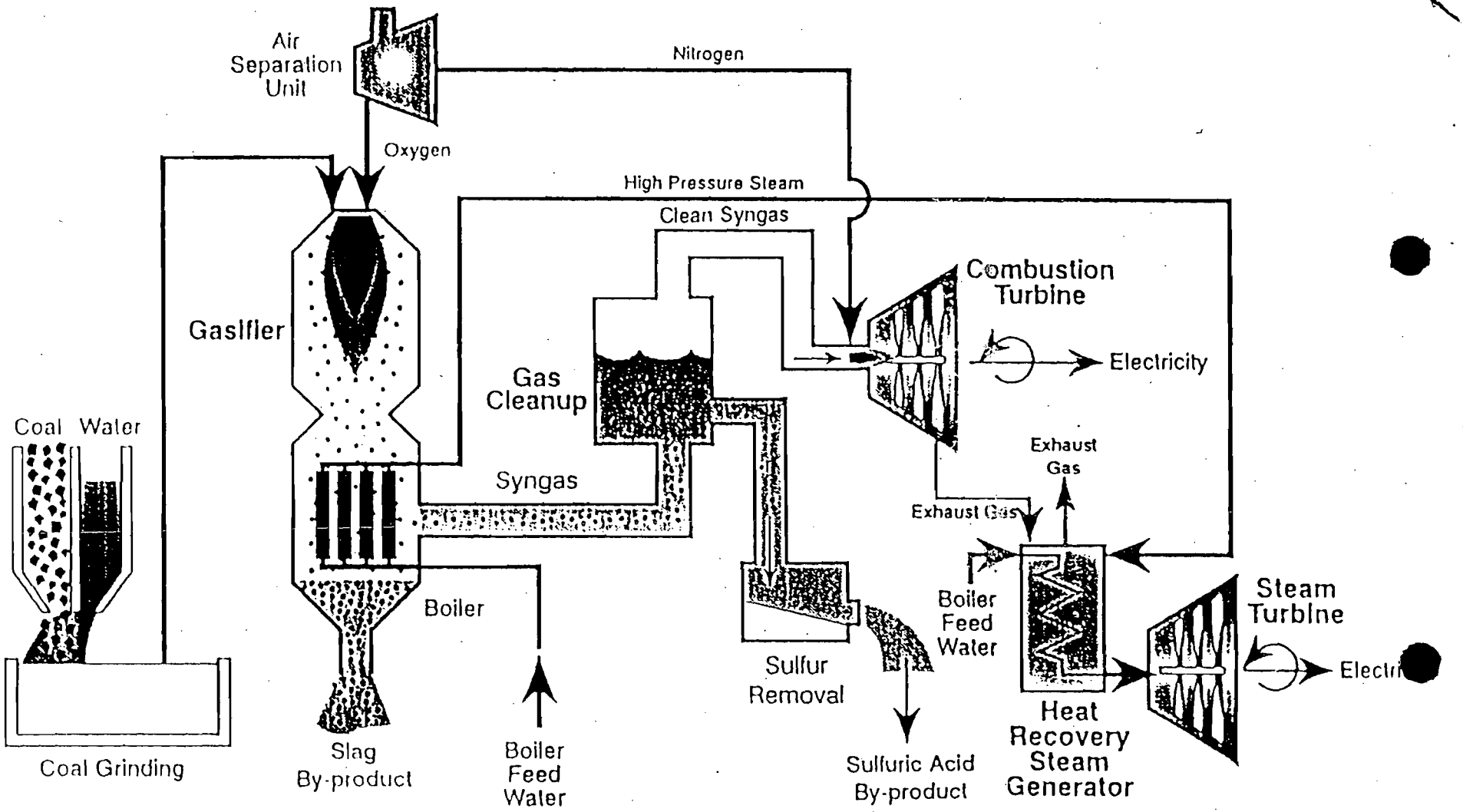

FIGURE 1.5.3-1.

SIMPLIFIED FLOW DIAGRAM OF INTEGRATED COAL GASIFICATION COMBINED CYCLE UNIT

Source: Texaco, 1992. Tampa Electric Company, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

a - IGCC emissions include the highest annual emissions estimates from the 7F CT (based on the larger of 100 percent CGCU or 50/50 CGCU/HGCU), plus related combustion emissions (e.g., thermal oxidizer), plus other associated process and fugitive emissions (PM, CO, VOC, and H_2S).

b - CC emissions represent the totals for four stand-alone CTs in CC mode.

c - SC emission represent the totals for six stand-alone CTs in simple cycle mode.

The proposed facility will also include one 49.5 MMBtu/hr auxiliary boiler fired with low sulfur (0.05% or less by weight) distillate fuel oil. The auxiliary boiler will operate only during startup and shutdown of the IGCC unit, or when steam from the IGCC unit's HRSG is unavailable. The auxiliary boiler will operate a maximum of 1,000 hours per year.

The coal gasification facility will serve as a source of medium Btu, low sulfur (0.07% or less, by weight, sulfur bearing compounds) coal-derived gas. The coal used in the gasification facility will have a maximum sulfur content of 3.05% and have a minimum heating value of approximately 11,035 Btu/lb. The coal gasification plant will consist of coal receiving, storage and process facilities, air separation unit, gasifier, product gas cleaning facilities, acid gas removal unit, and auxiliary equipment. The coal gasification unit will have two stacks, one flare stack used during startup, shutdown and emergency conditions and one thermal oxidation unit stack which will be used continuously.

The applicant has indicated the maximum tonnage of regulated air pollutants emitted from the IGCC unit CT during the initial phase, demonstration and post demonstration periods to be as shown in Table 3.

Table 3

Maximum Annual Emissions from IGCC Unit CT for Various Operating Configurations

Pollutant	Demonstration Period (tpy)[a]	Post-Demonstration Period (tpy)[b]
PM[c]	74.5	74.5
SO_2	2,269	1,564
NO_x	2,908	1,044
CO	430	430
VOC	38.5	38.5

H_2SO_4	241	241
Pb	0.13	0.067
Fluorides	0.92	0.92
Hg	0.11	0.017
Be	0.0029	0.0029

a - Based on baseload operations firing syngas, with a maximum of 8,760 hr/yr utilization of HGCU and up to 10 percent annual capacity factor firing fuel oil.

b - Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

c - Excluding sulfuric acid mist.

Florida Administrative Code Rule 17-212.400 requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in Table 1.

Date of Receipt of A BACT Application

September 21, 1992

BACT Determination Requested by the Applicant

Combined Cycle Units

Pollutant	Determination
NO_x	9 ppmvd (NG) 25 ppmvd (Syngas firing) 42 ppmvd (No. 2 fuel oil firing)
SO_2	Firing of NG or Syngas Fuel oil with a maximum sulfur content of 0.05 % by weight, 0.048 lb/MMBtu
CO	Combustion control 25 ppmvd (NG) 40 ppmvd (No. 2 fuel oil firing) 25 ppmvd (Syngas firing)
VOC	Combustion control 7 ppmvd (NG) 7 ppmvd (No. 2 fuel oil firing) 1 ppmvd (Syngas firing)

Particulates	Good combustion, and type of fuels fired
Pb	Good combustion, and type of fuels fired
H_2SO_4	Firing of NG, Syngas and No. 2 fuel oil
Be	Firing of NG, Syngas and No. 2 fuel oil
AS	Firing of NG, Syngas and No. 2 fuel oil

Coal Gasification Plant

Raw Product Gas

Pollutant	Control Technology
Sulfur	Acid Gas Removal (95.6%)
Particulates	Water scrubbing

The raw product gas is fired in the combined cycle combustion turbine units and emissions of product gas are included in the BACT determination for those units.

CG Emission (Thermal Oxidizer)

Pollutant	Control Technology
SO_2	Fuel oil firing with a sulfur content not to exceed 0.05% by weight. (45.3 lb/hr)
NO_x	Combustion controls
CO	Combustion controls
Pb	Efficient Operation
H_2SO_4	Efficient Operation
Mercury	Efficient Operation
Beryllium	Efficient Operation
Inorganic Arsenic	Efficient Operation

Materials Handling and Storage

Fugitive Dust Source	Control Technology
Coal Unloading	Enclosed - including a Collection System
Conveyers and Transfer Points (Coal, Slag)	Transfer points enclosed with Collection System. Conveyers enclosed
Coal Storage and Reclaiming	Crusting Agent Application Wet Suppression Systems or Crusting Agents Surfactant Application[1]
Fuel Oil Storage	Bottom Loaded/Submerged Filling

Auxiliary Boiler

NO_x	Low NOx Burners and Combustion Controls, limited operation[2] (0.159 lb/MMBtu)
SO_2	Fuel oil firing with a sulfur content not to exceed 0.05 % by weight, and limited operation (0.053 lb/MMBtu)
CO	Combustion Controls (0.087 lb/MMBtu)
VOC	Combustion Controls (0.0485 lb/MMBtu)
Particulates	Combustion Controls (0.061 lb/MMBtu)
Pb	Combustion Controls
Mercury	Combustion Controls
Beryllium	Combustion Controls
Inorganic Arsenic	Combustion Controls

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1 - Total Coal Handling Sources PM Emissions are 11.2 tpy
2 - Maximum of 1000 hours of operation per year

Annual pollutant emissions are shown in Table 2 for all sources. Pollutant emission rates are listed in the section entitled "BACT Determination by DEP".

Flare Stacks

This source did not propose a BACT since its operation is expected to be infrequent (startup and shutdown, and emergencies).

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-296, Stationary Sources - Emission Standards, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from combined cycle power plants and coal fired power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- Combustion Products (Particulates and Heavy Metals). Controlled generally by good combustion of clean fuels and/or fabric filters.
- Products of Incomplete Combustion (CO, VOC, Toxic Organic Compounds). Control is largely achieved by proper combustion techniques.
- Acid Gases (SOx, NOx, HCL, Fl). Controlled generally by gaseous control devices.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

Combustion Products

The IGCC facility's projected emissions for combustion products (Particulate Matter (PM) and trace heavy metals) exceed the significant emission rates given in Florida Administrative Code Rule 17-212.410, Table 212.400-2. A review of the BACT/LAER Clearinghouse indicates that the proposed PM/PM_{10} emission level of 0.013 lbs/MMBtu (excluding H_2SO_4) for syngas for the IGCC unit is consistent with the particulate limit for recent determinations of coal fired boilers. The applicant proposed PM/PM_{10} emission level of 0.009 lbs/MMBtu for No. 2 oil firing for the IGCC unit is consistent with previous BACT determinations in Florida.

In general, the BACT/LAER Clearinghouse does not contain specific emission limits for beryllium, mercury and arsenic from turbines. BACT for heavy metals is typically represented by the level of particulate control. The emission factors for PM/PM_{10} when firing the IGCC with syngas and No. 2 fuel oil are judged to represent BACT for beryllium, arsenic and mercury.

PM/PM_{10} emissions are controlled for the auxiliary boiler by firing with No. 2 fuel oil with a sulfur concentration not to exceed 0.05%, by weight. This fuel sulfur level is consistent with recent BACT determinations for similar facilities.

Products of Incomplete Combustion

The emissions of carbon monoxide, volatile organic compounds and other organics from combustion turbines are largely dependent upon the completeness of combustion and the type of fuel used. The applicant has indicated that the carbon monoxide emissions from the proposed turbines are based on exhaust concentrations of 25 ppmvd for syngas and 30 ppmvd for No. 2 fuel oil. Volatile organic compound emissions have been based on exhaust concentrations of 7 and 1 ppmvd for fuel oil firing and syngas, respectively.

A review of the BACT/LAER clearinghouse indicates that several of the largest combustion turbines (those with heat inputs greater that 1,000 MMBtu/hour) have been permitted with CO limitations which are similar to those proposed by the applicant. For VOC, the clearinghouse also indicates that the proposed emissions are consistent with that established for other turbines of similar size, thereby suggesting that the proposed emission levels for both CO and VOC are reasonable. Although the majority of BACT emissions limitations have been based on combustion controls for carbon monoxide and volatile organic compounds minimization, additional control is achievable through the use of catalytic oxidation.

Catalytic oxidation is a post-combustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection for NO_X control. These installations have been required to utilize LAER technology, and typically have CO limits in the 10 ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, thereby reducing the amount of thermal energy required compared to thermal oxidation. For CC combustion turbines, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature and desired efficiency. Most gas turbine applications have been limited to smaller cogeneration facilities burning natural gas in nonattainment areas.

The application of oxidation catalyst is not being required as BACT for the IGCC unit due to high content of sulfur in the fuel. Syngas fuel which will be utilized at 100 percent capacity factor contains up to 0.07% by weight sulfur content. These sulfur compounds are oxidized to SO_2 in the combustion process and will be further oxidized by the catalyst to sulfur trioxide (SO_3). SO_3 will, in turn, combine with moisture in the gas stream to form H_2SO_4 mist. Therefore, the use of an oxidation catalyst system for the IGCC unit is not BACT due to corrosion problems.

Acid Gases - Sulfur Dioxide

The emissions of sulfur dioxide, nitrogen oxides, fluorides, and sulfuric acid mist, as well as other acid gases which are not "regulated" under the PSD Rule, represent a significant proportion of the total emissions and need to be controlled if deemed appropriate. Sulfur dioxide emissions from combustion turbines are directly related to the sulfur content of the fuel being combusted.

The IGCC facility's projected emissions for SO_2 exceed the significant emission rates given in Florida Administrative Code Rule 17-212.410, Table 212.400-2. A review of the BACT/LAER Clearinghouse indicates that the proposed post-demonstration SO_2 emission level of 0.17 lbs/MMBtu for syngas is consistent with the SO_2 limit for recent determinations of coal fired boilers.

For the IGCC combustion turbine, the applicant has proposed the use of Syngas, No. 2 fuel oil with a maximum sulfur content of 0.05%, by weight, and coal gasification to control sulfur dioxide emissions. In accordance with the "top down" BACT review approach, only two alternatives exist that would result in more stringent SO_2 emissions. These include the use of a lower sulfur content syngas and fuel oil or the use of wet lime or limestone-based scrubbers, otherwise known as flue gas desulfurization (FGD).

In developing the NSPS for stationary gas turbines, EPA recognized that FGD technology was inappropriate to apply to these combustion units. EPA acknowledged in the preamble of the proposed NSPS that "Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) to control SO_2 emissions from stationary gas turbines is considered unreasonable." EPA reinforced this point when, later on in the preamble, they stated that "FGD... would cost about two to three times as much as the gas turbine." The economic impact of applying FGD today would be no different.

Furthermore, the application of FGD would have negative environmental and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and water) costs associated with the operation

of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

Coal gasification sulfur content is controlled through fuel-production process controls. Sulfur removal stages in the coal gasification process include acid gas removal, and sulfuric acid plant thermal oxidizer. Acid gas removal systems remove hydrogen sulfide, carbonyl sulfide and carbon dioxide from the fuel gas using an acid gas absorbent solution. The acid gases are stripped from the adsorbent solution and sent to the sulfuric acid plant for introduction into a thermal oxidizer, where the remaining sulfur compounds are converted to SO_2, and finally converted to commercial grade liquid H_2SO_4. The overall sulfur removal efficiency is 95.6%. The sulfur bearing compounds content of the syngas is reduced to 0.07% by weight, or less.

The elimination of flue gas control as a BACT option then leaves the use of NG, CG with the sulfur removal process or low sulfur coal as the options to be investigated. The applicant has proposed the use of syngas, CG with sulfur removal or No. 2 fuel oil (maximum of 876 hours per year per IGCC combustion turbine) with a maximum sulfur content of 0.05%, by weight, as BACT for this project.

Although the applicant's proposed coal gasification acid gas cleanup process is an existing technology, development is continuing on coal gasification systems. The data base to determine whether the proposed post-demonstration sulfur bearing compounds level of 0.07% by weight is reasonable for a coal gasification facility with resulting proposed emissions of 0.17 lbs/MMBtu is limited. A commercial scale demonstration of an IGCC 100 MW power plant has been conducted adjacent to Southern California Edison's Cool Water generating station. During the Cool Water demonstration project, high sulfur coals, Illinois #6 and Pittsburgh #8, with a sulfur content of about 3.1 percent were tested. The SO_2 emission rate was 0.11 lbs/MMBtu for the Pittsburgh #8 coal and was even lower for the Illinois #6 coal (Technical Brief, Cool Water Coal Gasification Program: Commercial Scale Demonstration of IGCC Technology Completed, Electric Power Research Institute). The Polk Power Station IGCC unit has been designed for a larger capacity and is expected to be capable of using coals from various sources not included in the Cool Water demonstration project tests. Although, emission rates from the Cool Water tests are representative of the SO_2 emission range that can be achieved using IGCC units, the study was conducted as a demonstration project and the unit was later converted to another fuel source.

The Polk Power Station IGCC coal gasification system includes an option for both cold gas and hot gas cleanup and emissions from the Cool Water demonstration project are not directly comparable to the hot gas cleanup system. However, an objective of the hot gas cleanup system test is to demonstrate the efficiency in decreasing sulfur emissions compared to cold gas cleanup system.

Acid Gases - Nitrogen Oxides

The applicant has stated that BACT for nitrogen oxides for the IGCC unit will be met by using nitrogen diluent injection to limit emissions to 25 ppmvd at 15% oxygen when burning syngas, and water injection to achieve 42 ppmvd at 15% oxygen when burning No. 2 fuel oil. The emission limit of 25 ppmvd when burning syngas is higher compared to 9 ppmvd when burning NG in a combustion turbine due to the difference in composition and heat content between the two fuels. In contrast to natural gas which is predominately methane, syngas is composed of a variety of constituents including CO, hydrogen, CO_2, nitrogen, and water. The combustible components of syngas are primarily CO and hydrogen instead of methane. CO and hydrogen burn at a higher adiabatic flame temperature than methane and therefore can produce approximately three times as much NO_X as natural gas.

A review of EPA's BACT/LAER Clearinghouse indicates that the lowest NO_X emission limit established to date for a combustion turbine is 4.5 ppmvd at 15 percent oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system. The two 25 MW combustion turbines are located in Kern County, California and the degree of control at this facility exceeds BACT requirements.

Selective catalytic reduction is a post-combustion method for control of NO_X emissions. The SCR process combines vaporized ammonia with NO_X in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed.

The applicant has indicated that the cost effectiveness for the application of SCR technology to the Polk Power Station IGCC project was determined to be $4,935 per ton of NO_X removed for a 50% reduction of NO_X concentration from 25 ppmvd to 12.5 ppmvd. The cost impact analysis was conducted using the OAQPS factors and project-specific economic factors. An assessment of economics impacts was performed by comparing control costs between a baseline case of advanced combustion and nitrogen injection and baseline technology with the addition of SCR controls. Baseline technology is expected to achieve NO_X exhaust concentrations of 25 and 42 ppmvd at 15% oxygen for syngas and oil-firing, respectively. Based

on Japanese experience, SCR technology was premised to achieve NO_x concentration of 12.5 and 21 ppmvd at 15% oxygen for syngas and oil-firing, respectively, representing a 50% NO_x removal efficiency.

Since SCR has been determined to be BACT for several combined cycle facilities firing natural gas, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics. In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products Inc.), the following statement is made:

"In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

The auxiliary boiler is expected to operate 1,000 hours per year or less. The applicant is proposing to control SO_2 and acid gas emissions by firing with No. 2 fuel oil with a sulfur content of 0.05% or less, by weight, and by using combustion controls. Therefore, limited operation and low sulfur distillate oil represents BACT for the auxiliary boiler.

H_2SO_4 Plant Thermal Oxidizer

The predominant emission from the thermal oxidizer is sulfur dioxide. The sulfur dioxide emissions proposed for the facility are based on the highest removal efficiency that is now being maintained at other coal gasification facilities. This is accomplished by using an acid gas removal system followed by a sulfuric plant thermal oxidizer. This process is capable of providing an overall sulfur removal rate of 95.6 percent.

Fugitive Sources

The applicant has indicated that fugitive particulate emissions may result from the storage and handling of coal, slag, and sulfur. BACT for controlling these activities is good engineering design and practices. Control measures shall include the following:

- Minimize number of material transfer points
- Apply crusting agent application to inactive storage areas
- Enclose conveyers and transfer points
- Provide induced collection systems for dust

- Provide wet suppression systems (surfactant)
- Cover by-product storage areas (upon completion of cell)
- Handle and store sulfur in a molten or continuous crystalline state

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions.

Environmental Impact Analysis

The predominant environmental impacts associated with this proposal are related to the use of SCR for NO_x control. The use of SCR results in emissions of ammonia, which may increase with increasing levels of NO_x control. In addition, some catalysts may contain substances which are listed as hazardous waste, thereby creating an additional environmental burden. Although the use of SCR does have some environmental impacts, the disadvantages do not outweigh the benefit which would be provided by reducing nitrogen oxide emissions by 50 percent. The benefits of NO_x control by using SCR is substantiated by the fact that a number of BACT determinations have established SCR as the control measure for nitrogen oxides over the last five years for combustion turbines.

In addition to the criteria pollutants, the impacts of toxic pollutants associated with the combustion of syngas and No. 2 fuel oil have been evaluated. Beryllium and Mercury exceeds the PSD significant level. Other toxics are expected to be emitted in minimal amounts, with the total emissions combined to be less than one ton per year.

Although the emissions of the toxic pollutants could be controlled by particulate control devices such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense for firing with natural gas or fuel oil. Therefore, the Department does not believe that the BACT determination would be affected by the emissions of the toxic pollutants associated with the firing of syngas or No. 2 fuel oil.

Potentially Sensitive Concerns

With regard to controlling NOx emissions from SCR the applicant has expressed concerns regarding SCR catalyst deactivation due to poisoning, oxidation of SO2 to SO3, formation of H2SO4, formation of ammonium bisulfate and ammonium sulfate, risk due to potential leaks from storage of NH3 and disposal of spent catalyst which may be considered hazardous.

A review of permitting activities for combined cycle proposals across the nation indicates that SCR has been required or proposed for installations with a variety of operating conditions including firing with fuel oil. SCR also has been accepted as BACT for boilers fired with pulverized coal. Although the concerns expressed by the applicant were valid at one time, the most recent experiences indicate that these problems have been resolved through advances in catalysts and experiences gained in operation.

BACT Determination by DEP

1. Combustion Products - PM/PM_{10} (excluding H_2SO_4)

During the two year demonstration period for the IGCC unit at the Polk Power Station, the applicant's proposed PM/PM10 emission limit of 0.013 lb/MMBtu is accepted for IGCC hot cleanup testing conducted under the Cooperative agreement with the US DOE.

For IGCC operation following the 2-year demonstration period particulate emissions control for the IGCC unit will be limited to 0.013 lb/MMBtu.

2. Products of Incomplete Combustion - CO and VOC

The use of an oxidation catalyst system for the IGCC system is not found to be BACT due to the high sulfur content in the syngas and resulting corrosion problems. Emissions are to be controlled by good combustion practices during demonstration and post demonstration periods.

3. Acid Gases - Sulfur Dioxides

During the 2-year demonstration period for the IGCC unit at the Polk Power Station, the applicant's proposed SO_2 emissions limit of 0.247 lbs/MMBtu is accepted for IGCC demonstration testing conducted under the Cooperative Agreement with the US DOE. The proposed emissions limit will allow for testing of coals with a broad range of sulfur content and for evaluation of the IGCC unit design.

For IGCC operations following the demonstration period, SO_2 emissions shall not exceed the 0.17 lbs/MMBtu limit established in a recent BACT determination for the Indiantown Cogeneration facility.

The SO_2 emissions shall be limited to 0.17 lbs/MMBtu for the IGCC unit by the use of low sulfur coal and the integral IGCC sulfur removal and recovery processes.

Acid Gases - Nitrogen Oxides

The annualized cost per ton for NO_X removal of $4,935 for the IGCC SCR estimated by the applicant exceeds recent estimates for other applications. Recent published estimates for a pulverized coal plant (Selective Catalytic Reduction for a 460 MW coal fueled unit: Overview of a NO_X Reduction System Selection, EPRI, 1993) with a NO_X reduction of 47 percent was $3,265 per ton in 1997 dollars. Costs per ton in this range indicate SCR is a reasonable alternative. However, there are significant differences between a pulverized coal-fired power plant and an IGCC unit in the design and operation of SCR NO_X control systems.

Due to the uncertainty in actual system performance and high cost of a SCR control system, NO_X BACT for the IGCC CT will be determined following a data collection period. After the demonstration phase, NO_X emission testing will be conducted on the CT every two months over a 12 to 18 month period. Test results will be provided to the Department within thirty (30) days after each test is performed. During the test period, the CT shall be operated to achieve the lowest possible NO_X emission rate and shall not exceed 25 ppmvd NO_X corrected to 15 percent oxygen and ISO conditions. This concentration limitation, equivalent to an emission rate of 0.099 lb NO_X/MMBtu, is 42 percent lower than rates recently established as BACT for other pulverized coal-fired power plant applications. One month after the test period ends, the applicant will submit a recommended BACT determination for NO_X using the test results, data obtained from other similar facilities, and research conducted by the CT manufacturer. The Department will then make a BACT determination for NO_X only and adjust the NO_X emission limits as appropriate.

The emission limits for the IGCC unit for firing with syngas and No. 2 fuel oil for the Polk Power Station are thereby established as follows:

Emission Limitations - 7F CT

Pollutant			IGCC Post Demonstration			IGCC 2-year Demonstration		
	Fuel	Basis	lb/hr	tpy[a]	Fuel	Basis	lb/hr	tpy[b]
NO_x	Oil	42 ppmvd[f]	311	N/A	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd[f]	222.5	1,044	Syngas	81 ppmvd	664.2	2,908.3
VOC[c]	Oil	0.028 lb/MMBtu	32	N/A	Oil	0.028 lb/MMBtu	32	N/A
	Syngas	0.0017 lb/MMBtu	3	38.5	Syngas	0.0017 lb/MMBtu	3	38.5
CO	Oil	40 ppmvd	99	N/A	Oil	40 ppmvd	99	N/A
	Syngas	25 ppmvd	98	430.1	Syngas	25 ppmvd	99	430.1
PM/PM_{10}[d]	Oil	0.009 lb/MMBtu	17	N/A	Oil	0.009 lb/MMBtu	17	N/A
	Syngas	0.013 lb/MMBtu	17	74.5	Syngas	0.013 lb/MMBtu	17	74.5
Pb	Oil	5.30E-5 lb/MMBtu	0.101	N/A	Oil	5.30E-5 lb/MMBtu	0.101	N/A
	Syngas	2.41E-6 lb/MMBtu	0.0035	0.067	Syngas	1.10E-5 lb/MMBtu	0.023	0.13
SO_2	Oil[e]	0.048 lb/MMBtu	92.2	N/A	Oil	0.048 lb/MMBtu	92.2	N/A
	Syngas	0.17 lb/MMBtu	357	1563.7	Syngas	0.247 lb/MMBtu	518	2,269

NOTES: a - Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

b - Based on baseload operations firing syngas, with a maximum of 8760 hrs/yr utilization of HGCU operations; up to 10 percent annual capacity factor firing fuel oil.

c - Exclusive of background concentrations.

d - Excluding sulfuric acid mist.

e - Sulfur dioxide emissions based on a maximum of 0.05 percent sulfur, by weight.

f - ppmvd at 15% O_2 and ISO conditions.

Auxiliary Boiler

For the auxiliary boiler, BACT will be represented by a limitation on hours of operation and the use of clean fuel (maximum 1,000 hours per year firing No. 2 fuel oil with 0.05% sulfur, by weight).

H_2SO_4 Plant Thermal Oxidizer

A review of the proposed emission rates for the thermal oxidizer indicates that equipment in and of itself represents BACT for these sources.

Fugitive Sources

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions and is representative of BACT.

Details of the Analysis May be Obtained by Contacting:
Doug Outlaw, P.E., BACT Coordinator
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

February 18 1994
Date

Approved by:

Virginia B. Wetherell, Secretary
Dept. of Environmental Protection

February 24 1994
Date

TAMPA ELECTRIC

August 11, 1998

A. A. Linero, P.E..
Administrator, New Source Review Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32399-2400

Via FedEx
Airbill No. 805858540190

Re: Tampa Electric Company (TEC)
Polk Power Station
Proof of Publication for Modification of PSD-FL-194B

Dear Mr. Linero:

I have enclosed the Affidavit of Publication for the Lakeland newspaper, The Ledger, as requested. This public notice was published on August 7th. If you have any questions, please feel free to telephone me at (813) 641-5210. Thank you.

Sincerely,

Patrick L. Shell
Engineer
Environmental Planning

EP\gm\PLS102

Enclosure
SWD
Polk Co.
S. Arif, BAR

TAMPA ELECTRIC COMPANY
P. O. BOX 111 TAMPA, FL 33601-0111

(813) 228-4111

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HILLSBOROUGH COUNTY (813) 223-0800
OUTSIDE HILLSBOROUGH COUNTY 1 (888) 223-0800

AFFIDAVIT OF PUBLICATION

THE LEDGER

Lakeland, Polk County, Florida

Case No .....

STATE OF FLORIDA)
COUNTY OF POLK)

Before the undersigned authority personally appeared David Vail, who on oath says that he is Controller of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Public Notice Of Intent

in the matter of

DEP FILE PSD-FL-194B

in the

Court, was published in said newspaper in the issues of

August 7;

1998

Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the post office in Lakeland, in said Polk 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.

Signed .....
David Vail
Controller
By David Vail who is personally known to me

Sworn to and subscribed before me this 7TH day of August A.D. 1998

(Seal) Donald Ray Jenkins
Notary Public

DONALD RAY JENKINS
MY COMMISSION # CC 586345
EXPIRES: September 18, 2000
Bonded Thru Notary Public Underwriters

My Commission Expires.....

Order#706888
TECO

B776

Attach Notice Here

PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION
STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEP FILE PSD-FL-194B
Polk Power Station Integrated Gasification Combined Cycle Project
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a PSD Permit Modification to Tampa Electric Company (TEC) to extend the demonstration period for gas cleaning technology from two to three years at its Integrated Gasification Combined Cycle Facility (Polk Power Station) located at 9895 State Road 37 South Mulberry, Polk County. A Best Available Control Technology determination was not required pursuant to Rule 62-212.400, F.A.C. or 40CFR52.21, Prevention of Significant Deterioration (PSD). The applicant's name and address are: Tampa Electric Company, Post Office Box 111, Tampa, Florida 33601-0111.

The present permit provides for a two year period to demonstrate hot gas cleanup technology at the 260 megawatt Polk Power Station that was built with joint funding by TEC and the Department of Energy (DOE). The request will defer the hot gas cleanup demonstration until the sorbent becomes more commercially viable. TEC and DOE will focus instead on other sulfur dioxide and carbon dioxide reduction activities, thus extending the demonstration period to three years. This revised period will end on September 30, 1999. The ending date for a subsequent period to demonstrate compliance with the nitrogen oxides limit of 25 ppm while operating the facility using cold gas cleanup will be extended to April 2001. A revised BACT will be issued by the Department by June 2001.

The extra year of demonstration will permit the facility to emit sulfur dioxide and nitrogen oxides emissions at higher rates than ultimately allowed by the present permit. This amount is equal to approximately 1860 tons of nitrogen oxides and 700 tons of sulfur dioxide.

The Department will issue the final permit modification with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments concerning the proposed permit modification issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit Modification." Written comments should be provided to the Departments Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station 5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit modification and require, if applicable, another Public Notice.

The Department will issue the permit modification with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S. or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known, (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Polk County Public Works
Department - Air Program
4189 Ben Durrance Road
Bartow, Florida 33830
Telephone: 941/534-7377
Fax: 941/534-7374

Dept. of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301
Telephone: 850/488-0114
Fax: 850/922-6979

Dept. of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218
Telephone: 813/744-6100
Fax: 813/744-6084

The complete project file includes the Draft Permit Modification, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114 for additional information.

B-776 - 8-7-1998

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

July 30, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Gregory M. Nelson, P.E.
Administrator, Air Programs
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Re: Modification of DEP File PSD-FL-194B
Polk Power Station

Dear Mr. Nelson:

Enclosed is one copy of the Draft PSD Permit Modification for the Integrated Gasification Combined Cycle facility located at 9895 State Road 37, Mulberry, Polk County. The Department's Intent to Issue PSD Permit Modification and the "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION" must be published in a newspaper of general circulation in Polk County. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section at the above letterhead address. If you have any other questions, please call Mr. Syed Arif at 850/921-9528.

Sincerely,

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CHF/sa

Enclosures

In the Matter of an
Application for Permit Modification by:

Mr. Gregory M. Nelson, P.E.
Administrator, Air Programs
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

DEP File PSD-FL-194B
Polk Power Station
Polk County

_____/

INTENT TO ISSUE PSD PERMIT MODIFICATION

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit modification (copy of DRAFT Permit Modification attached) for the proposed action, as detailed in the application specified above, for the reasons stated below.

The applicant, Tampa Electric Company, applied on February 27, 1998 to the Department for a permit modification to extend the demonstration period for gas cleaning technology from two to three years at its Integrated Gasification Combined Cycle facility located at 9895 Sate Road 37 South, Mulberry, Polk County.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212, and 40CFR52.21(u). The above actions are not exempt from permitting procedures. The Department has determined that a modification of the permit issued pursuant to the Prevention of Significant Deterioration (PSD Permit) is required to extend the demonstration period described above.

The Department intends to issue this PSD Permit modification based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-110.106(7)(a)1., F.A.C., you (the applicant) are required to publish at your own expense the enclosed ""Public Notice of Intent to Issue PSD Permit Modification." The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be one with significant circulation in the area that may be affected by the permit modification. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station 5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-0114; Fax 850/ 922-6979). The Department suggests that you publish the notice within thirty days of receipt of this letter. You must provide proof of publication within seven days of publication, pursuant to Rule 62-110.106(5), F.A.C. No permitting action for which published notice is required shall be granted until proof of publication of notice is made by furnishing a uniform affidavit in substantially the form prescribed in Section 50.051, F.S. to the office of the Department issuing the permit modification or other authorization. Failure to publish the notice and provide proof of publication may result in the denial of the permit modification pursuant to Rules 62-110.106(9) & (11), F.A.C.

The Department will issue the final permit modification with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments concerning the proposed permit modification issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit Modification." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit modification and require, if applicable, another Public Notice.

The Department will issue the permit modification with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542 F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

Executed in Tallahassee, Florida.

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE PSD PERMIT MODIFICATION (including the PUBLIC NOTICE, and DRAFT permit modification) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 7-31-98 to the person(s) listed:

Greg Nelson, P.E.*
Doug Neely, EPA
John Bunyak, NPS
Bill Thomas, DEP SWD
Buck Oven, DEP PPS
Joe King, Polk County

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

(Clerk) 7-31-98 (Date)

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File PSD-FL-194B

Polk Power Station Integrated Gasification Combined Cycle Project
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a PSD Permit Modification to Tampa Electric Company (TEC) to extend the demonstration period for gas cleaning technology from two to three years at its Integrated Gasification Combined Cycle Facility (Polk Power Station) located at 9895 State Road 37 South, Mulberry, Polk County. A Best Available Control Technology determination was not required pursuant to Rule 62-212.400, F.A.C. or 40CFR52.21, Prevention of Significant Deterioration (PSD). The applicant's name and address are: Tampa Electric Company, Post Office Box 111, Tampa, Florida 333601-0111.

The present permit provides for a two year period to demonstrate hot gas cleanup technology at the 260 megawatt Polk Power Station that was built with joint funding by TEC and the Department of Energy (DOE). The request will defer the hot gas cleanup demonstration until the sorbent becomes more commercially viable. TEC and DOE will focus instead on other sulfur dioxide and carbon dioxide reduction activities, thus extending the demonstration period to three years. This revised period will end on September 30, 1999. The ending date for a subsequent period to demonstrate compliance with the nitrogen oxides limit of 25 ppm while operating the facility using cold gas cleanup will be extended to April 2001. A revised BACT will be issued by the Department by June 2001.

The extra year of demonstration will permit the facility to emit sulfur dioxide and nitrogen oxides emissions at higher rates than ultimately allowed by the present permit. This amount is equal to approximately 1860 tons of nitrogen oxides and 700 tons of sulfur dioxide.

The Department will issue the final permit modification with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments concerning the proposed permit modification issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit Modification." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station 5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit modification and require, if applicable, another Public Notice.

The Department will issue the permit modification with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Polk County Public Works Department - Air Program 4189 Ben Durrance Road Bartow, Florida 33830 Telephone: 941/534-7377 Fax: 941/534-7374	Dept. of Environmental Protection Bureau of Air Regulation 111 S. Magnolia Drive, Suite 4 Tallahassee, Florida 32301 Telephone: 850/488-0114 Fax: 850/922-6979	Dept. of Environmental Protection Southwest District 3804 Coconut Palm Drive Tampa, Florida 33619-8218 Telephone: 813/744-6100 Fax: 813/744-6084

The complete project file includes the Draft Permit Modification, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114 for additional information.

September XX, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Gregory M. Nelson, P.E.
Administrator, Air Programs
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Re: Modification of DEP File PSD-FL-194A
Polk Power Station

Dear Mr. Nelson:

The Department reviewed your letter and application dated February 24, 1998 and additional information on June 11, 1998 requesting an extension of the demonstration period for integrated coal gasification and combined-cycle system, as well as changing dates to correlate with the extension. This request is acceptable to the Department. Following publication of the Public Notice of the Intent to Issue dated August XX, and the Department's review of comments received, the referenced permit (relevant pages attached) is hereby modified as follows:

SPECIFIC CONDITION H.2.

The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and No. 2 fuel oil during the ~~two~~ three year demonstration period (until September 30, 1999), shall not exceed the following:

(Note that the rest of this condition is related to applicable emissions and is not changed by this action)

SPECIFIC CONDITION H.6.

The combustion turbine will be operated for 12-18 months after the demonstration period (estimated to be from ~~Mid 1998~~ October 1, 1999 until ~~December 31, 1999~~ April 1, 2001).

(Note that the rest of this condition is related to testing requirements and is not changed by this action)

SPECIFIC CONDITION H.7.

One month after the test period ends (estimated to be by ~~February 2000~~ June 1,2001), the permittee will submit to the Department a NO_X recommended BACT Determination as if it were a new source using data gathered on this facility, other similar facilities and the manufacturer's research. The Department will make a determination on the BACT for NO_X only and adjust the NO_X emission limits accordingly.

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes. Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., by the filing of a Notice of Appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within (thirty) days after this Notice is filed with the Clerk of the Department.

Sincerely,

Howard L. Rhodes, Director
Bureau of Air Regulation

HLR/sa

Enclosures

Department of Environmental Protection

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

June 16, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Janice K. Taylor
Senior Engineer
Environmental Planning
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Re: DEP File No. 1050233-002-AC; PSD-FL-194(A); PA-92-32
Polk Power Station

Dear Ms. Taylor:

The Department has received your request of May 21, 1998, to allow burning of coal/petroleum coke fuel blends as well as 100 percent coal as solid fuels for use in the Integrated Coal Gasification Combined Cycle (IGCC) combustion turbine during the demonstration period. The Department has issued an incompleteness letter on March 26, 1998, for an earlier request for extending the demonstration period for the hot gas cleanup system from two to three years. The two requests will be combined and handled as one project. Based on our initial review of this request, we have determined that additional information is needed in order to process the application. The following information is required:

1. Please indicate based on the start-up of the unit your best estimate of the ending date for the demonstration period before the extension is granted.
2. Please provide the material balances for sulfur and associated SO_2 emissions with the burning of 25%, 50% and 75% blend of petcoke which has a much higher sulfur content compared to coal.
3. Please indicate if any limitations were considered for the sulfur content of the coal for this project. If so, what was the limit considered either in the original application or during BACT discussions.
4. Please provide reasonable assurance that the current sulfuric acid plant will be capable of handling the added sulfur due to petroleum coke. What are the emissions of SO_2 from the sulfuric acid plant with the present set-up and what are the emissions expected when coal/petroleum coke blend is fired in IGCC.

5. Please provide the different scenarios under which testing will be done and the associated time periods for each scenario.

The Department will resume processing this application after receipt of the requested information. If there are any questions regarding this matter, please call me at (850)921-8968.

Sincerely,

Syed Arif, P.E.
New Source Review Section

/sa

cc: Buck Oven, DEP
Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, SWD

TAMPA ELECTRIC

RECEIVED
JUN 16 1998
BUREAU OF
AIR REGULATION

June 11, 1998

Mr. A.A. Linero, P.E.
Administrator
New Source Review Section
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Certified Mail No. P 148 152 268
Return Receipt Requested

RECEIVED
JUN 18 1998
DEP

Re: Tampa Electric Company
Polk Power Station Demonstration Period Extension
DEP File No. PSD-FL-194A; PA-92-32

Dear Mr. Linero:

We hereby provide the following responses to comments raised in your letter of March 26, 1998 regarding TEC's request to extend the demonstration period for the Polk Power Station. For ease of review, we have included your comments, followed by our corresponding responses.

FDEP Comment #1:

Please explain the need for extending the demonstration period for hot gas cleanup system from two to three years. In responding to this incompleteness, provide documentation from DOE or the equipment vendors reflecting the need for a three year demonstration period.

TEC Response:

The demonstration period for the Polk Power Station DOE-IGCC Clean Coal Project has been extended from two (2) years to three (3) years as evidenced by Amendment # A011 of TEC's Cooperative Agreement with DOE. A copy of this amendment dated May 15, 1997 has been attached hereto. In addition, because of the recent determination by DOE, GE, and TEC, that HGCU demonstration should be temporarily put on hold until development of HGCU sorbent becomes more commercially viable, DOE and TEC have agreed to modify the demonstration requirements of the cooperative agreement to shift the demonstration focus from HGCU to other sulfur and CO_2 emissions reductions activities that provide greater overall benefit to Polk Power Station. These activities will specifically entail implementation of increased COS reduction,

operational and hardware modifications, and TEC's participation in DOE's national CO_2 sequestration and disposal program PRDA No. DE-RA26-98FT-35008.

In addition to the above noted shifts in DOE focus, the specific requirements for TEC's alternate fuels demonstration period has been formally extended from two (2) to three (3) years. It is specifically for this extension, which requires additional fuel testing at Polk until 10-1-99, that TEC requests DEP to extend the Polk demonstration duration for a similar period.

FDEP Comment #2:

Please explain the effect of additional 2,908 tons of NO_X and 2,269 tons of SO_2 emissions if the demonstration period is extended for one year by the Department. In responding to this incompleteness, provide analyses, if required, to show no violations of National Ambient Air Quality Standards.

TEC Response:

Extending the demonstration period for one year will not have an adverse environmental impact. Specifically, no violations of the National or Florida Ambient Air Quality Standards (AAQS) are predicted. Dispersion modeling of the complete Polk Power Station build-out was conducted during the site certification and prevention of significant deterioration (PSD) permitting process. The complete build-out included the IGCC (both demonstration and post-demonstration modes), four (4) natural gas-fired combustion turbines in combined-cycle mode, and six (6) natural gas-fired combustion turbines in simple-cycle mode. This dispersion modeling demonstrated no violations of the national or Florida AAQS. Relying on the results of this dispersion modeling is appropriate because:

1. *An increase in the demonstration period emissions limits is not being requested. TEC is requesting the existing demonstration period be extended as is for one (1) year.*

2. *The dispersion modeling was very conservative because the full site buildout scenario, at full load, was modeled.*

FDEP Comment #3:

Please provide updated information on the hot gas cleanup technology. What percent gas stream will be used for hot gas cleanup technology. What effect will it have on pollutant emissions. Provide any information relating to the feasibility of this technology since the original application was submitted to the Department in September 1992.

TEC Response:

The Polk IGCC unit has included in its design a HGCU slip stream unit that can process 10% of the total syngas flow generated at Polk Power Station. This system is in addition to the 100% capacity traditional cold gas clean-up system which has been installed in parallel with the HGCU system.

The HGCU system was designed to remove in excess of 99% of the sulfur from its 10% flow stream.

Attached is a position paper regarding the status of hot gas cleanup and other pollution control strategies which DOE is preparing for imminent release. Please treat this position paper as Confidential until it is formally released by DOE.

It is our understanding that the Department will resume processing our request to extend the Polk Power Station demonstration period upon receipt of the above responses. Should you have any further questions or comments regarding this matter, please call me at (813) 641-5016.

Sincerely,

Gregory M. Nelson

Gregory M. Nelson, P.E.
Administrator - Air Programs
Environmental Planning

EP\gm\GMN108

Attachments

cc: S. Arif, BAR
Polk Co.
SWD

DOE F 4600.1
(7-81)

U.S. DEPARTMENT OF ENERGY
NOTICE OF FINANCIAL ASSISTANCE AWARD
(See Instructions)

Under the authority of Public Law 100-446 and 101-45 and subject to legislation, regulations and policies applicable to *(cite legislative program title)*: Department of Energy Clean Coal Technology

1. PROJECT TITLE
Tampa Electric Company Integrated Gasification Combined-Cycle Project

2. INSTRUMENT TYPE
☐ GRANT ☒ COOPERATIVE AGREEMENT

3. RECIPIENT *(Name, address, zip code, area code and telephone no.)*
Tampa Electric Company
P.O. Box 111
Tampa, FL 33601

4. INSTRUMENT NO.
DE-FC21-91MC27363

5. AMENDMENT NO.
A011

6. BUDGET PERIOD
From: 10/01/96 To: 09/30/01

7. PROJECT PERIOD
From: 03/18/91 To: 09/30/01

8. RECIPIENT PROJECT DIRECTOR *(Name and telephone No.)*
Charles R. Black
(813) 228-1767

10. TYPE OF AWARD
☐ NEW ☐ CONTINUATION ☐ RENEWAL
☒ REVISION ☐ SUPPLEMENT

RECIPIENT BUSINESS OFFICER *(Name and telephone No.)*
Charles R. Black
(813) 228-1767

12. ADMINISTERED FOR DOE BY *(Name, address, zip code, telephone No.)*
Alexis W. Puher (304) 285-4084
Federal Energy Technology Center
P.O. Box 880
Morgantown, WV 26507-0880

9. DOE PROJECT OFFICER *(Name, address, zip code, telephone No.)*
Nelson P. Rekos (304) 285-4066
P.O. Box 880
Morgantown, WV 26507-0880

13. RECIPIENT TYPE
☐ STATE GOVT ☐ INDIAN TRIBAL GOVT ☐ HOSPITAL ☒ FOR PROFIT ORGANIZATION ☐ INDIVIDUAL
☐ LOCAL GOVT ☐ INSTITUTION OF HIGHER EDUCATION ☐ OTHER NONPROFIT ORGANIZATION ☒ C ☐ P ☐ SP ☐ OTHER *(Specify)*

14. ACCOUNTING AND APPROPRIATIONS DATA

a. Appropriation Symbol	b. B & R Number	c. FT/AFP/OC	d. CFA Number
89X0235.91	AZ0502020	H1/255 MB-75-91	790209

15. EMPLOYER I.D. NUMBER/SSN
59-0475140

16. BUDGET AND FUNDING INFORMATION

a. CURRENT BUDGET PERIOD INFORMATION

DOE Funds Obligated This Action	$ 7,900,000
DOE Funds Authorized for Carry Over	$ 0
DOE Funds Previously Obligated in this Budget Period	$ 20,100,000
DOE Share of Total Approved Budget	$ 28,000,000
Recipient Share of Total Approved Budget	$ 29,500,000
Total Approved Budget	$ 57,500,000

b. CUMULATIVE DOE OBLIGATIONS

(1) This Budget Period *[Total of lines a.(1) and a.(3)]*	$ 28,000,000
(2) Prior Budget Periods	$ 122,894,223
(3) Project Period to Date *[Total of lines b.(1) and b.(2)]*	$ 150,894,223

TOTAL ESTIMATED COST OF PROJECT $ 302,288,446

(This is the current estimated cost of the project. It is not a promise to award nor an authorization to expend funds in this amount.)

AWARD/AGREEMENT TERMS AND CONDITIONS

This award/agreement consists of this form plus the following:

a. Special terms and conditions (if grant) or schedule, general provisions, special provisions (if cooperative agreement)

b. Applicable program regulations *(specify)* _____ *(Date)*

c. DOE Assistance Regulations, 10 CFR Part 600, as amended, Subparts A and ☐ B (Grants) or ☒ C (Cooperative Agreements).

d. Application/proposal dated 08/89, ☐ as submitted ☒ with changes as negotiated

REMARKS

Reference Pages 2 and 3 for description of amendment.

EVIDENCE OF RECIPIENT ACCEPTANCE

(Signature of Authorized Recipient Official) *(Date)*

(Name)

(Title)

21. AWARDED BY

(Signature) *(Date)*

Randolph R. Cooper
(Name)

Contracting Officer
(Title)

STANDARD FORM 36. JULY 1966 GENERAL SERVICES ADMINISTRATION FED. PROC. REG. (41 CFR) 1-16.101	CONTINUATION SHEET	REF. NO. OF DOC. BEING CONTD. DE-FC21-91MC27363 A011	PAGE 2 OF 3

NAME OF OFFEROR OR CONTRACTOR
Tampa Electric Company

The purpose of this amendment A011 is to provide additional funds to cover the expenses resulting from syngas heat exchanger failure including repairs to the brine concentration system, O&M expenses for the third year of operation on coal fuels or coal blends including the expenses associated with the hot gas cleanup system (HGCU). This amendment fixes the demonstration period at 5 years with the Participant providing DOE the plant operational data throughout the 5 year period. This amendment to the Cooperative Agreement, and the corresponding amendment to the Repayment Agreement, expand the commercialization and repayment efforts to worldwide applications of the IGCC technology.

Accordingly, this Cooperative Agreement is revised as follows:

1. In Schedule Article VII(B) and (C), delete the word "(maximum)."

2. Schedule Article VII(D)'s footnote is changed to read "Phase III costs reflect only the first 3 years of the 5 year plant operational period."

3. The following cost figures in Schedule Article VII (D) are revised as shown below:

TOTAL ESTIMATED PROJECT COST	"$303,288,446"	
Phase III		
DOE Share	"$28,000,000"	"48.7%"
Participant Share	"$29,500,000"	"51.3%"
Total		
DOE Share	"$150,894,223"	"49.8%"
Participant Share	"$152,394,223"	"50.2%"

4. Schedule Article X(C) Project Costs Allowable for Cost-Sharing Purposes -- subarticle (9) is replaced with the following: "DOE's cost sharing for Budget Period 3 shall be applied to the first 3 years of Phase III. Normal operation and maintenance (O&M) (HGCU sorbent replacement excluded) costs after the first 3 years of Phase III shall be at no cost to the Government."

5. Article XXV Commercialization is replaced with the following: "The Participant agrees to exercise its best efforts to commercialize, or to assist others to commercialize, in the United States and throughout the world, oxygen-blown IGCC technology in accordance with Attachment E."

6. Schedule Article XXXV is replaced with the following:

"ARTICLE XXXV -- Phase III Testing and Cost Limitations

During the first 3 years of the Phase III, 5 coals or coal blends will be tested and formal reports of their performance issued to DOE. Based on a positive determination during this 3-year period, jointly concurred in by DOE, General Electric Environmental Services, Inc. (GEESI), and the Participant, that the HGCU system continues to hold significant promise to become technically and commercially viable, the Participant agrees to exert good faith efforts to make the HGCU system work through Phase III or until a mutual determination has been made as described in the fourth paragraph of this article.

In support of this commitment, if such a positive determination is made, the Participant shall, with the concurrence of DOE and GEESI, develop and execute a plan (Plan) for the required system(s) to allow an additional period of operation of the HGCU system during the course of the Participant's commercial operation of the Polk Unit 1 plant. This additional period of operation will be for 2 years after the third year of Phase III and shall be conducted at no expense to the Government (except that HGCU sorbent replacement will continue to be eligible for DOE cost sharing as described below). The Participant shall provide DOE with operating data from both the HGCU

STANDARD FORM 36, JULY 1966 GENERAL SERVICES ADMINISTRATION FED. PROC. REG. (41 CFR) 1-16.101	CONTINUATION SHEET	REF. NO. OF DOC. BEING CONTD. DE-FC21-91MC27363 A011	PAGE 3 OF 3
NAME OF OFFEROR OR CONTRACTOR Tampa Electric Company		REC: DUP/FAX	

97 MAY -5 AM 10:07

system and the remainder of the Polk Unit 1 plant during this additional operating period. DOE requirements for this data shall not create an unreasonable financial burden on the Participant.

In further support of this commitment, if such a positive determination is made, the Participant shall provide, and the Government shall not share in, the first $3,000,000 required during Phase III for addition to, or repair or modification of, the HGCU system or ancillary systems necessary for the proper operation of the HGCU system. After this $3,000,000 has been expended, additional capital expenses for any necessary system changes (including sorbent replacement) will be considered for DOE cost sharing in accordance with Article XII, paragraphs (C) and (D). The DOE is not obligated to provide such funding.

If at anytime during Phase III operation the HGCU is determined by mutual agreement by DOE, GEESI, and the Participant to be technically or commercially unfeasible, the Participant shall be released of its obligation to make the HGCU system work but shall continue to provide data from the commercially operated Polk Unit 1 plant to complete the Participant's obligation to provide data for 5 years of plant operation during Phase III.

It is the intent of this Cooperative Agreement to demonstrate a HGCU system which can be operated independently of selective catalytic reduction (SCR) technology. Therefore, the HGCU shall be determined to be unfeasible in the event that state or Federal regulatory agencies amend the Polk Unit 1 permits to require, as a condition of the Participant operating the HGCU system, that an SCR system be installed on the Polk Unit 1 plant. In such event, the Participant's remaining obligation to DOE shall be as described in the preceding paragraph.

Notwithstanding the specific requirements of the Cooperative Agreement related to the initial three (3) year demonstration period, during the subsequent two (2) year period of commercial operation, the Participant shall be authorized to operate the Facility in accordance with its standards of prudent utility practice (Participant's least cost of operation) for commercial dispatch and operating conditions. Consistent with the above, operation and maintenance costs (excluding HGCU sorbent replacement) during the subsequent two (2) year period of commercial operation shall not be allowed for cost-sharing purposes as defined in Article X(C) of this Cooperative Agreement.

Notwithstanding any provision of this Article XXXV, all O&M expenses for the Polk Unit 1 plant beyond the first 3 years of Phase III shall be borne by the Participant with no Government cost sharing (except that HGCU system sorbent replacement will continue to be eligible for DOE cost sharing after the Participant has expended the first $3,000,000 for fixes, as described above)."

7. Statement of Work, Project Description, C. Project Budget Periods -- change Budget Period 3 duration to "sixty (60) months."

8. Upon execution of this amendment, the maximum Department of Energy (DOE) cost sharing has been reached, and no additional DOE funds beyond the $150,894,223, presently obligated, shall be authorized for this project.

All other terms and conditions of this Cooperative Agreement remain unchanged.

END OF AMENDMENT A011

PUHER\1:970841.W52

OPTIONAL FORM 99 (7-90) Sent by: P. Nueso 05-15-97

FAX TRANSMITTAL # of pages ▸ 3

To Don Moss	From Nelson Rekos
Dept./Agency	Phone #
Fax # 941-428 5939	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Cooperative Agreement DE-FC21-91M27363 Tampa Electric Integrated Gasification Combined-Cycle (IGCC) Clean Coal Demonstration Project

Subject: Suspension of Testing/Operating the Hot Gas Cleanup System (HGCU) - GEESI's Moving-Bed Desulfurization Technology at Tampa Electric

Summary:
After extensive discussion with General Electric (GE) and Tampa Electric, DOE has concurred with Tampa Electric's recommendation that the testing of GEESI's moving bed desulfurization system at Tampa's IGCC facility at Polk Power Station be put on hold until such time that the moving bed technology becomes more commercially viable. The recommendation is based on several recent events including: 1) The moving bed system design for 10% of the gasifier syngas flow has several technical problems which would have to be resolved/repaired before any long term testing could start; 2) GE believes that no near term market exists to justify further development of the moving bed technology Furthermore, GE, the parent company of GEESI (the technology vendor), has sold the company to Marsulex but did not sell the rights to the HGCU, and 3) Tampa feels there are other emissions reduction activities that would provide a greater benefit to the Polk plant with applications to other IGCC systems.

Background
Tampa Electric's IGCC Project is part of the DOE Clean Coal Program, Round 3 Solicitation. The project is for the demonstration for a nominal 250-MWe oxygen-blown, integrated gasification combined-cycle utilizing a Texaco gasifier and a GE 7F frame combustion turbine. Bechtel Engineering worked with Texaco to design the system that includes a 100% flow conventional cold gas (amine-based) cleanup system and a 10% GEESI designed slipstream moving bed desulfurizer. The overall project cost was approximately $600 million with DOE contributing $150 million toward the construction and the three year demonstration period. The IGCC plant began producing power from clean syngas in October 1996, achieving a 45% plant availability on coal during 1997. These successes have been achieved while the plant operated on four different coal fuels with the conventional cold gas cleanup system. During this time, the GEESI moving bed desulfurization system completed its cold flow checkout with a regenerable metal-oxide sorbent. In February 1998, following a careful review of the moving bed status, including the poor results from the cold flow checkout tests, Tampa Electric with GE's concurrence, recommended to DOE that testing of the moving-bed system be put on hold.

The significant events that precipitated Tampa's recommendation are:

1) In November 1997, the cold flow system testing with the hot gas desulfurization sorbent at Tampa revealed that the attrition rate for the metal-oxide sorbent was significantly higher than required for commercial operation at Polk station. Further, the cold flow tests revealed that the system could not be operated in an automatic mode, and significant manpower would be required to maintain its

operation. Finally, the stainless steel selected for the moving-bed was found to be susceptible to stress corrosion cracking due to the high alkali levels in the flyash. This corrosion would be accelerated during shutdown periods due to the high local humidity in central Florida which caused any residual flyash in the pipe to convert to acids. While none of the problems were felt to be insurmountable, Tampa determined that additional capital and manpower would be required to resolve them.

2) GE reviewed the status and the near term commercial marketability of the moving-bed technology and informed Tampa that their focus was no longer aimed at investing additional capital or manpower to support the HGCU technology at Polk. In addition, in October, 1997, GEESI announced that it had been sold to Marsulex. Marsulex did not acquire the moving-bed technology. Therefore, the responsibility and any commitments to Tampa for the system reverted to GEESI's parent company GE.

During the same time, Tampa had identified several areas within the plant where an equivalent effort, as had been planned for testing of the moving-bed, could produce significant environmental benefits to the Polk plant and to IGCC applications worldwide. Tampa proposed to DOE that by implementing several modifications and capital improvements additional reductions in both CO2 and SO2 may be achieved. These reductions are significantly better than those expected from the slip-stream moving-bed system which would have improved only sulfur emissions by 5% over conventional cold gas cleanup system. Further the technologies used to obtain these sulfur and CO2 emissions have not been utilized at any other IGCC system and could be applied in IGCC applications worldwide.

Based on the above information, DOE believes it is in the best interest of all parties to suspend testing and operation of the GEESI system until all the issues associated with the system can be remedied. DOE also believes that it is in the best interest of all parties that the recommendations of Tampa Electric for further reduction of SO2 and CO2 emissions stated herein be pursued and the appropriate modifications to the cooperative agreement be made to include the stated improvements.

TAMPA ELECTRIC

RECEIVED
MAY 22 1998
BUREAU OF AIR REGULATION

RECEIVED
MAY 28 1998
Department of Environmental Protection
SOUTHWEST DISTRICT

May 21, 1998

Via FedEx
Airbill No. 803727908962

Mr. A.A. Linero, P.E., Administrator
New Source Review Section
Florida Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Re: Tampa Electric Company (TEC) 1050233-002-AC
Polk Power Station
Request to Amend PSD-FL-194 for the use of Coal/Petroleum Coke Solid Fuel Blend

Dear Mr. Linero: PSD-FL-194B

The Florida Department of Environmental Protection (FDEP), Bureau of Air Regulation, currently authorizes Tampa Electric Company (TEC) to operate the Polk Power Station under Permit PSD-FL-194. The permitted equipment includes, but is not limited to, one 260 MW (nominal) integrated coal gasification combined cycle (IGCC) combustion turbine (CT). In addition to the CT, the complete IGCC includes a solid fuel handling and storage system, a solid fuel gasification system, hot gas and cold gas clean-up systems, a sulfuric acid plant, and other ancillary equipment.

TEC is requesting an amendment to Permit PSD-FL-194 to include up to a 25% coal/75% petroleum coke fuel blend as well as 100 percent coal as solid fuels for use in the IGCC. The coal/petroleum coke fuel blend will be handled in the same manner as coal is currently handled at the facility. No changes will be made to the CT or any of the solid fuel handling, gasification, hot and cold gas clean-up, or acid plant equipment or processes. The syngas generated from the coal/petroleum coke blend and supplied to the CT will be comparable to the syngas generated from 100 percent coal gasification. No emissions increase is expected from coal/petroleum coke-produced syngas versus 100 percent coal-generated syngas.

TEC will conduct applicable emissions testing of the CT during the combustion of coal/petroleum coke blend-produced syngas-firing to provide reasonable assurance that emissions have not increased. This testing will be integrated into the required Demonstration Period testing program. A test protocol will be submitted to FDEP prior to testing, consistent with permit and regulatory requirements.

TAMPA ELECTRIC COMPANY
P. O. BOX 111 TAMPA, FL 33601-0111

(813) 228-4111

CUSTOMER SERVICE:
HILLSBOROUGH COUNTY (813) 223-0800
OUTSIDE HILLSBOROUGH COUNTY 1 (888) 223-0800

AN EQUAL OPPORTUNITY COMPANY
HTTP://WWW.TECOENERGY.COM

As we discussed in our telephone conversation on May 15, 1998 enclosed is a $250.00 processing fee. TEC appreciates your timely review of this amendment request. Please call me at (813) 641-5039 if you have any questions or wish to discuss any aspect of this request.

Sincerely,

Janice K. Taylor
Senior Engineer
Environmental Planning

Enclosure

EP\gm\JKT836

c: Mr. Hamilton Oven, FDEP - Tallahassee

cc: SWD
Polk Co.

file

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DISTRICT ROUTING SLIP

To: compliance Air Section DATE: 4/12/95

cc To:

	PENSACOLA	**NORTHWEST DISTRICT**	
	Panama City	Northwest District Branch Office	
	Tallahassee	Northwest District Branch Office	
	Sopchoppy	Northwest District Satellite Office	
✓	**TAMPA**	**SOUTHWEST DISTRICT**	
	Punta Gorda	Southwest District Branch Office	
	Bartow	Southwest District Satellite Office	
	ORLANDO	**CENTRAL DISTRICT**	
	Melbourne	Central District Satellite Office	
	JACKSONVILLE	**NORTHEAST DISTRICT**	
	Gainesville	Northeast District Branch Office	
	FORT MYERS	**SOUTH DISTRICT**	
	Marathon	South District Branch Office	
	WEST PALM BEACH	**SOUTHEAST DISTRICT**	
	Port St. Lucie	Southeast District Branch Office	

☐ Reply Optional Date Due _____ ☐ Reply Required Date Due: _____ ☐ Info Only

Comments:

FYI Elec c Info

D.E.P.
APR 13 1995
SOUTHWEST DISTRICT
TAMPA

From: Tel:

Scott Sheplak Tally

08-18-93

TAMPA ELECTRIC
A TECO ENERGY COMPANY

RECEIVED
APR 11 1995
Bureau of Air Regulation

April 7, 1995

Mr. Scott Sheplak
Department of Environmental Protection
Bureau of Air Regulation
Title V - Mail Station #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2410

Re: Tampa Electric Company
Annual Operation License Fee
Polk Power Station #40TPA530233

Dear Mr. Sheplak:

Pursuant to your telephone conversation with Jamie Woodlee of my staff, this letter is in response to a past due notice regarding the Polk Power Station's annual operating licensing fee. As discussed and agreed upon by Ms. Woodlee and yourself, the Polk Power Station is under construction; therefore, the annual operating fee is not yet applicable.

We would also like to request that the annual licensing fee forms be sent directly to Patrick A. Ho, Manager, Environmental Planning, P.O. Box 111, Tampa, Florida 33601.

If you have any questions, please feel free to call Jamie Woodlee or me at (813)228-4860.

Sincerely,

Patrick A. Ho

Patrick A. Ho, P.E.
Manager
Environmental Planning

EP\gm\JTW426

✓ copy to: Southwest District

AIRS expected startup date 7/1/95

Bill Thomas
copy all PA's
pb

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In Re: TAMPA ELECTRIC COMPANY POLK POWER STATION MODIFICATION OF CONDITIONS OF CERTIFICATION PA 92-32 POLK COUNTY, FLORIDA	)))))	DEP CASE NO. PA 92-32A OGC CASE NO. 92-1399

D.E.P.

FEB 23 1995

SOUTHWEST DISTRICT
TAMPA

FINAL ORDER MODIFYING CONDITIONS
OF CERTIFICATION

On January 26, 1994, the Governor and Cabinet, acting as the Siting Board, issued a final order approving certification for the Tampa Electric Company (TEC) Polk Power Station Project. That certification order approved the construction and operation of a 260 MW (net) first phase of an ultimate 1150 MW capacity, integrated coal gasification combined cycle (IGCC) facility and associated facilities to be located in Polk County, Florida.

On May 12, 1994 and September 9, 1994, TEC filed requests to modify the conditions of certification pursuant to section 403.516(1)(b), Florida Statutes (F.S.). TEC requested that the conditions be modified to approve changes to the plant design, layout, and operating conditions. The changes include increases in size and operating parameters for the auxiliary boiler, replacement of uncovered coal piles with coal silos, decreased NOx emission limits for the IGCC combustion turbine, revised monitoring requirements for the auxiliary boiler, and updating of applicable regulatory requirements.

Copies of TEC's request were distributed to all parties to the certification proceeding and made available for public review. On December 23, 1994, a Notice of Proposed Modification of Power Plant Certification regarding the proposed modifications was published in the Florida Administrative Weekly. TEC published notice of the proposed modification in the Tampa Tribune and Lakeland Ledger on December 3, 1994. The notice specified that a hearing would be held if requested on or before 45 days from receipt of the proposed modification by the parties or within 30 days of publication of the notice. No written objection to the proposed modification was received by the Department.

Accordingly, in the absence of any timely objection,

IT IS ORDERED:

The proposed changes to the TEC Polk Power Station , described in the May 12, and September 9, 1994 requests for modification, are **APPROVED**. Pursuant to Section 403.516(1)(b), F.S. the Department hereby **MODIFIES** the conditions of certification for the Polk Power Station as follows:

XIII. AIR

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed ~~49.5~~ 120.0 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content by weight. All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

G. Fugitive Dust

Fugitive dust emission during the construction period shall be minimized by covering or watering dust generation areas. Particulate matter emissions from the coal handling equipment shall be controlled by enclosing all coal storage, conveyors and conveyor transfer points ~~(except those directly associated with the coal stacker reclaimer for which an enclosure is operationally infeasible.)~~. Fugitive emissions shall be tested as specified in Condition No. XIII.J. ~~Inactive coal storage shall be shaped, compacted, and oriented to minimize wind erosion~~. Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. ~~When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.~~

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

			Emission Limitations 7F CT Post demonstration Period	
Pollutant	Fuel	Basis	lb/hr	tpy
NOx	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd	~~222.5~~ 220.25	~~1,044~~ 1,032.9

I. Auxiliary Boiler Operation

Normal operation of the auxiliary boiler shall be limited to a maximum of ~~1,000~~ 3,000 hours per year ~~and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable.~~ The auxiliary boiler may operate continuously (i.e. 8,760 hrs/yr) in the standby mode. The following emission limitations shall apply:

1. NOx emissions shall not exceed ~~0.16~~ 0.10 lbs/MMBtu for oil firing.

2. Sulfur dioxide emissions shall be limited by firing low sulfur oil with a maximum sulfur content of 0.05 percent by weight.

3. Visible emissions shall not exceed 20 percent opacity (6-minute average) (except for one six-minute period per hour during which opacity shall not exceed 27 percent), while burning low sulfur fuel oil.

a. The CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

b. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C., and 40 CFR 60. The record shall include periods of startup, shutdown and malfunction.

c. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

d. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of the CEMS.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 62-212 and 62-4, F.A.C., and 40 CFR 60, Subparts A, Db and GG.

Any party to this Order has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department of Environmental Protection in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that the Final Order is filed with the Department of Environmental Protection.

DONE AND ENTERED this 20th day of February, 1995 in Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for Virginia B. Wetherell
Secretary
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000
Telephone: (904) 488-4805

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52
Florida Statutes, with the designated
Department Clerk, receipt of which
is hereby acknowledged.

Clerk 2-22-95 Date

CERTIFICATE OF SERVICE

I DO HEREBY certify that a true an correct copy of the foregoing has been sent by U.S. Mail to the following listed persons:

Lawrence N Curtin
Attorney at Law
Holland & Knight
P.O. Drawer 810
Tallahassee, FL 32302

Karen Brodeen
Assistant General Counsel
Dept. of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-0850

Michael Palecki, Chief
Bureau of Electric & Gas
Florida Public Service Commission
101 East Gaines Street
Tallahassee, FL 32399-0850

Carolyn S. Holifield, Chief
Dept. of Transportation
605 Suwannee Street, M.S. 58
Tallahassee, FL 32399-0458

Doug Leonard, Executive Director
Ralph Artigliere, Attorney at Law
Central Florida Regional Planning Council
409 E. Davidson Street
P.O. Box 2089
Bartow, FL 33830

Julia Greene, Executive Director
Tampa Bay Regional Planning Council
9455 Koger Blvd.
St. Petersburg, FL 33702

John J. Dingfelder
Assistant County Attorney
Hillsborough County
P.O. Box 1110
Tampa, FL 33601-1110

Mark Carpanini
Attorney at Law
Office of County Attorney
P.O. Box 60
Bartow, FL 33830-0060

Martin D. Hernandez
Richard Tschantz
Assistant General Counsels
Southwest Florida Water Management District
2370 Broad Street
Brooksville, FL 34609-6899

James Antista, General Counsel
Florida Game and Fresh Water Fish Commission
Bryant Building
620 South Meridian Street
Tallahassee, FL 32399-1600

Sara M. Fotopulos
Chief Counsel
Environmental Protection Commission of Hillsborough County
1900 Ninth Avenue
Tampa, FL 33605

this 22 day of February, 1995.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

David A. Crowley for
RICHARD T. DONELAN, JR.
Assistant General Counsel
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400
(904) 488-9314

~~L~~. Monitoring Requirements

1. IGCC Combustion Turbine

A continuous emission monitoring system (CEMS) shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO2 or O2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75, if applicable, when these requirements become effective within the state.

~~1~~ a. Each CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

~~2~~ b. CEMS data shall be recorded and reported in accordance with Chapter 62-297.500, F.A.C., 40 CFR 60 and 40 CFR 75, if applicable. The record shall include periods of startup, shutdown, and malfunction.

~~3~~ c. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

~~4~~ d. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

~~5~~ e. For purposes of the reports required under this certification, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Condition No. XIII.H.4 herein, which exceeds the applicable emission limits in Condition No. XIII.H.1.

2. Auxiliary Boiler

A CEM shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the auxiliary boiler to monitor nitrogen oxides emissions and in accordance with 40 CFR 60.13 to monitor opacity.

Law Offices
HOLLAND & KNIGHT

315 South Calhoun Street
Suite 600
P.O. Drawer 810 (ZIP 32302-0810)
Tallahassee, Florida 32301

904-224-7000
FAX 904-224-8832

A Partnership Including Professional Corporations

Atlanta	Orlando
Fort Lauderdale	St. Petersburg
Jacksonville	Tampa
Lakeland	Washington, D.C.
Miami	West Palm Beach

permit file from TE rec'd 12/21

December 16, 1994

RECEIVED
DEC 19 1994
Bureau of
Air Regulation

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

Re: PSD-FL-194(A) Polk County -- Polk Power Station

Dear Clair:

Attached for your files is the affidavit of publication of the Notice of Intent to Issue Permit Amendment for PSD-FL-194(A), concerning Tampa Electric Company's Polk Power Station. The Notice was published in the December 3, 1994, edition of The Lakeland Ledger.

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

Sincerely,

HOLLAND & KNIGHT

Lawrence N. Curtin

Attachment
cc w/o att:
Mr. Greg Nelson
Mr. Steve Jenkins

LNC/mrh
TAL-54885

AFFIDAVIT OF PUBLICATION

THE LEDGER
Lakeland, Polk County, Florida

Case No .....

STATE OF FLORIDA)
COUNTY OF POLK)

Before the undersigned authority personally appeared Robert Lee, who on oath says that he is Classified Manager of The Ledger, a daily newspaper published in Polk County, Florida; that the attached copy of advertisement, being a

Notice of Intent to Issue Permit

in the matter of

PSD-FL-194 (A)

in the

Court, was published in said newspaper in the issues of

December 3,

1994

Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the post office in Lakeland, in said Polk 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.

Signed .....
Classified Advertising Manager

by Robert E. Lee who is personally known to me

Sworn to and subscribed before me this 3rd

day of December A.D. 19 94

BILLIE MORLAN
MY COMMISSION # CC 191354
EXPIRES: April 6, 1996
Bonded Thru Notary Public Underwriters

Billie Morlan
Notary Public
BILLIE MORLAN

My Commission Expires

Holland & Knight
Acct. 12610

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT AMENDMENT
PSD-FL-194(A)

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit amendment to Tampa Electric Company, Post Office Box 111, Tampa, Florida 33601-0111, to reflect modifications to the affected source and an extension of the expiration date. This facility consists of a 260 megawatt (net) integrated coal gasification combined cycle (IGCC) source located approximately 13 miles southwest of Bartow, Polk County, Florida. The modifications include the following: increasing the size and operating parameters of the auxiliary boiler; replacement of uncovered coal piles with coal silos; decreasing NOx emission limits for the IGCC combustion turbine; monitoring requirements for the auxiliary boiler; and, updating of applicable regulatory requirements. Modeling results show that increases in ground-level concentrations are less than Prevention of Significant Deterioration (PSD) significant impact levels. These emissions will not cause or contribute to a violation of any ambient air quality standard or PSD increment.

A person whose substantial interests are affected by the Department's proposed permitting decision (amendment) may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) a statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrants reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and, (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application/request have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel of the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S. and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application/requests are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Any person may send written comments on the proposed action to Mr. John Brown at the Department of Environmental Protection, Bureau of Air Regulation, Mail Station 5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

K264-12-3: 1994

K264

Department of Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

November 10, 1994

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

DZ - files
don't do anything
on these unless
you have spare
time

Mr. G. F. Anderson
Tampa Electric Company
P. O. Box 111
Tampa, Florida 33601-0111

Dear Mr. Anderson:

Enclosed is a proposed amendment letter and Public Notice for modifications to the Polk Power Station's coal gasification combined cycle facility located in Polk County, Florida. You are required to do a public notice for this modification. All comments during the public notice period should be addressed to Mr. John Brown at the Department's Tallahassee address.

If there are additional questions on the above, please call Syed Arif at (904) 488-1344.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/SA/bjb

Enclosures

cc: B. Thomas, SWD
J. Harper, EPA
J. Bunyak, NPS
H. Oven, PPS
T. Davis, P.E., ECT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFIED MAIL

In the Matter of an
Application for Permit Amendment: DEP File No. PSD-FL-194(A)
Polk County

Mr. G. F. Anderson
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

_____/

INTENT TO ISSUE

The Department of Environmental Protection (Department) hereby gives notice of its intent to issue a permit amendment for a modification (copy attached) for the proposed project as detailed in the application/request specified, above, for the reasons stated in the application/request.

The applicant, Tampa Electric Company, applied on May 12 and June 9, 1994, to the Department for a permit amendment for a modification to the coal gasification combined cycle source's permit and to extend the expiration date. The facility is located in Polk County.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.). The project is not exempt from permitting procedures. The Department has determined that a permit amendment is required for the proposed work.

Pursuant to Section 403.815, F.S. and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permit Amendment. The notice shall be published one time only within 30 days in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit amendment.

The Department will issue the permit amendment with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit amendment applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application/ request have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt

of this intent in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this INTENT TO ISSUE PERMIT AMENDMENT and all copies were mailed by certified mail before the close of business on 11-16-94 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk

11-16-94
Date

Copies furnished to:

cc: B. Thomas, SWD
J. Harper, EPA
J. Bunyak, NPS
H. Oven, PPS
L. Novak, Polk County
T. Davis, P.E., ECT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT AMENDMENT

PSD-FL-194(A)

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit amendment to Tampa Electric Company, Post Office Box 111, Tampa, Florida 33601-0111, to reflect modifications to the affected source and an extension of the expiration date. This facility consists of a 260 megawatt (net) integrated coal gasification combined cycle (IGCC) source located approximately 13 miles southwest of Bartow, Polk County, Florida. The modifications include the following: increasing the size and operating parameters of the auxiliary boiler; replacement of uncovered coal piles with coal silos; decreasing NO_x emission limits for the IGCC combustion turbine; monitoring requirements for the auxiliary boiler; and, updating of applicable regulatory requirements. Modeling results show that increases in ground-level concentrations are less than Prevention of Significant Deterioration (PSD) significant impact levels. These emissions will not cause or contribute to a violation of any ambient air quality standard or PSD increment.

A person whose substantial interests are affected by the Department's proposed permitting decision (amendment) may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner

contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and, (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application/ request have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application/requests are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Any person may send written comments on the proposed action to Mr. John Brown at the Department of Environmental Protection, Bureau of Air Regulation, Mail Station 5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

Department of
Environmental Protection

DRAFT

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

November XX, 1994

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. G. F. Anderson
Tampa Electric Company
P. O. Box 111
Tampa, Florida 33601-0111

Dear Mr. Anderson:

RE: Amendment for a Modification to the Auxiliary Boiler and Expiration Date Extension
PSD-FL-194(A)

The Department received your requests of May 12 and June 9, 1994, to modify the auxiliary boiler by increasing the heat input rate, which will require changing some existing specific conditions, and to extend the expiration date of the PSD permit referenced below. The permit is amended as shown:

Permit No. PA-92-32, PSD-FL-194, Tampa Electric Company.

Current Expiration Date: June 1, 1996

New Expiration Date: June 30, 2000

The Department is also modifying the specific conditions as follows:

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed ~~49.5~~ 120.0 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content by weight. All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

G. Fugitive Dust

Fugitive dust emissions during the construction period shall be minimized by covering or watering dust generation areas. Particulate matter emissions from the coal handling equipment shall be controlled by enclosing all coal storage, conveyors and conveyor

transfer points (~~except those directly associated with the coal stacker/reclaimer for which an enclosure is operationally infeasible~~). Fugitive emissions shall be tested as specified in Condition No. J. ~~Inactive coal storage shall be shape, compacted, and oriented to minimize wind erosion.~~ Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. ~~When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.~~

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

Pollutant	Fuel	Basis	Emissions Limitations 7F CT Postdemonstration Period lb/hr	tpy
NO_x	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd	~~222.5~~ 220.25	~~1,044~~ 1,032.9

I. Auxiliary Boiler Operation

Normal operation of the auxiliary boiler shall be limited to a maximum of ~~1,000~~ 3,000 hours per year ~~and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable.~~ The auxiliary boiler may operate continuously (i.e. 8,760 hrs/yr) in the standby mode. The following emission limitations shall apply:

1. NO_x emissions shall not exceed ~~0.16~~ 0.10 lbs/MMBtu for oil firing.
2. Sulfur dioxide emissions shall be limited by firing low sulfur oil with a maximum sulfur content of 0.05 percent by weight.
3. Visible emissions shall not exceed 20 percent opacity (6-minute average) ~~(except for one six-minute period per hour during which opacity shall not exceed 27 percent)~~, while burning low sulfur fuel oil.

DRAFT

L. Monitoring Requirements

1. IGCC Combustion Turbine

A continuous emission monitoring system (CEMS) shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO_2 or O_2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75, if applicable, when those requirements become effective within the state.

~~1.~~ a Each CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

~~2.~~ b CEMS data shall be recorded and reported in accordance with Rule ~~Chapter~~ 62-297.500, F.A.C.; ~~,~~ 40 CFR 60; and, 40 CFR 75, if applicable. The record shall include periods of startup, shutdown, and malfunction.

~~3.~~ c A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition, or preventable equipment breakdown shall not be considered malfunctions.

~~4.~~ d The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

~~5.~~ e For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Condition No. H.4 herein, which exceeds the applicable emission limits in Condition No. H.1.

2. Auxiliary Boiler

A CEMS shall be installed, operated and maintained in accordance with 40 CFR 60, Appendix F, for the auxiliary boiler to monitor nitrogen oxides emissions and in accordance with 40 CFR 60.13 to monitor opacity.

a. The CEMS shall meet the performance specifications of 40 CFR 60, Appendix B.

DRAFT

b. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C., and 40 CFR 60. The record shall include periods of startup, shutdown and malfunction.

c. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

d. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of the CEMS.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 62-212 and 62-4, F.A.C., and 40 CFR 60, Subparts A, Db and GG.

A copy of this letter shall be attached to the above mentioned permit, No. PSD-FL-194(A), and shall become a part of the permit.

Sincerely,

Howard L. Rhodes
Director
Division of Air Resources
Management

HLR/SA/bjb

cc: B. Thomas, SWD
J. Harper, EPA
J. Bunyak, NPS
H. Oven, PPS
T. Davis, P.E., ECT

file

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DISTRICT ROUTING SLIP

To: Bill Thomas DATE: 5/12/94

CC To:

	PENSACOLA	**NORTHWEST DISTRICT**	
	Panama City	Northwest District Branch Office	
	Tallahassee	Northwest District Branch Office	
	Sopchoppy	Northwest District Satellite Office	
	TAMPA	**SOUTHWEST DISTRICT**	
	Punta Gorda	Southwest District Branch Office	
	Bartow	Southwest District Satellite Office	
	ORLANDO	**CENTRAL DISTRICT**	
	Melbourne	Central District Satellite Office	
	JACKSONVILLE	**NORTHEAST DISTRICT**	
	Gainesville	Northeast District Branch Office	
	FORT MYERS	**SOUTH DISTRICT**	
	Marathon	South District Branch Office	
	WEST PALM BEACH	**SOUTHEAST DISTRICT**	
	Port St. Lucie	Southeast District Branch Office	

☐ Reply Optional Date Due _____ ☐ Reply Required Date Due: _____ ☐ Info Only

Comments:

RECEIVED
MAY 16 1994
Department of Environmental Protection
BY SOUTHWEST DISTRICT

From: Claire Fancy Tel.: (904) 488-1344

08-18 93

TAMPA ELECTRIC
A TECO ENERGY COMPANY

May 10, 1994

Mr. Clair Fancy
Florida Department of Environmental
Protection Bureau of Air Regulation
2600 Blair Stone Road
Mail Station 5500
Tallahassee, Florida 32399-2400

RE: TEC Polk Power Station Unit No. 1
CT Emission Correction Curves
Condition of Certification No. 5 XIII.B and XIII.H

Dear Mr. Fancy:

Please find enclosed the Syngas Fuel Emission Correction Curve (1625 mmBTU/Hr. @ 59 F, LHV), which was inadvertently omitted from the "package" we submitted to you on May 6, 1994. We regret any inconvenience this may have caused you.

If you have any questions, please call Robert Durgan at (813)228-4137 or me at (813)228-4844.

Sincerely,

Patrick A. Ho

Patrick A. Ho, P.E.
Manager
Environmental Planning

RECEIVED
MAY 11 1994
Bureau of
Air Regulation

RECEIVED
MAY 16 1994
Department of Environmental Protection
SOUTHWEST DISTRICT
BY

ad\RWD\DD157

Enclosure

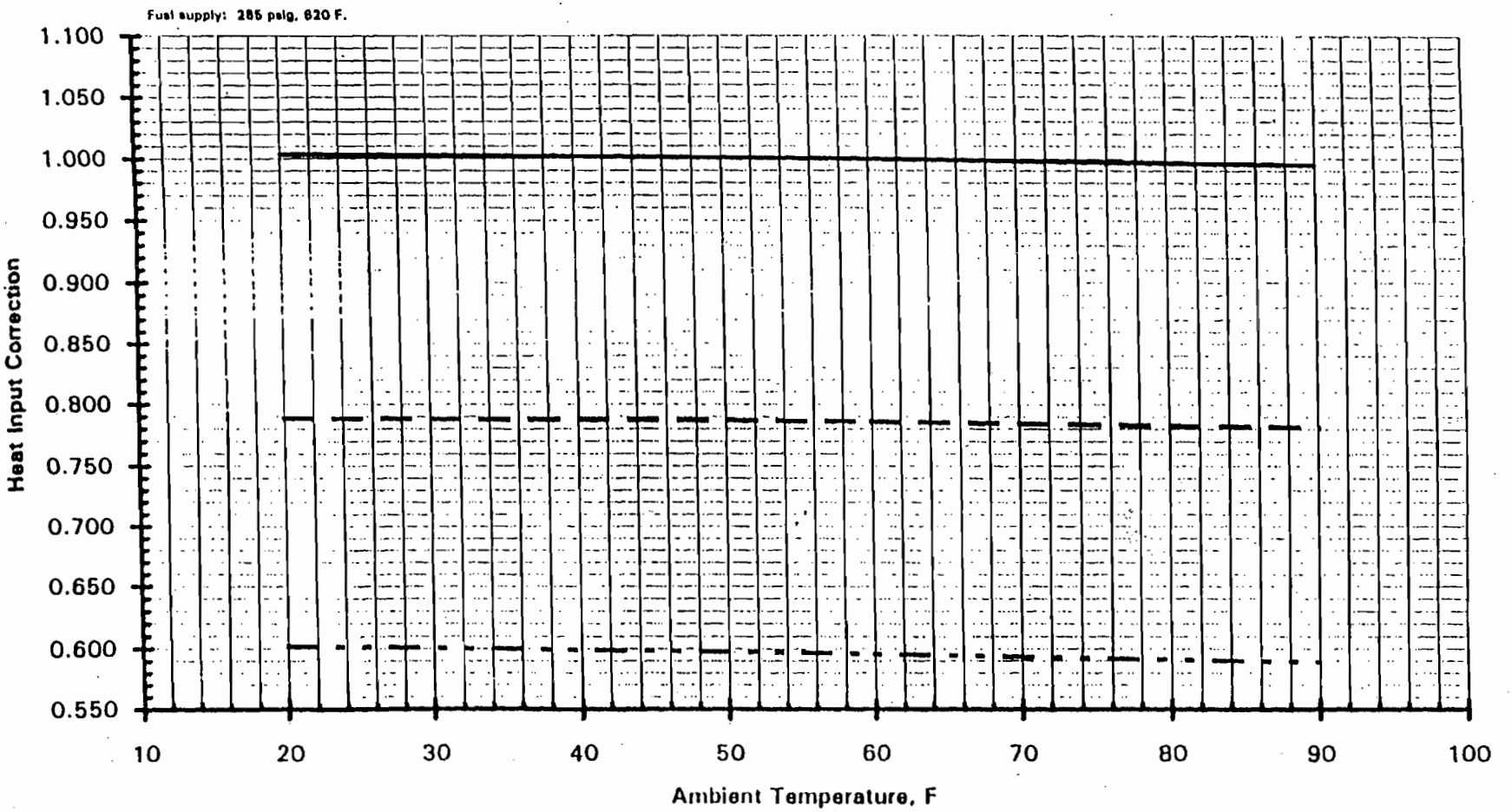
cc: Mr. H.S. Oven, Jr. P.E. (w\enc)
D. Crisp
C. Holladay
B. Thomas, SW Dist.
G. Harper, EPA

TEC Polk Unit 1
HEAT INPUT CORRECTION vs AMBIENT
Estimated Data, Not Guaranteed
Syngas Fuel, Combined Cycle
Base Load, 60% RH, Illinois #6 Coal
Heat Input = 1625 mmBTU/Hr @ 59 F, LHV

Fuel Composition:
Volume %

CO	44.485
CO2	14.647
H2	33.304
H2O	0.361
N2	5.811
CH4	0.180
Ar	1.166
H2S	0.001
COS	0.030

236.4 BTU/SCF, LHV
HHV/LHV = 1.08



3/11/94

TECO ENERGY

RECEIVED

MAY 9 1994

Bureau of
Air Regulation

May 6, 1994

Mr. Clair Fancy
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Mail Station 5500
Tallahassee, Florida 32399-2400

RE: TEC Polk Power Station Unit No. 1
CT Emission Correction Curves

Dear Mr. Fancy:

Please find enclosed the emission correction curves that satisfy the requirements of Sections XIII.B and XIII.H of the conditions of Certification for Polk Power Station. These curves are also required per special conditions B and H of our PSD permit PSD-FL-194.

The curves were supplied to us by General Electric, the manufacturer of the combined cycle system. The curves address ambient temperature corrections to heat input, along with emissions of SO_2, NO_X, CO, and VOC for syngas and distillate oil firing. These curves generally follow the emission data provided to FDEP in our Sufficiency Response FDER-B.

Please note that the data provided by General Electric are calculated, and not specifically a part of the performance guarantees provided in our contract. The data is based on specific syngas/oil analyses and may require adjustment if actual conditions are different. The heat impact data are on a Lower Heating Value basis; the "HHV/LHV" ratios are provided on the curves for calculation of Higher Heating Value bases given in the Conditions of Certification and PSD permit. For example, the 1625 mmBtu/hr LHV on the syngas heat input correction curve is multiplied by 1.08 to give the value of 1755 mmBtu/hr HHV shown in the Conditions of Certification and PSD permit.

If you have any questions, please call Robert Durgan at (813)228-4137 or me at (813)228-4844.

Sincerely,

Patrick A. Ho, P.E.
Manager
Environmental Planning

ad\RWD\DD156

Enclosure

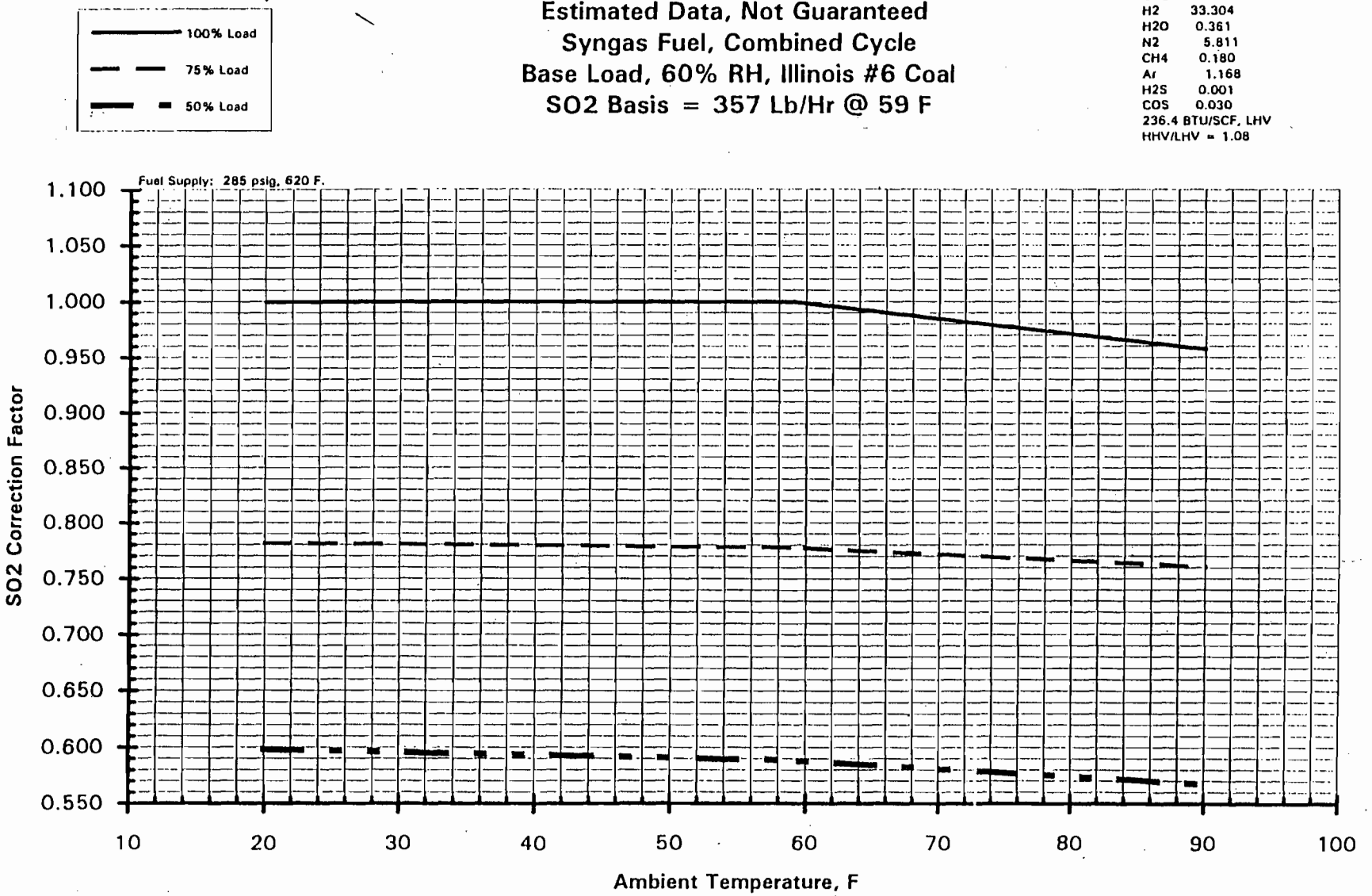
cc: Mr. H.S. Oven, Jr. P.E. (w/enc)

TEC Polk Unit 1
SO2 CORRECTION FACTOR vs AMBIENT
Estimated Data, Not Guaranteed
Syngas Fuel, Combined Cycle
Base Load, 60% RH, Illinois #6 Coal
SO2 Basis = 357 Lb/Hr @ 59 F

Fuel Composition:
Volume %

CO	44.485
CO2	14.647
H2	33.304
H2O	0.361
N2	5.811
CH4	0.180
Ar	1.168
H2S	0.001
COS	0.030

236.4 BTU/SCF, LHV
HHV/LHV = 1.08



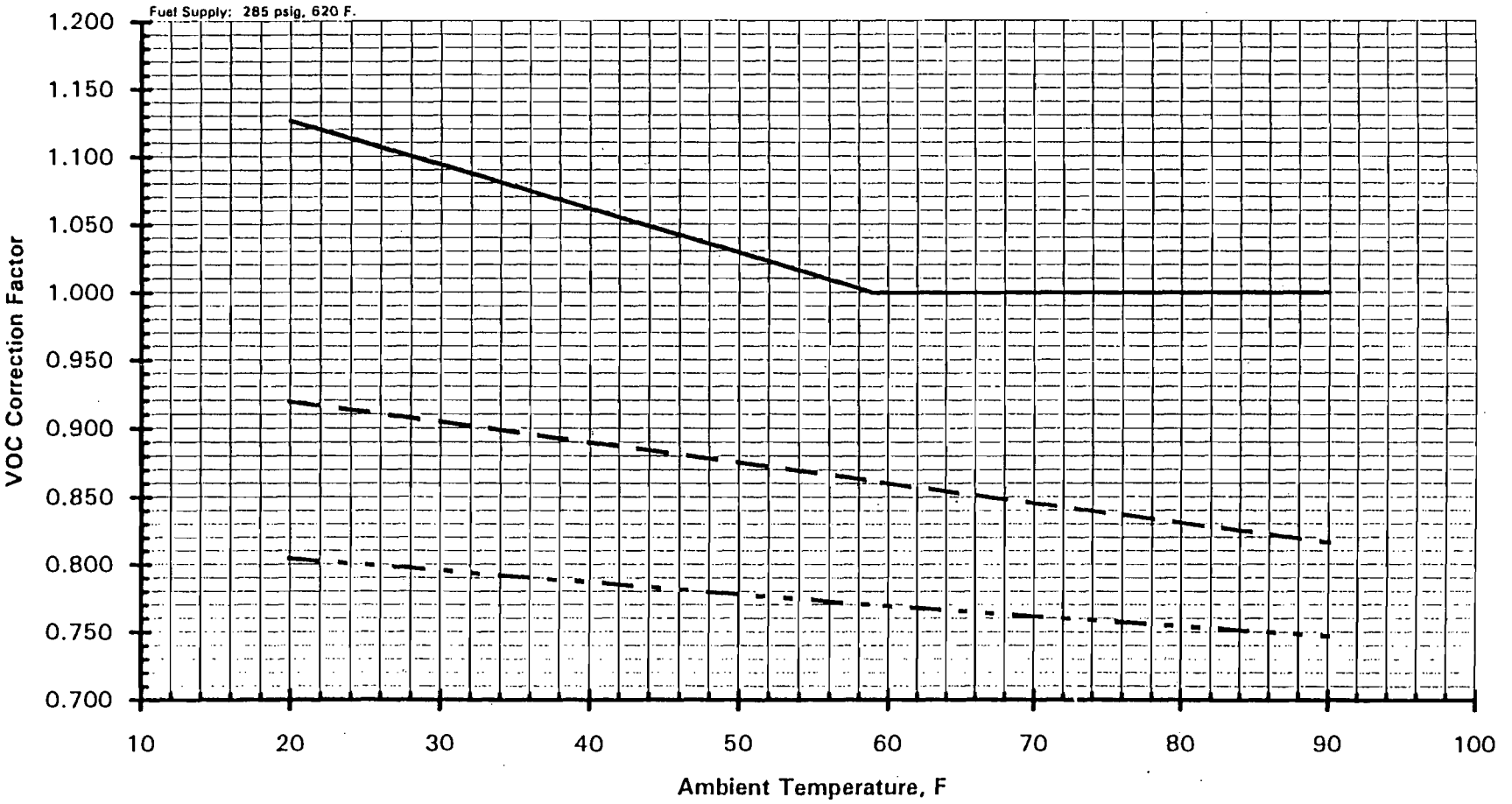
3/24/94

TEC Polk Unit 1
CO CORRECTION FACTOR vs AMBIENT
Estimated Data, Not Guaranteed
Syngas Fuel, Combined Cycle
Base Load, 60% RH, Illinois #6 Coal
CO Basis = 87.5 Lb/Hr @ 59 F

Fuel Composition:
Volume %

CO	44.485
CO2	14.647
H2	33.304
H2O	0.361
N2	5.811
CH4	0.180
Ar	1.168
H2S	0.001
COS	0.030

236.4 BTU/SCF, LHV
HHV/LHV = 1.08



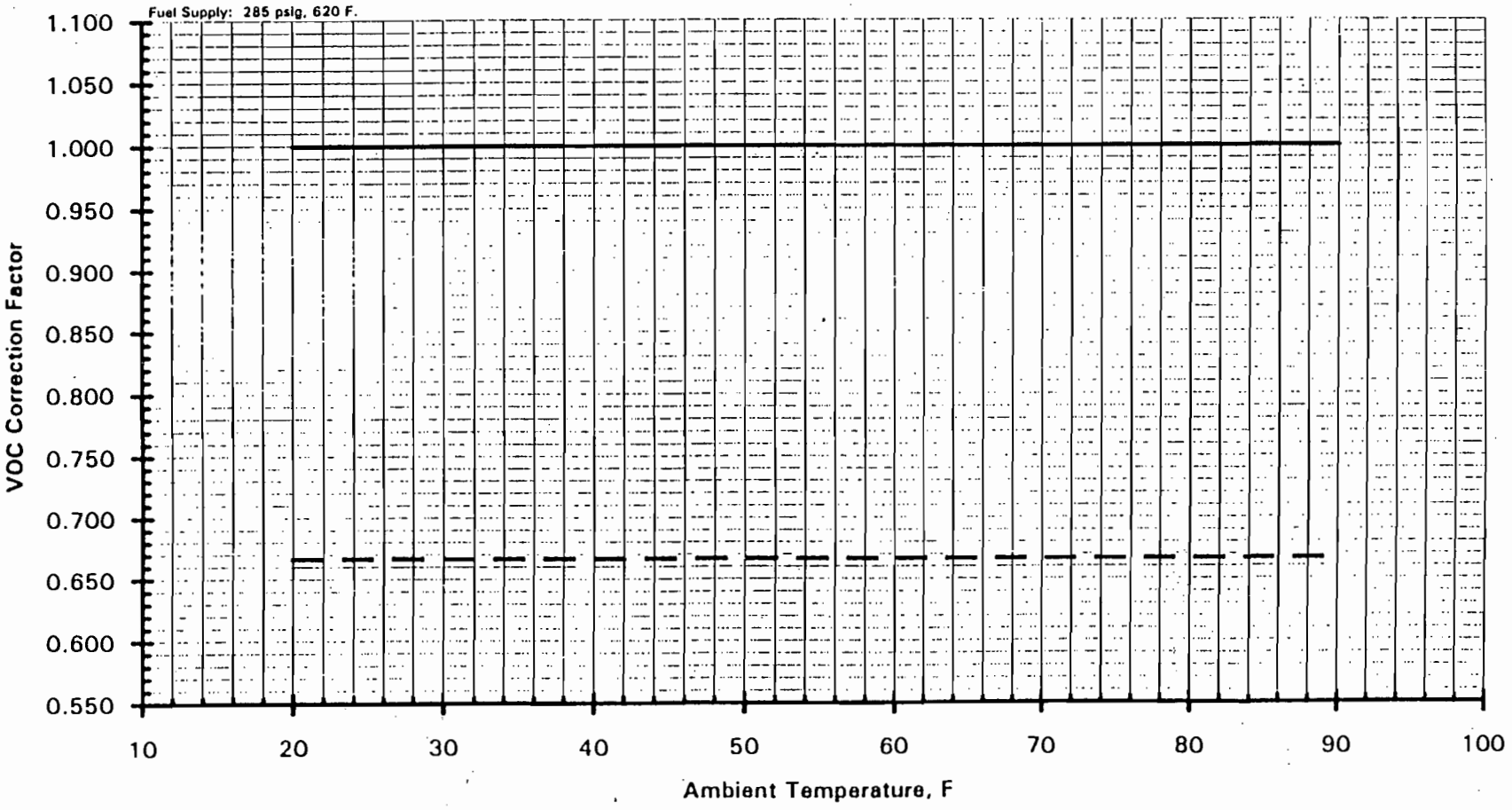
3/24/94

TEC Polk Unit 1
VOC CORRECTION FACTOR vs AMBIENT
Estimated Data, Not Guaranteed
Syngas Fuel, Combined Cycle
Base Load, 60% RH, Illinois #6 Coal
VOC Basis = 3 Lb/Hr @ 59 F

Fuel Composition:
Volume %

CO	44.485
CO2	14.647
H2	33.304
H2O	0.361
N2	5.811
CH4	0.180
Ar	1.168
H2S	0.001
COS	0.030

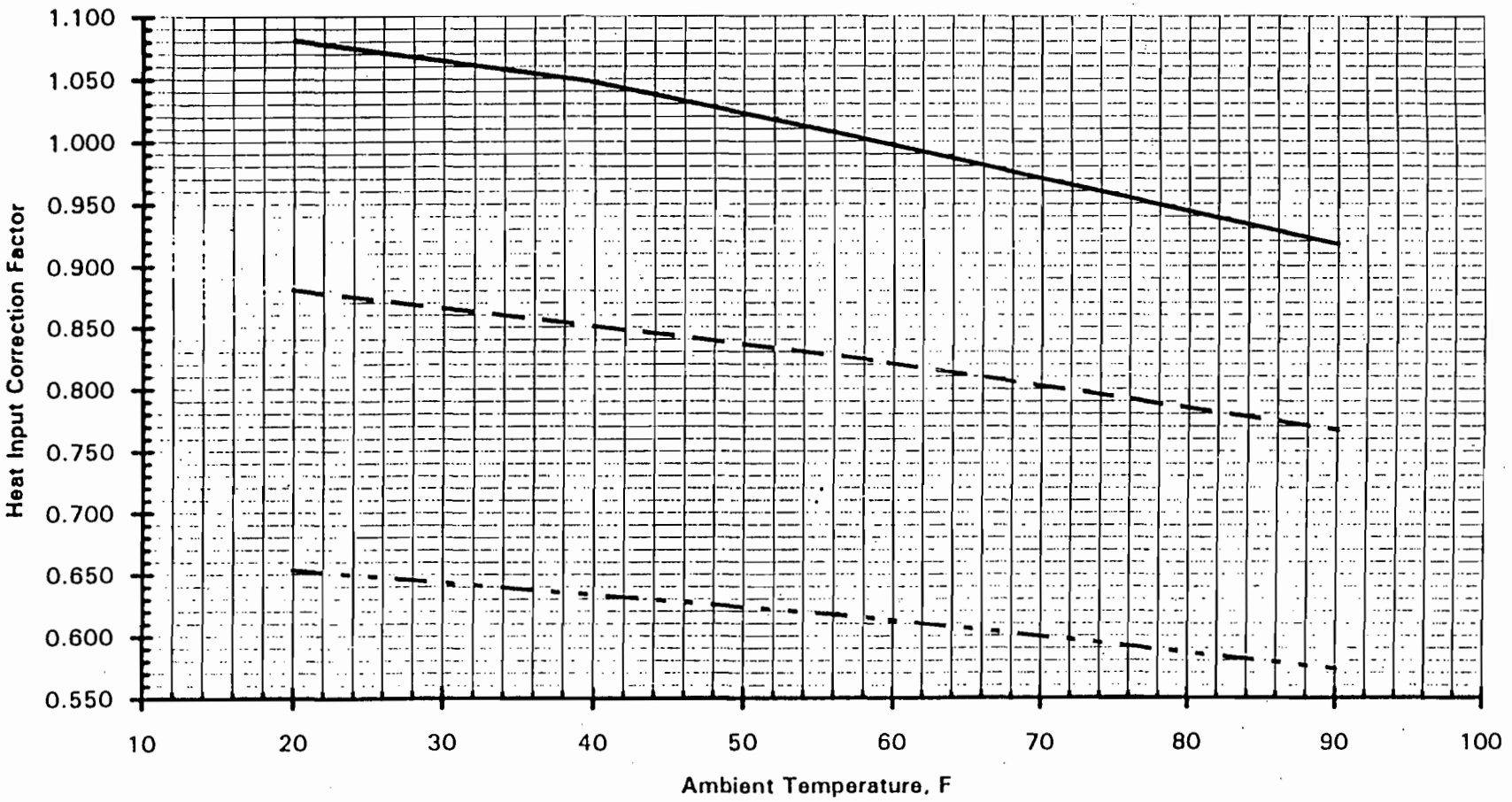
236.4 BTU/SCF, LHV
HHV/LHV = 1.08



3/11/94

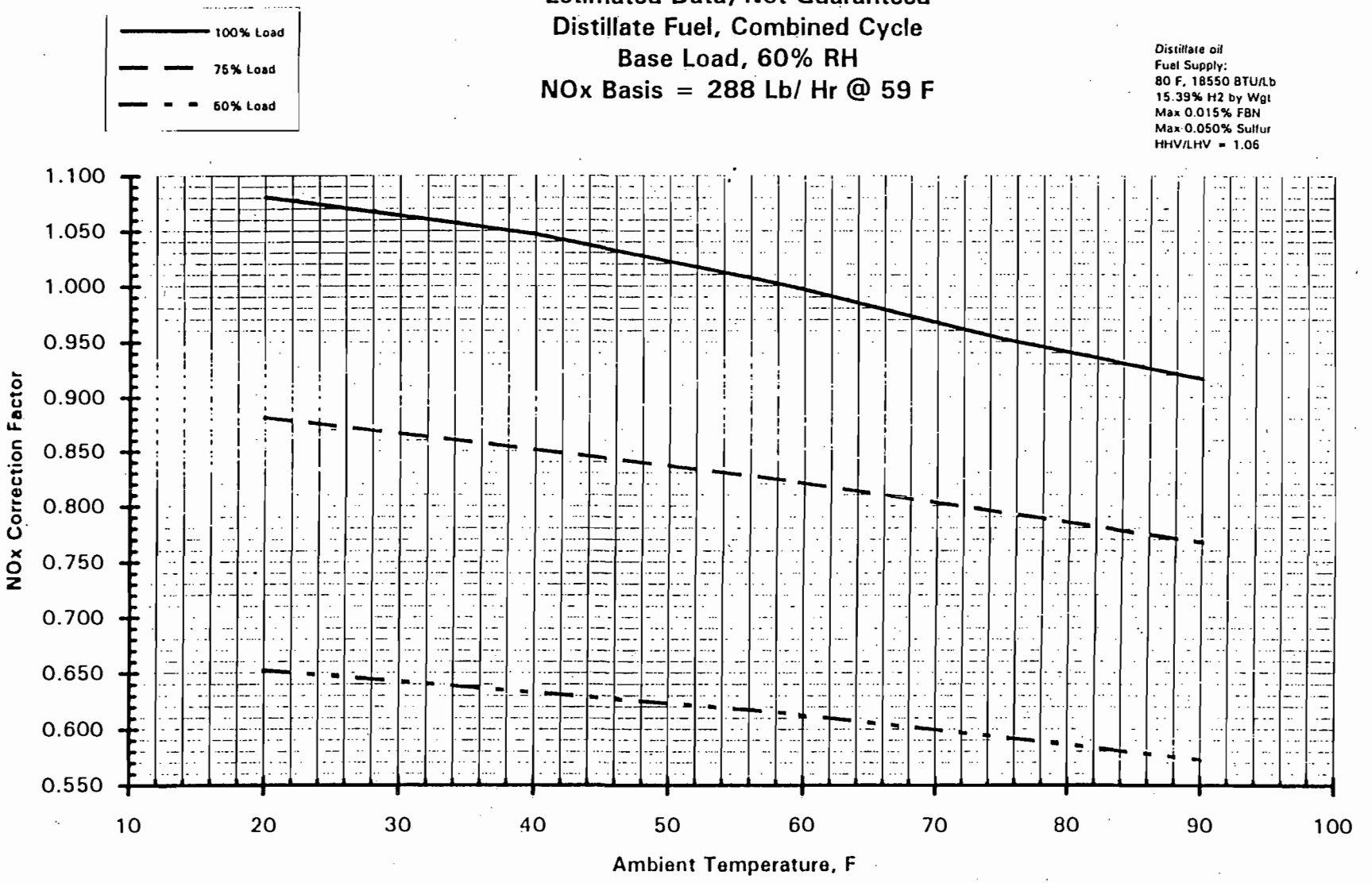
TEC Polk Unit 1
HEAT INPUT CORRECTION vs AMBIENT
Estimated Data, Not Guaranteed
Distillate Fuel, Combined Cycle
Base Load, 60% RH
Heat Input Basis = 1665 mmBTU/Hr @ 59 F, LHV

Distillate oil
Fuel Supply:
80 F, 18550 BTU/Lb
15.39% H2 by Wgt
Max 0.015% FBN
Max 0.050% Sulfur
HHV/LHV = 1.06



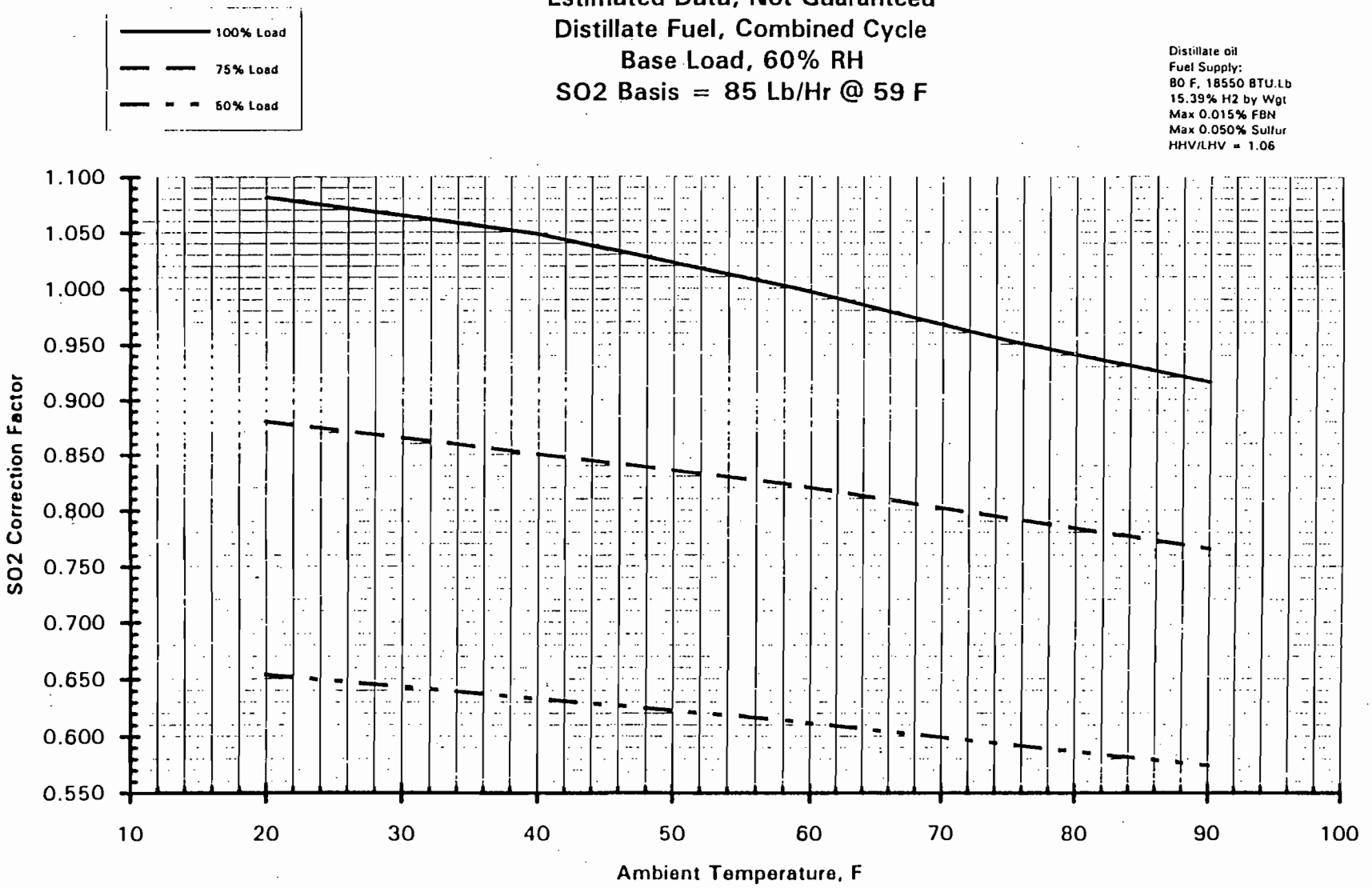
3/11/94

TEC Polk Unit 1
NOx CORRECTION FACTOR vs AMBIENT
Estimated Data, Not Guaranteed
Distillate Fuel, Combined Cycle
Base Load, 60% RH
NOx Basis = 288 Lb/ Hr @ 59 F



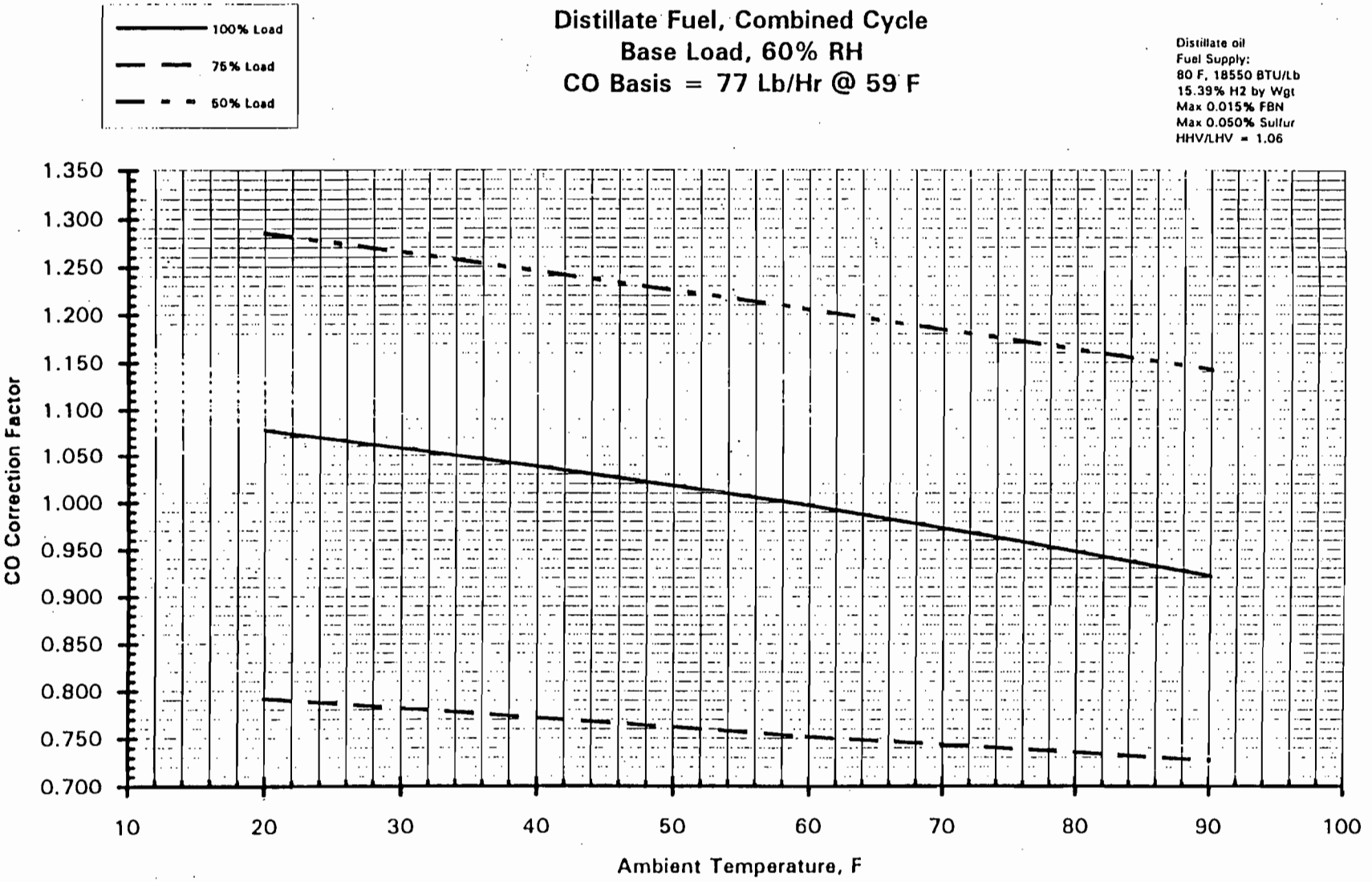
3/11/94

TEC Polk Unit 1
SO2 CORRECTION FACTOR vs AMBIENT
Estimated Data, Not Guaranteed
Distillate Fuel, Combined Cycle
Base Load, 60% RH
SO2 Basis = 85 Lb/Hr @ 59 F



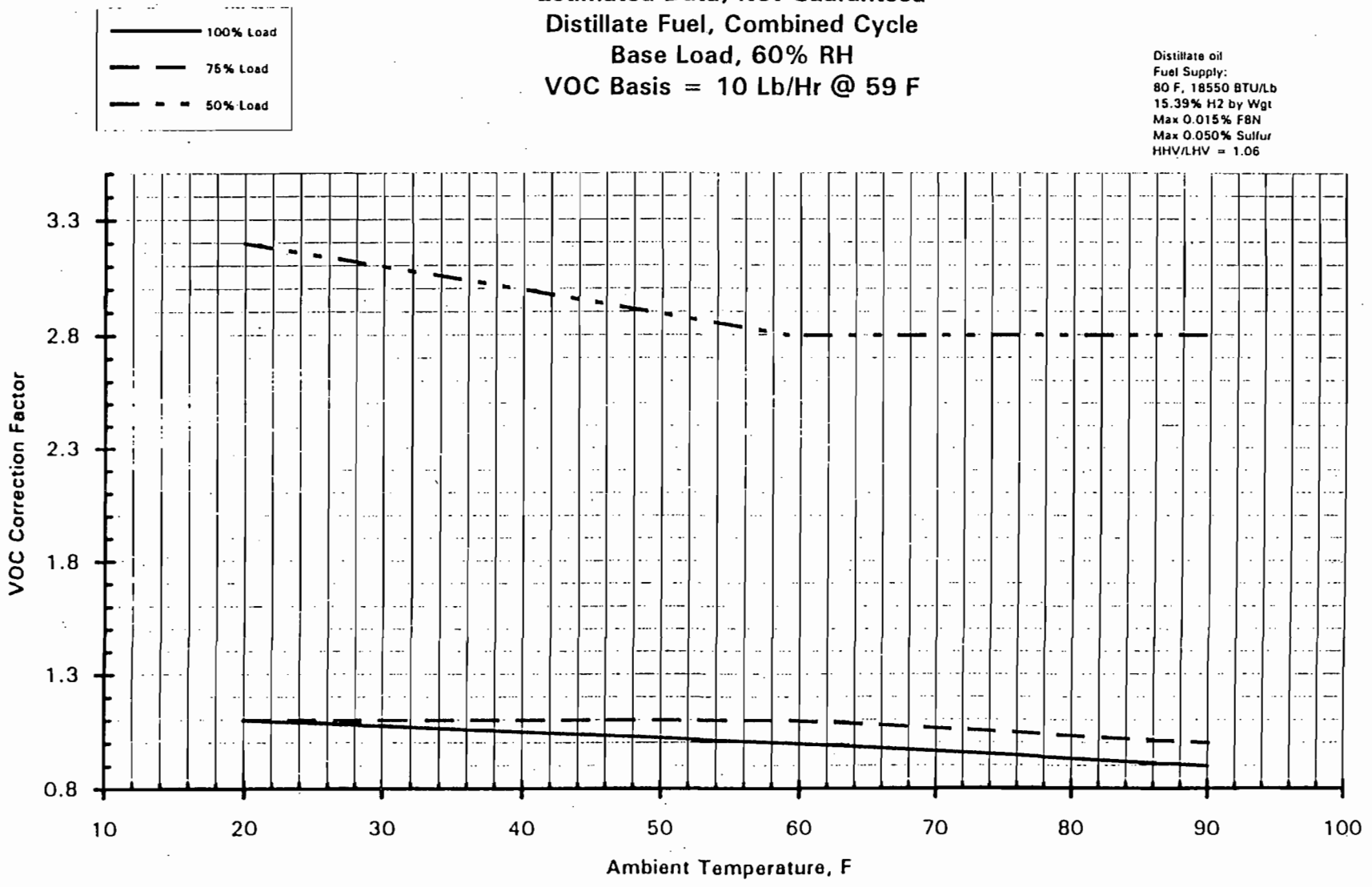
3/11/94

TEC Polk Unit 1
CO (Lb/Hr) vs AMBIENT TEMPERATURE
Estimated Data, Not Guaranteed
Distillate Fuel, Combined Cycle
Base Load, 60% RH
CO Basis = 77 Lb/Hr @ 59 F



3/11/94

TEC Polk Unit 1
VOC CORRECTION FACTOR vs AMBIENT
Estimated Data, Not Guaranteed
Distillate Fuel, Combined Cycle
Base Load, 60% RH
VOC Basis = 10 Lb/Hr @ 59 F



3/11/94

Memorandum

Florida Department of
Environmental Protection

TO: PPSA Reviewers

FROM: Michael S. Hickey

DATE: April 19, 1994

SUBJECT: TECO - Polk

Attached is the quarterly report for your information.

/sgl

cc: Richard D. Garrity
Bill Thomas
Bob Stetler

TAMPA ELECTRIC
A TECO ENERGY COMPANY

D.E.P

APR 14 1994

SOUTHWEST DISTRICT
TAMPA

April 12, 1994

Dr. Richard D. Garrity, Ph.D.
Southwest District
Florida Department of Environmental Protection
3804 Coconut Palm Drive
Tampa, Florida 33619-8318

Re: Tampa Electric Company
Polk Power Station
Quarterly Construction Status Report

Dear Dr. Garrity:

In accordance with Tampa Electric Company, Polk Power Station, Condition of Certification (XII.D.1) please find enclosed the first quarterly construction status report.

If you have any questions, please call Robert Durgan at (813) 228-4137 or me at (813) 228-4844.

Sincerely,

Patrick A. Ho, P.E.
Manager
Environmental Planning

ud\DD149

Enclosure

cc: Mr. H.S. Oven, Jr., P.E., FDEP (w/enc)

Polk Power Station
Quarterly Construction Report
1 April 1994

As required by the Conditions of Certification under section XII.D.1, a short quarterly narrative describing the progress of construction since Notice of Commencement of Construction follows.

Access to the property has been provided through the transmission corridor onto the site from the Fort Green road. A temporary construction fenced office compound with trailers, portable sanitary facilities, security gate, and gravel parking lot has been constructed. Telephone and electric service for the office are in-service.

Construction activities commenced March 1, 1994 and have been limited to areas and activities approved by the Southwest Florida Water Management District. Protected wetlands within the site have been delineated and barrier fences have been erected around the perimeters. Silt fences have been erected to protect these wetland and other areas from stormwater erosion. The clearing and grubbing activities were discontinued on March 22, 1994 at the request of the U.S. Army Corps of Engineers (COE). Tampa Electric is currently in communication with COE to resume these activities.

Monitoring wells currently on site which are not intended for future use have been identified. These abandoned wells have been plugged under the rules and procedures of the Southwest Florida Water Management District (SWFWMD). SWFWMD witnessed the plugging of the wells and notification was made March 25, 1994 to the Department of Environmental Protection-Southwest District as required by Condition of Certification numbers (nos.) XVIII.F and XXVI.B.24.

Except for the erection of barrier and silt fences, all activities are on hold and awaiting regulatory approval.

ECT
Environmental Consulting & Technology, Inc.

April 18, 1994
ECT No. 94014-0002-1300

Mr. Preston Lewis
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Mail Station 5500
Tallahassee, Florida 32399-2400

Re: Tampa Electric Company Polk Power Station

Dear Mr. Lewis:

As per your telephone conversation with Mr. Greg Nelson of Tampa Electric Company, enclosed is information describing proposed revisions to the Polk Power Station project and the impacts these revisions will have on ambient air concentrations. Please contact Mr. Nelson at 813/228-4847 if you have any questions prior to our meeting to discuss these revisions.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Alan M. Trbovich

Alan M. Trbovich, CCM
Senior Scientist

AMT/dlm

cc: Greg Nelson, TEC
Jack Doolittle, ECT
S. Auf
C. Holladay
B. Thomas, SW Dist.
J. Harper, EPA

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

3701 Northwest
98TH Street
Gainesville, FL
32606

(904)
332-0444

FAX (904)
332-6722

TAMPA ELECTRIC COMPANY POLK POWER STATION
POSTCERTIFICATION DESIGN REVISIONS
AIR QUALITY CHANGES

Design Revision	Reason for Revision	Effect of Revision
• Coal storage in silos instead of open piles.	Availability of coal delivery from Big Bend Station.	Significantly changes PM emission characteristics and reduces PM ambient impacts.
• Revised structure dimensions: 7F HRSG enclosure, SGC wings 1 and 2, gasifier, cold box, coal grinding day bin, coal storage silos 1 and 2, oil tanks 1, 2, and 3, coal delivery enclosure (see revised Table 3.2.0-2).	Ongoing detailed engineering by Bechtel.	Revised GEP modeling shows small changes in downwash characteristics.
• Revised locations of IGCC HRSG, auxiliary boiler, and thermal oxidizer stacks (see revised Figure 3.2.0-5).	Ongoing detailed engineering by Bechtel.	See discussion for auxiliary boiler changes, below.
• Increased size (49.5 to 120 MMBtu/hr) normal operating hours (1,000 to 3,000 hr/yr) and standby operating hours (0 to 8,760 hr/yr) for auxiliary boiler.	Ongoing detailed engineering by Bechtel indicates previous boiler too small to meet IGCC unit needs.	Revised significant impact area (SIA) modeling shows slightly increased SO_2 and NO_x and annual PM ambient impacts compared to SCA Rev. 2 analyses, but are less than original SCA impacts. Revised SIA modeling shows decreased short-term PM and CO ambient impacts compared to SCA Rev. 2 and original SCA analyses. Revised SIA modeling shows SIAs for SO_2, NO_x, and PM_{10} are smaller than SIAs analyzed in original SCA. Revised detailed PSD Class I and II, AAQS, and air toxics modeling is not planned.
• Decrease use of HGCU system for treatment of syngas from approximately 50 percent of syngas flow to approximately 10 to 15 percent.	Ongoing design and pilot scale testing by GEESI.	No change in PSD permit emission limits for demonstration or postdemonstration periods.
• Provide separate stacks for sulfuric acid plant and thermal oxidizer and decrease size of thermal oxidizer for hot gas cleanup (HGCU) unit only.	Make sulfuric acid plant operation similar to standard design for other acid plants in central Florida and elsewhere.	Separate stacks and revised emissions rates included in revised SIA modeling discussed for auxiliary boiler changes above.

TAMPA ELECTRIC COMPANY POLK POWER STATION
POSTCERTIFICATION DESIGN REVISIONS
AIR QUALITY CHANGES
(Continued, Page 2 of 2)

Design Revision	Reason for Revision	Effect of Revision
• Changes in conditions of certification numbers XIII.E, XIII.G, XIII.I, XIII.L, and XIII.N.	Changes in size and hours of operation for auxiliary boiler, addition of coal storage silos, and elimination of coal storage piles.	E. Auxiliary boiler size increased. G. References to coal storage piles eliminated. I. Auxiliary boiler operating hours increased. L. Continuous NO_x and opacity monitoring required on auxiliary boiler emissions. N. 40 CFR Db added as applicable to auxiliary boiler.

Source: ECT, 1994.

Table 3.2.0-2. Dimensions of All Structures Exceeding 50 Ft in Height and Exhaust Stacks on the Polk Power Station Site

Elements	Structure Dimensions Length (ft)	Width (ft)	Height (ft)
Gasifier structure	60	~~40~~ 63	300
Syngas cooling wings (2)	~~180~~ 152	~~35~~ 25	~~100~~ 90
Air separation unit cold box	~~12*~~ 23*	--	~~110~~ 165
Coal grinding structure	~~80~~ 50	~~60~~ 25	~~175~~ 90
IGCC HRSG	~~150~~ 131	~~40~~ 43	~~80~~ 90
CC HRSGs (4)	75	33	57
H_2SO_4 plant absorbers (2) and dryer (1)	8*	--	60
H_2SO_4 plant gas cooling tower	8*	--	70
Acid gas removal stripper	10*	--	100
Water wash column	10*	--	80
Acid gas removal absorber	10*	--	100
~~One-day~~ Coal storage ~~bin~~ silos (2)	~~25~~ 59*	~~25~~ --	~~70~~ 197
HGCU	65	52	~~218~~ 279
Oil Storage Tanks (3)	100*	--	57

Exhaust Stacks	Stack Height (ft)	Stack Diameter (ft)
IGCC HRSG stack	150	19
CC HRSG stacks (4)	150	14.5
HGCU thermal oxidizer	125	4
Auxiliary boiler	~~20~~ 75	~~5~~ 3.7
Flare	~~75~~ 150	4
CC/bypass stacks (10)	75	18†
H_2SO_4 plant ~~thermal oxidizer~~	199	~~3~~ 2.5

*Diameter.
†Equivalent diameter. Stack is usually square.

Sources: Texaco, 1992.
Bechtel, 1993 4.

Table 7-9. Maximum Polk Power Station Criteria Pollutant Impacts

Pollutant	Averaging Time	Maximum Impact ($\mu g/m^3$)	Significance Level ($\mu g/m^3$)
SO_2 (HGCU/CGCU)	Annual	~~1.58~~ ~~1.24~~ *1.50*	1.0
	24-hour	~~19.0~~ ~~14.6~~ *16.0*	5.0
	3-hour	~~68.6~~ ~~47.3~~ *54.8*	25.0
SO_2 (100% CGCU)	Annual	~~1.58~~ ~~1.24~~ *1.35*	1.0
	24-hour	~~19.0~~ ~~14.6~~ *15.9*	5.0
	3-hour	~~68.6~~ ~~47.3~~ *54.4*	25.0
NO_x	Annual	~~1.78~~ ~~1.06~~ *1.20*	1.0
PM	Annual	~~1.49~~ ~~1.13~~ *1.14*	1.0
	24-hour	~~29.4~~ ~~33.6~~ *19.1*	5.0
CO	8-hour	~~67.1~~ ~~52.9~~ *49.6*	500
	1-hour	~~169.2~~ ~~137.4~~ *123.2*	2,000
Lead	Quarterly	~~0.0018~~ 0.0011	NA*

*The AAQS for lead is 1.5 $\mu g/m^3$.

Source: ECT, 1992 ~~3~~ *4*.

Table 7-10a. Summary of SO_2 Impacts Due to Polk Power Station Sources (HGCU/CGCU Case)*

	1982	1983	1984	1985	1986
Annual average					
Highest ($\mu g/m^3$)	~~1.34~~ ~~0.99~~ *1.32*	~~1.26~~ ~~0.84~~ *1.25*	~~1.35~~ ~~1.02~~ *1.32*	~~1.27~~ ~~1.07~~ *1.24*	~~1.58~~ ~~1.24~~ *1.50*
Location					
Distance (meters)	~~1,310~~ ~~3,500~~ *1,310*	~~1,310~~ ~~3,000~~ *1,310*	~~1,415~~ ~~3,000~~ *1,600*	~~1,415~~ ~~2,500~~ *1,310*	~~1,310~~ ~~2,000~~ *1,310*
Radial (°)	~~290~~ ~~270~~ *290*	~~290~~ ~~270~~ *290*	~~280~~ 270	~~280~~ ~~90~~ *290*	~~290~~ ~~90~~ *290*
24-Hour average					
Highest ($\mu g/m^3$)	~~15.9~~ ~~10.5~~ *13.6*	~~17.9~~ ~~12.0~~ *14.0*	~~18.4~~ ~~14.6~~ *16.0*	~~19.0~~ ~~11.4~~ *15.1*	~~15.1~~ ~~13.0~~ *13.8*
Location					
Distance (meters)	~~2,000~~ ~~2,500~~ *2,135*	~~2,000~~ ~~2,135~~ *2,000*	1,995	2,000	1,995
Radial (°)	120	120	130	120	130
Second highest ($\mu g/m^3$)	~~10.3~~ ~~7.52~~ *9.90*	~~15.5~~ ~~10.5~~ *13.9*	~~17.0~~ ~~11.1~~ *14.4*	~~18.1~~ ~~10.9~~ *14.0*	~~13.1~~ ~~10.3~~ *10.4*
Location					
Distance (meters)	~~2,000~~ ~~3,000~~ *2,000*	2,000	1,995	2,000	1,995
Radial (°)	~~110~~ 120	120	130	120	130
3-Hour average					
Highest ($\mu g/m^3$)	~~48.4~~ ~~32.3~~ *35.1*	~~53.3~~ ~~37.6~~ *38.7*	~~67.3~~ ~~47.3~~ *54.8*	~~56.0~~ ~~36.6~~ *40.7*	~~68.6~~ ~~41.8~~ *38.7*
Location					
Distance (meters)	~~1,675~~ ~~2,500~~ *1,770*	~~2,000~~ ~~2,500~~ *1,295*	1,995	2,000	~~1,660~~ 1,995
Radial (°)	~~160~~ ~~330~~ *340*	~~140~~ ~~330~~ *300*	130	120	~~70~~ 130
Second highest ($\mu g/m^3$)	~~34.7~~ ~~27.9~~ *30.1*	~~41.4~~ ~~31.0~~ *31.1*	~~44.3~~ ~~32.7~~ *33.4*	~~51.5~~ ~~35.8~~ *33.4*	~~51.7~~ ~~35.9~~ *34.5*
Location					
Distance (meters)	~~2,000~~ *1,995*	~~1,660~~ 1,995	1,995	~~2,000~~ *1,995*	~~2,000~~ 1,995
Radial (°)	~~140~~ ~~250~~ *130*	~~70~~ 130	130	~~120~~ *130*	~~120~~ 130

* Annual average impacts were based on ISCLT2 results using STAR data (1982 through 1986). Short-term average impacts were based on ISCST2 results for the individual years indicated.

Source: ECT, 1992 ~~3~~ *4*.

Table 7-10b. Summary of SO_2 Impacts Due to Polk Power Station Sources (100% CGCU Case)*

	1982	1983	1984	1985	1986
Annual average					
Highest ($\mu g/m^3$)	~~1.34~~ ~~0.99~~ *1.33*	~~1.26~~ ~~0.84~~ *1.14*	~~1.35~~ ~~1.02~~ *1.35*	~~1.27~~ ~~1.07~~ *1.21*	~~1.58~~ ~~1.24~~ *1.31*
Location					
Distance (meters)	~~1,310~~ ~~2,500~~ *1,310*	~~1,310~~ ~~3,000~~ *1,600*	~~1,415~~ ~~3,000~~ *1,600*	~~1,415~~ ~~2,500~~ *1,600*	~~1,310~~ ~~2,000~~ *1,980*
Radial (°)	~~290~~ ~~270~~ *290*	~~290~~ 270	~~280~~ 270	~~280~~ ~~90~~ *270*	~~290~~ 90
24-Hour average					
Highest ($\mu g/m^3$)	~~15.9~~ ~~10.5~~ *13.5*	~~17.9~~ ~~12.0~~ *13.9*	~~18.4~~ ~~14.6~~ *15.9*	~~19.0~~ ~~11.4~~ *14.8*	~~15.1~~ ~~13.0~~ *13.6*
Location					
Distance (meters)	~~2,000~~ ~~2,500~~ *2,135*	~~2,000~~ ~~2,135~~ *2,000*	1,995	2,000	1,995
Radial (°)	120	120	130	120	130
Second highest ($\mu g/m^3$)	~~10.3~~ ~~7.52~~ *10.1*	~~15.5~~ ~~10.5~~ *13.7*	~~17.0~~ ~~11.1~~ *14.3*	~~18.1~~ ~~10.9~~ *14.1*	~~13.1~~ ~~10.3~~ *10.1*
Location					
Distance (meters)	~~2,000~~ ~~3,000~~ *2,000*	2,000	1,995	2,000	1,995
Radial (°)	~~110~~ 240	120	130	120	130
3-Hour average					
Highest ($\mu g/m^3$)	~~48.4~~ ~~32.3~~ *36.7*	~~53.3~~ ~~37.6~~ *40.4*	~~67.3~~ ~~47.3~~ *54.4*	~~56.0~~ ~~36.6~~ *40.4*	~~68.6~~ ~~41.8~~ *43.1*
Location					
Distance (meters)	~~1,675~~ ~~2,500~~ *1,770*	~~2,000~~ ~~2,500~~ *1,770*	1,995	2,000	~~1,660~~ 1,995
Radial (°)	~~160~~ ~~330~~ *340*	~~140~~ 330	130	120	~~70~~ 130
Second highest ($\mu g/m^3$)	~~34.7~~ ~~27.9~~ *31.0*	~~41.4~~ ~~31.0~~ *30.9*	~~44.3~~ ~~32.7~~ *33.2*	~~51.5~~ ~~35.8~~ *33.2*	~~51.7~~ ~~35.9~~ *34.3*
Location					
Distance (meters)	~~2,000~~ *1,995*	~~1,660~~ 1,995	1,995	~~2,000~~ *1,995*	~~2,000~~ 1,995
Radial (°)	~~140~~ ~~250~~ *130*	~~70~~ 130	130	~~120~~ *130*	~~120~~ 130

* Annual average impacts were based on ISCLT2 results using STAR data (1982 through 1986). Short-term average impacts were based on ISCST2 results for the individual years indicated.

Source: ECT, 1992 ~~3~~ *4*.

Table 7-12. Summary of NO_x Impacts Due to Polk Power Station Sources (Full Buildout)*

	1982	1983	1984	1985	1986
Annual average					
Highest ($\mu g/m^3$)	~~1.44~~ ~~0.89~~ *1.11*	~~1.78~~ ~~0.73~~ *0.95*	~~1.76~~ ~~0.90~~ *1.12*	~~1.70~~ ~~0.91~~ *1.08*	~~1.63~~ ~~1.06~~ *1.20*
Location					
Distance (meters)	~~1,310~~ ~~3,000~~ *2,500*	~~2,000~~ ~~3,000~~ *2,000*	~~2,000~~ ~~3,000~~ *2,000*	~~2,000~~ ~~2,500~~ *2,000*	~~1,310~~ 2,000
Radial (°)	~~290~~ 260	~~140~~ ~~270~~ *140*	~~140~~ 260	~~120~~ ~~90~~ *100*	~~290~~ ~~90~~ *100*

*Annual average impacts were based on ISCLT2 results using STAR data (1982 through 1986).

Source: ECT, 1992 ~~3~~ *4*.

Table 7-13. Summary of PM Impacts Due to Polk Power Station Sources*

	1982	1983	1984	1985	1986
Annual average					
Highest ($\mu g/m^3$)	~~1.35~~ ~~1.06~~ *1.10*	~~1.23~~ ~~0.99~~ *1.01*	~~1.36~~ ~~1.09~~ *1.14*	~~1.20~~ ~~0.96~~ *1.01*	~~1.49~~ ~~1.13~~ 1.06
Location					
Distance (meters)	~~1,415~~ 1,600	1,600	1,600	1,600 ~~1,415~~	~~1,600~~ *1,415*
Radial (°)	~~280~~ 270	270	270	270	~~280~~ ~~270~~ *280*
24-Hour average					
Highest ($\mu g/m^3$)	~~28.6~~ ~~25.1~~ *15.6*	~~24.1~~ ~~21.8~~ *19.1*	~~29.4~~ ~~33.6~~ *19.0*	~~26.6~~ ~~23.3~~ *15.9*	~~27.5~~ ~~32.1~~ *15.5*
Location					
Distance (meters)	1,415	~~1,310~~ 1,600	2,000	~~1,415~~ *2,000*	~~1,415~~ ~~2,000~~ *1,995*
Radial (°)	280	~~290~~ 270	250	~~280~~ *250*	~~280~~ ~~250~~ *130*
Second highest ($\mu g/m^3$)	~~22.9~~ ~~17.7~~ *14.8*	~~22.7~~ ~~19.6~~ *14.7*	~~22.2~~ ~~22.4~~ *14.5*	~~22.7~~ ~~19.2~~ *13.4*	~~24.6~~ ~~23.6~~ *14.8*
Location					
Distance (meters)	~~1,415~~ ~~1,600~~ *1,415*	~~1,310~~ 1,600	2,000	2,000	~~1,415~~ *2,000*
Radial (°)	~~280~~ ~~270~~ *280*	~~290~~ 270	250	250	~~280~~ *250*

*Annual average impacts were based on ISCLT2 results using STAR data (1982 through 1986). Short-term average impacts were based on ISCST2 results for the individual years indicated.

Source: ECT, 1992 ~~3~~ *4*.

Table 7-14. Summary of CO Impacts Due to Polk Power Station Sources*

	1982	1983	1984	1985	1986
8-Hour average					
Highest ($\mu g/m^3$)	~~40.6~~ ~~26.9~~ *26.2*	~~40.4~~ ~~37.0~~ *30.7*	~~56.1~~ ~~40.8~~ *49.6*	~~67.1~~ ~~52.9~~ *43.9*	~~44.2~~ ~~34.8~~ *33.0*
Location					
Distance (meters)	~~1,750~~ ~~1,310~~ *1,995*	~~2,000~~ *1,415*	1,995	2,000	~~2,000~~ 1,995
Radial (°)	~~300~~ ~~290~~ *130*	~~120~~ *280*	130	120	~~140~~ 130
Second highest ($\mu g/m^3$)	~~35.0~~ ~~25.1~~ *22.3*	~~35.6~~ ~~28.5~~ *25.1*	~~44.2~~ ~~36.6~~ *38.8*	~~63.3~~ ~~50.4~~ *43.5*	~~39.3~~ ~~32.8~~ *29.1*
Location					
Distance (meters)	~~1,500~~ ~~1,295~~ *1,995*	~~1,310~~ 1,995	1,995	2,000	~~1,310~~ 1,995
Radial (°)	~~300~~ *130*	~~290~~ 130	130	120	~~290~~ 130
1-Hour average					
Highest ($\mu g/m^3$)	~~167.0~~ ~~134.9~~ *121.4*	~~149.7~~ ~~133.6~~ *113.5*	~~168.8~~ ~~136.9~~ *121.6*	~~169.2~~ ~~137.4~~ *123.2*	~~162.5~~ ~~125.5~~ *121.3*
Location					
Distance (meters)	~~2,000~~ *1,995*	~~1,675~~ ~~1,995~~ *2,000*	2,000	2,000	2,000
Radial (°)	~~120~~ *130*	~~160~~ ~~130~~ *140*	120	120	120
Second highest ($\mu g/m^3$)	~~148.0~~ ~~119.2~~ *120.5*	~~140.2~~ ~~133.0~~ *104.6*	~~165.6~~ ~~133.5~~ *120.5*	~~168.1~~ ~~136.1~~ *122.2*	~~147.8~~ ~~120.6~~ *100.3*
Location					
Distance (meters)	~~1,310~~ ~~2,000~~ *1,995*	~~2,000~~ ~~1,995~~ *2,000*	~~2,000~~ *1,995*	2,000	~~1,310~~ ~~2,000~~ *1,995*
Radial (°)	~~290~~ ~~120~~ *130*	~~110~~ 130	~~120~~ *130*	120	~~290~~ ~~120~~ *130*

*Short-term average impacts were based on ISCST2 results for the individual years indicated.

Source: ECT, 1992 ~~3~~ *4*.

Table 7-16. Summary of Lead Impacts Due to Polk Power Station Sources (Full Buildout)*

Year		Winter Quarter	Spring Quarter	Summer Quarter	Fall Quarter
1982	Seasonal average				
	Highest ($\mu g/m^3$)	0.0009 04	0.0010 07 *06*	0.0014 08	0.0012 11 *09*
	Location				
	Distance (meters)	1,415 2,000 *4,000*	1,415 2,000	2,000	2,000 *2,300*
	Radial (°)	280 250 *270*	280 250 *260*	120 90 *100*	250 240 *250*
1983	Seasonal average				
	Highest ($\mu g/m^3$)	0.0010 04 *05*	0.0018 07 *08*	0.0013 08 *07*	0.0010 09 *07*
	Location				
	Distance (meters)	2,000 1,560 *2,000*	2,000	1,415 2,000	1,600 2,000 *2,300*
	Radial (°)	140 180 *140*	140	280 250 *90*	270 240 *250*
1984	Seasonal average				
	Highest ($\mu g/m^3$)	0.0011 07 *05*	0.0013 06	0.0014 08 *07*	0.00 10 *08*
	Location				
	Distance (meters)	2,000	2,000	1,415 1,905 *2,000*	2,000 *2,300*
	Radial (°)	140 250 *140*	140 250 *110*	280 260 *100*	250 240 *250*
1985	Seasonal average				
	Highest ($\mu g/m^3$)	0.0010 05	0.0016 07 *08*	0.0011 09	0.0012 11 *09*
	Location				
	Distance (meters)	2,000	2,000 *2,075*	1,415 2,000	1,600 2,000 *2,500*
	Radial (°)	140 240 *140*	120 90 *100*	280 90	270 250 *260*
1986	Seasonal average				
	Highest ($\mu g/m^3$)	0.0011 05	0.0016 07	0.0014 11	0.0015 10 *07*
	Location				
	Distance (meters)	2,000	2,000	1,415 1,980	1,415 2,000
	Radial (°)	140 240 *140*	140 250 *100*	280 90	280 250 *260*

*Quarterly average impacts were based on ISCLT2 results using STAR data (1982 through 1986).

Source: ECT, 1992 3 *4*.

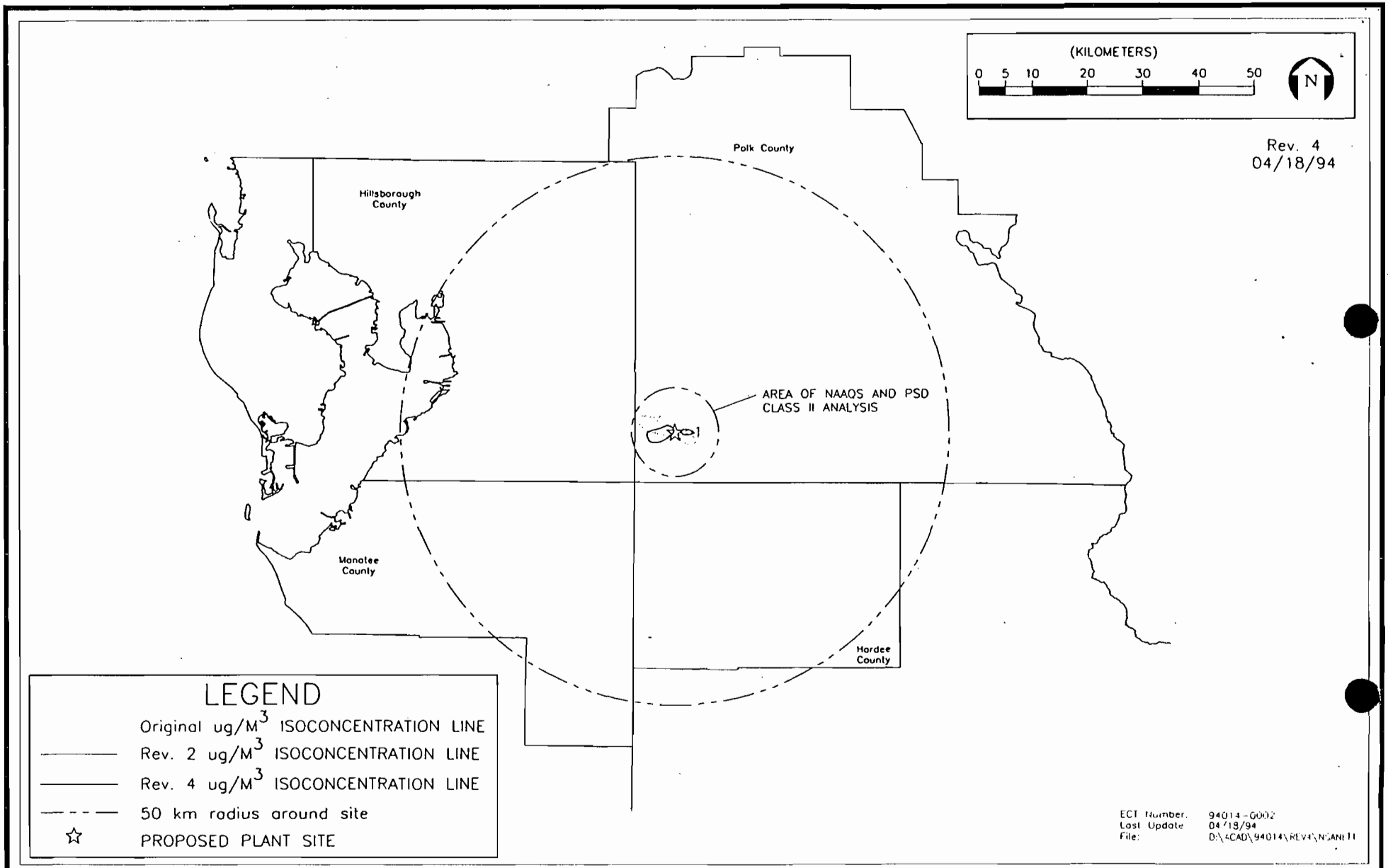


FIGURE 7-1.
ANNUAL SO2 SIA - COMPARISON

Source: ECT, 1994.

ECT
Environmental Consulting & Technology, Inc.

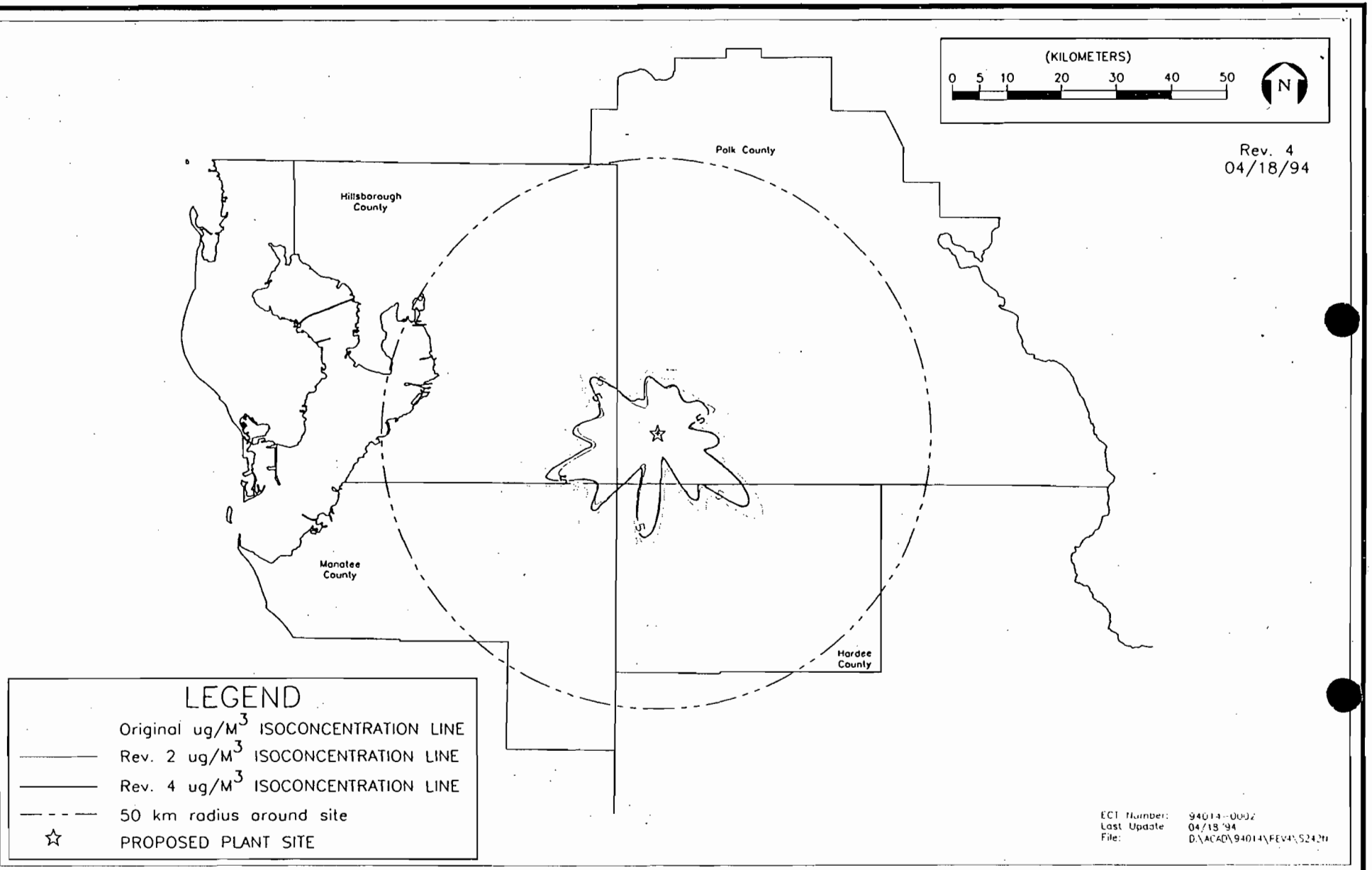


FIGURE 7-2.
24-HOUR SO2 SIA - COMPARISON

Source: ECT, 1994.

ECT
Environmental Consulting & Technology, Inc.

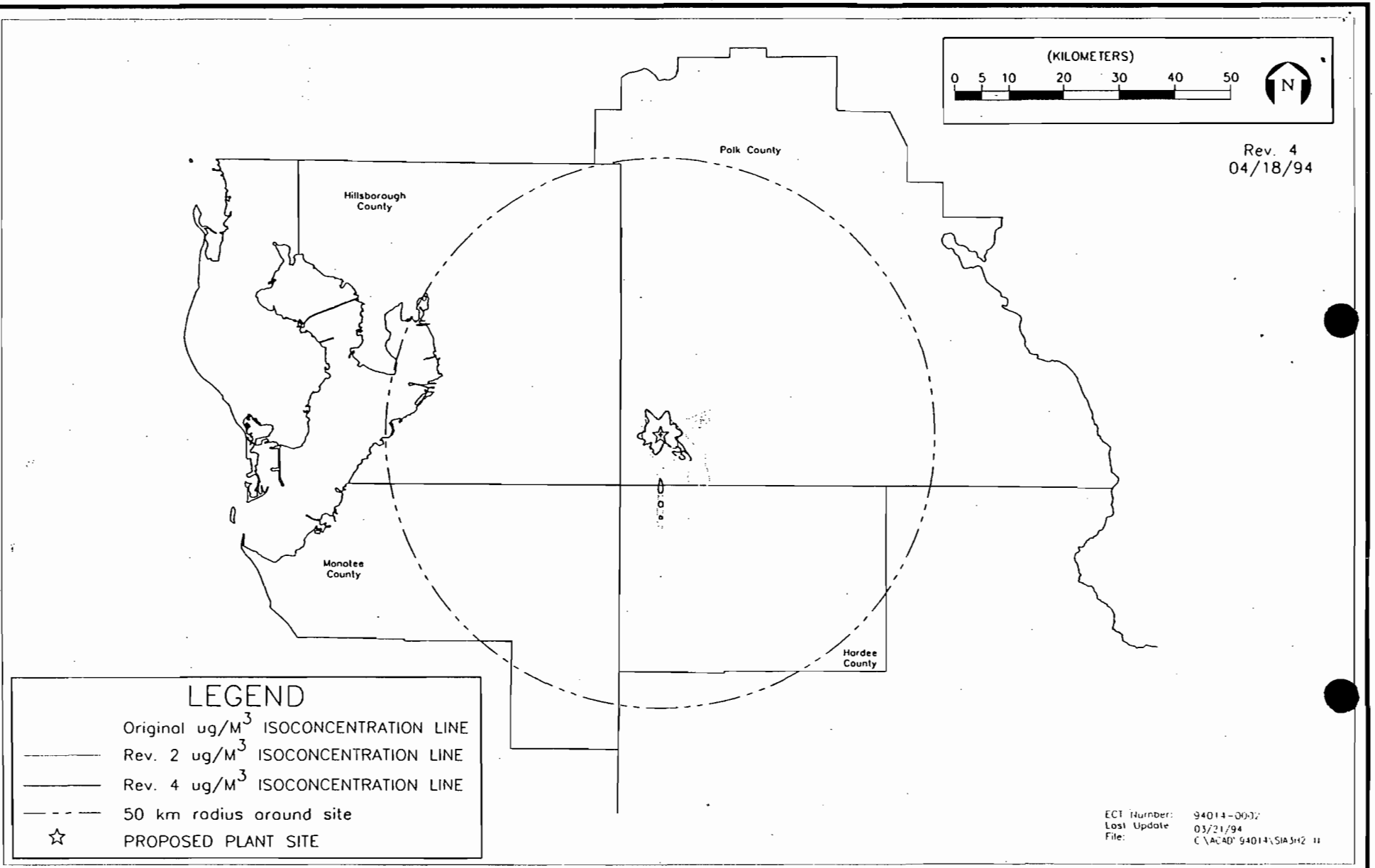


FIGURE 7-3.
3-HOUR SO2 SIA - ORIGINAL

Source: ECT, 1994.

ECT
Environmental Consulting & Technology, Inc.

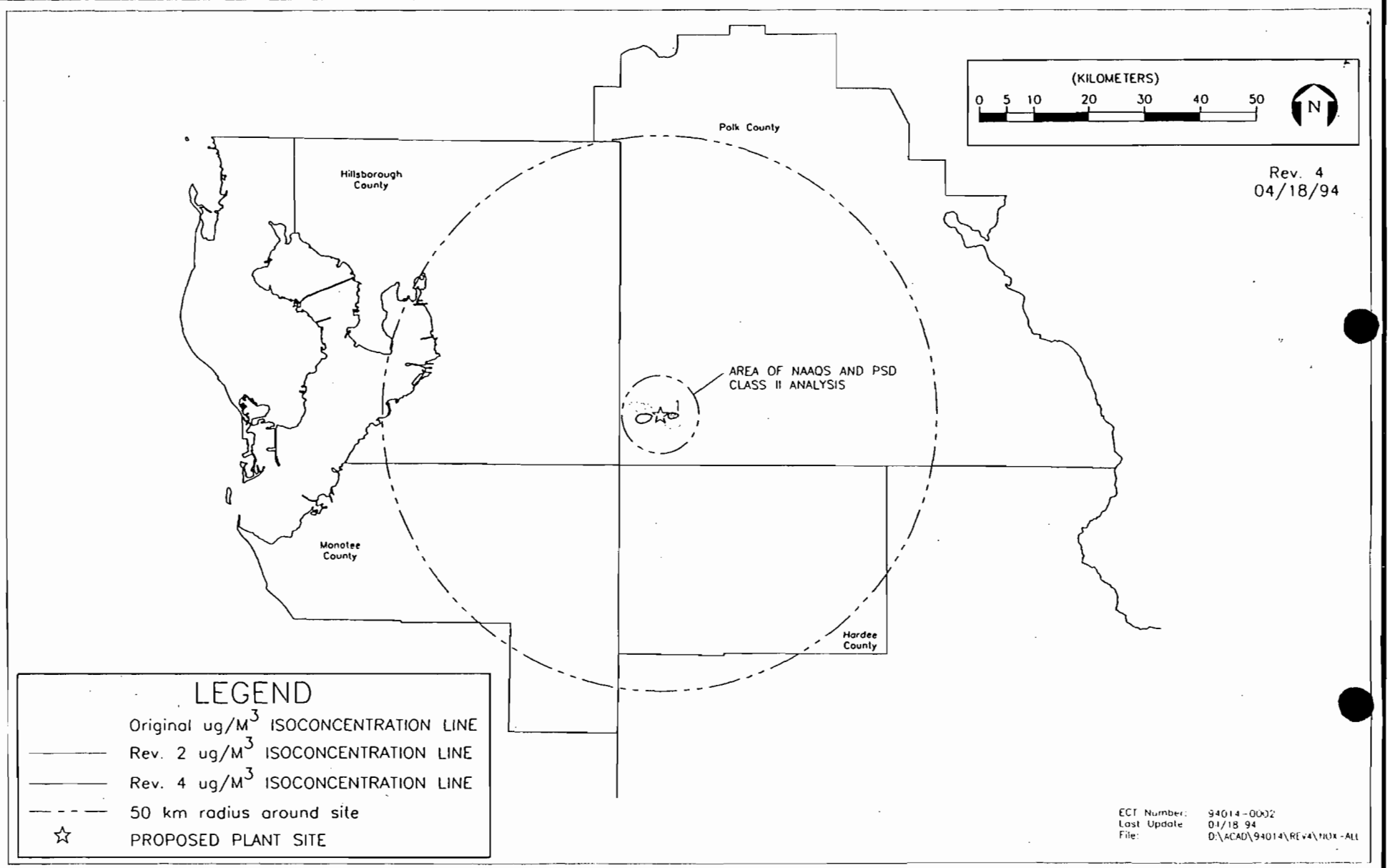


FIGURE 7-4.

ANNUAL NOX SIA - COMPARISON

Source: ECT, 1994.

ECT

Environmental Consulting & Technology, Inc.

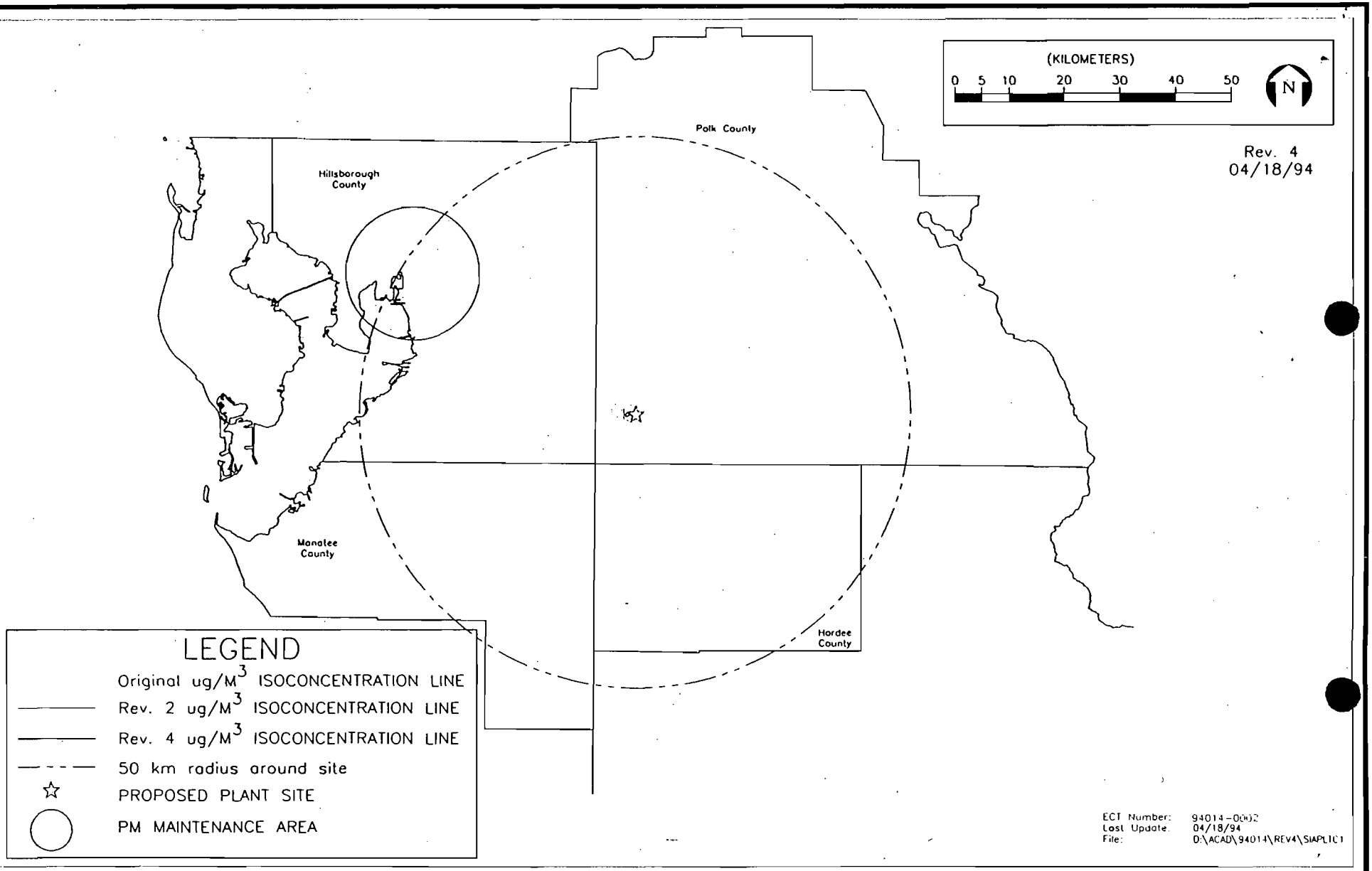


FIGURE 7-5.
ANNUAL PM SIA - COMPARISON

Source: ECT, 1994.

ECT
Environmental Consulting & Technology, Inc.

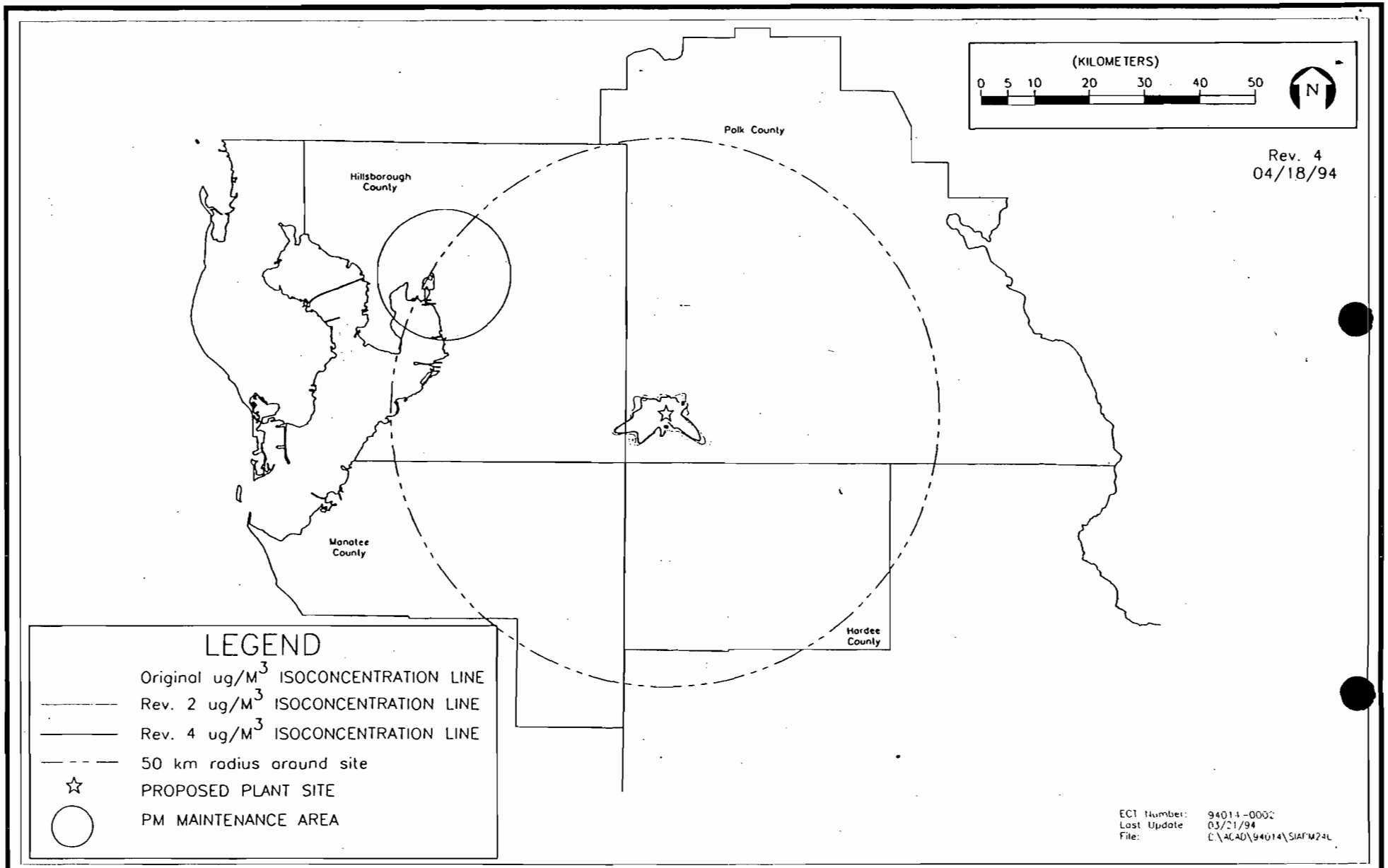


FIGURE 7-6.
24-HOUR PM SIA - COMPARISON

Source: ECT, 1994.

ECT
Environmental Consulting & Technology, Inc.

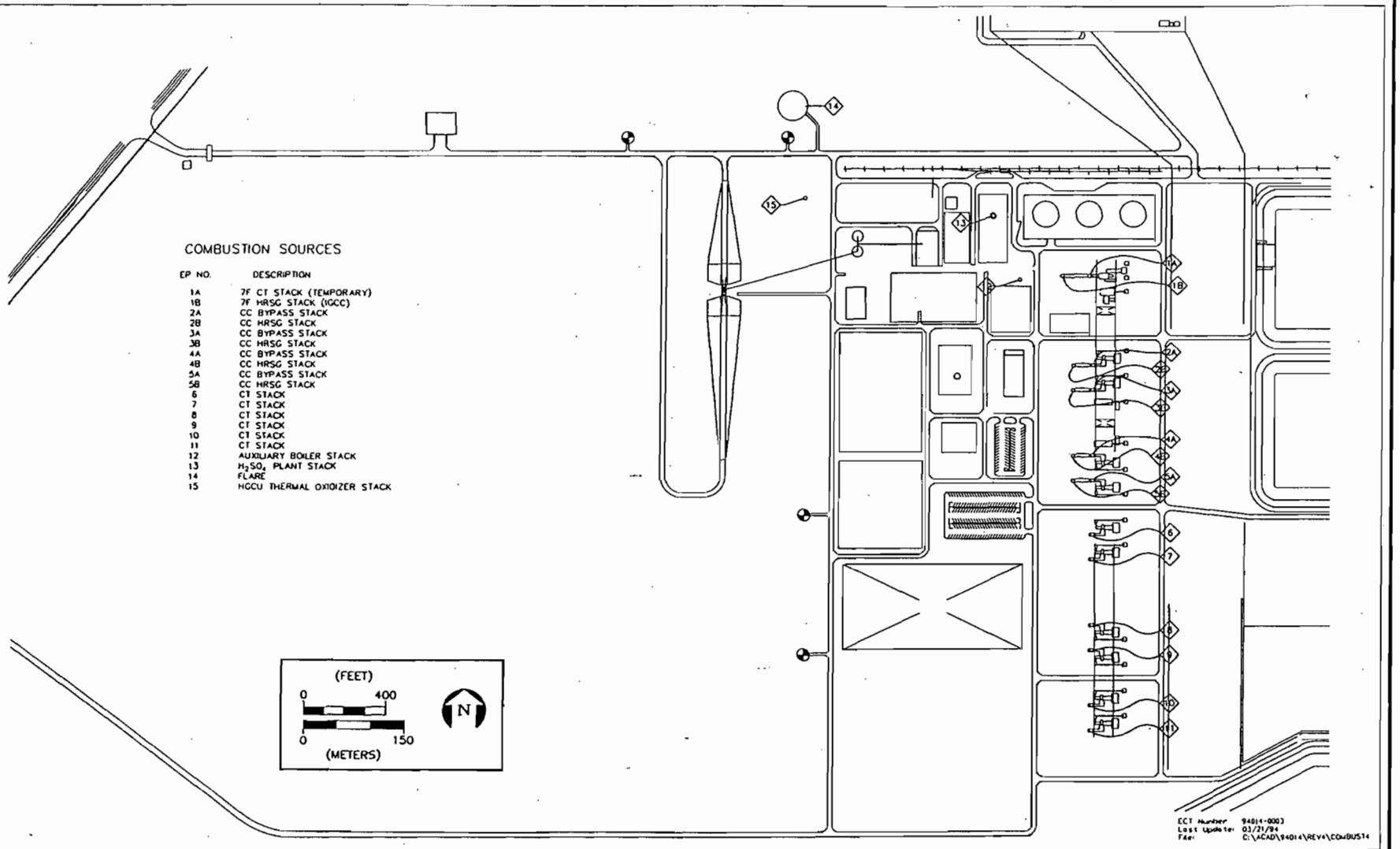


FIGURE 2-15.

LOCATION OF COMBUSTION SOURCES

Source: ECT, 1994.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

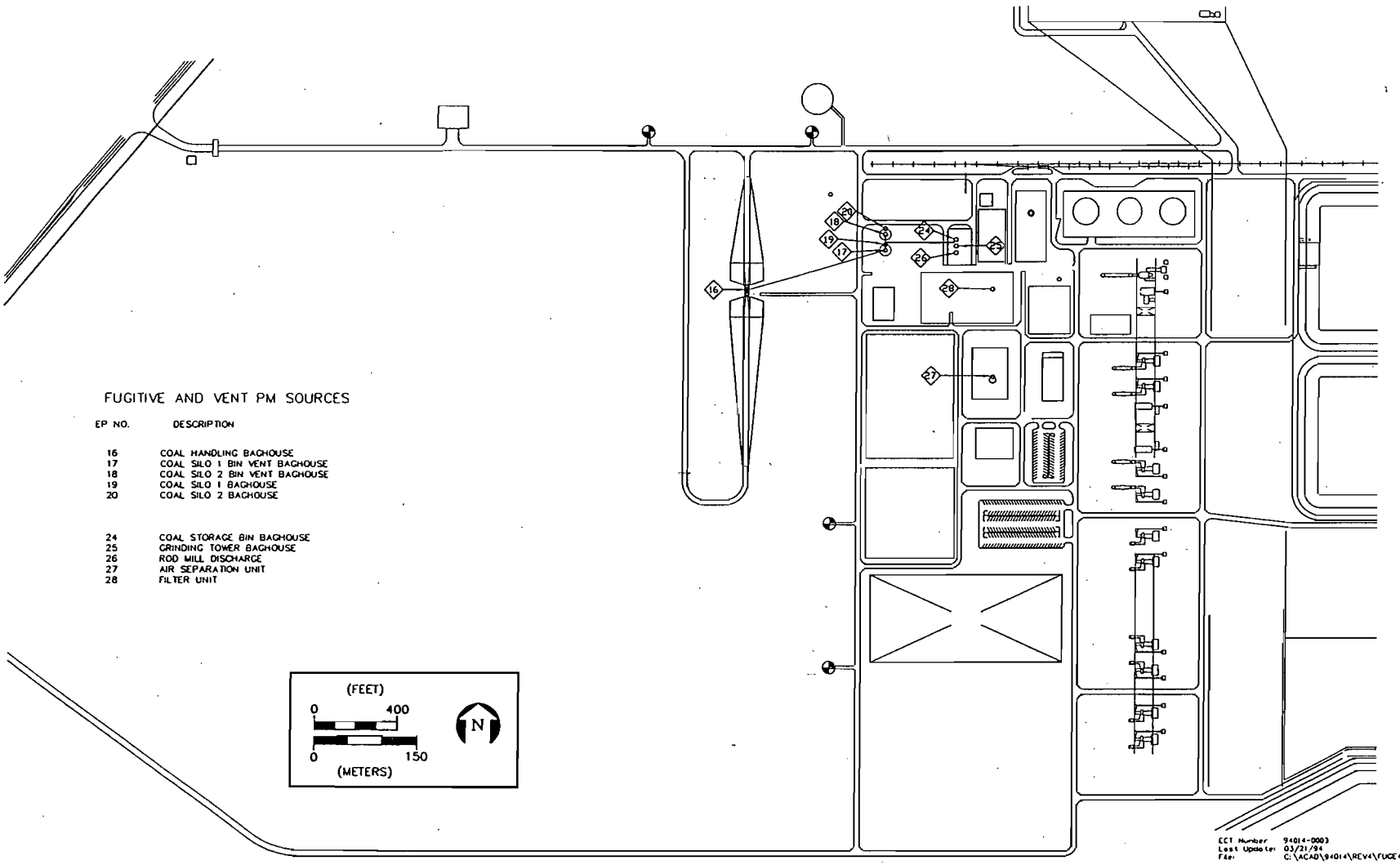


FIGURE 2-16.

LOCATION OF FUGITIVE AND VENT PARTICULATE MATTER SOURCES

Source: ECT, 1994.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

LW
PN 4/14
WH 4/14
SC 4/15
4/20

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In Re: Tampa Electric Company Big Bend Station Unit 4 Modification of Conditions of Certification PA 79-12 Hillsborough County, Florida	)	DER CASE NO. PA 79-12C OGC CASE NO. 94-0914

FINAL ORDER MODIFYING CONDITIONS OF CERTIFICATION

On August 17, 1981, the Governor and Cabinet, sitting as the Siting Board, issued a final order approving certification for Tampa Electric Company's (TECO's) Big Bend Station Unit 4. That certification order approved the construction and operation of a 486 MW (gross) coal-fired facility and associated facilities located in Hillsborough County, Florida.

On September 21, 1992, TECO filed a request to modify the conditions of certification pursuant to Section 403.516(1)(b), Florida Statutes. TECO requested that the conditions be modified to approve several recently identified changes to the project design and operation. These proposed changes include changes in the coal yard facility and alterations to the plant layout.

Copies of TECO's proposed modification were distributed to all parties to the certification proceeding and made available for public review in February, 1993. On March 5, 1993, Notice of Proposed Modification of power plant certification was published in the Florida Administrative Weekly. As of February 22, 1993, all parties to the original proceeding had received copies of the intent to modify. The notice specified that a

hearing would be held if a party to the original certification hearing objects within 45 days from receipt of the proposed notice of modification or if a person whose substantial interests will be affected by the proposed modification objects in writing within 30 days after issuance of the public notice. No written objection to the proposed modifications has been received by the Department. Accordingly, in the absence of any timely objection,

IT IS ORDERED:

The proposed changes to TECO Big Bend Station as described in the September 21, 1992, and June 30, 1993, requests for modification are APPROVED. Pursuant to Section 403.516(1)(b), F.S., the conditions of certification for the TECO Big Bend Station are MODIFIED as follows:

Condition I.A.3.

a. Pursuant to Rule 17-296.310(2), Florida Administrative Code (F.A.C.), ~~the permittee shall not cause to be discharged into the atmosphere~~ no owner or operator shall cause, permit, or allow visible emissions equal to or greater than 20% opacity of fugitive or unconfined particulate matter from any coal processing or conveying equipment, coal storage system, or coal transfer and loading system, or transloading source/emissions point (i.e., off-loading or loading of coal and coal piles) associated with the processing of coal; ~~visible emissions which exceed 20 percent opacity~~. Initial and subsequent visible emissions compliance tests shall be demonstrated using EPA Reference Method 22, 40 CFR Part 60,

Appendix A, Visual Determination of Fugitive Emissions from Material Sources (July 1, 1993 version).

b. The permittee shall submit ----

c. The coal pile operations are subject to Rule 17-296.310(3), F.A.C., Unconfined Emissions of Particulate Matter. Reasonable precautions to minimize unconfined particulate matter shall be in accordance with Rule 17-296.310(3)(c), F.A.C.; and, may include, but shall not be limited to, the coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed coal.

d. From each coal transloading source/emissions point (i.e., off-loading and loading of coal), the maximum hourly transloading transfer of coal shall not exceed 4,000 tons, 24-hour rolling average.

e. From each coal transloading source/emissions point, (i.e., off-loading and loading of coal), the maximum annual transloading transfer of coal shall not exceed 1,428,030 tons.

f. The number of railcars and trucks and the quantity of coal loaded by each coal transloading source/emissions point (i.e., off-loading and loading of coal) shall be recorded, maintained, and kept on file for a minimum of two years. The annual quantity of coal loaded by each coal transloading source/emissions point shall be submitted in an annual operation report (AOR) to the Environmental Protection Commission of Hillsborough County by March 1 of each year for

the previous year's operation.

Any party to this Notice has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department of Environmental Protection in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that the Final Order is filed with the Department of Environmental Protection.

DONE AND ENTERED this 31st day of March, 1994 in Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

Virginia B. Wetherell

VIRGINIA B. WETHERELL
SECRETARY
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk 4-6-94 Date

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing was sent by U.S. Mail to the following this 6th day of April, 1994.

Lawrence N. Curtin, Esq.
Holland & Knight
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Tallahassee, FL 32302

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Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100

Martin D. Hernandez, Esq.
Southwest Florida Water
Management District
2379 Broad Street
Brooksville, FL 34609-6899

Greg Nelson, P.E.
Tampa, Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Michael Palecki
Division of Legal Services
Public Service Commission
101 East Gaines Street
Fletcher Building,Room 212
Tallahassee, FL 32399-0850

Sara M. Fotopulos, Esq.
Environmental Protection
Comm. of Hillsborough Co.
1900 Ninth Avenue
Tampa, FL 33605

R T Donelan

Richard Donelan, Esq.
Department of Environmental
Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-9314

TAMPA ELECTRIC
A TECO ENERGY COMPANY

D.E.P
MAR 03 1994
TAMPA

March 1, 1994

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

Re: Tampa Electric Company
Polk Power Station
Commencement of Construction Activities

Dear Gentlemen:

Pursuant to Tampa Electric Company, Polk Power Station, Condition of Certification (XII.D.1)(Reporting), please be advised that clearing and grubbing activities in non-jurisdictional areas will commence March 1, 1994 with overall construction to commence by May 1, 1994. This is the initial construction status report with quarterly reports to follow.

Sincerely,

Patrick A. Ho, P.E.
Manager
Environmental Planning

td/DD127

cc: Richard D. Garrity, Ph.D, FDEP

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

February 25, 1994

Mr. Greg Nelson
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Dear Mr. Nelson:

Re: Polk Power Station

The enclosed letter from the Department of Interior's Fish and Wildlife Service is forwarded for your information and compliance when you apply for permits for future phases of the Polk Power Station.

Sincerely,

John C. Brown, Jr., P.E.
Administrator
Air Permitting and Standards

JB/CH/bjb

Enclosure

cc: H. Mueller, EPA
J. W. Pulliam, EPA
W. Thomas, SWD
T. Rogers, FDEP

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO:

February 14, 1994

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

Dear Mr. Fancy:

We have reviewed the Prevention of Significant Deterioration (PSD) permit application and the Technical Evaluation and Preliminary Determination for Tampa Electric Company's (TECO) proposed 260 MW Integrated Coal Gasification Combined Cycle Unit. This is the first phase of a project at TECO's Polk Station that would eventually have a generating capacity of 1150 MW. The facility would be located in Polk County, Florida, approximately 120 km southeast of Chassahowitzka Wilderness Area (WA), a Class I air quality area, administered by the Fish and Wildlife Service (Service). The proposed project would be a significant emitter of nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM/PM_{10}), carbon monoxide (CO), volatile organic compounds (VOC), and sulfuric acid mist (H_2SO_4). The facility is also subject to PSD regulations for lead, beryllium, and mercury.

Best Available 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 Modeling Analysis

Although this PSD permit is for the first phase of the project, a 260 MW facility, the modeling was performed for the entire project, which will eventually have a generating capacity of 1150 MW.

The Class I increment modeling was first performed with the 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 ISC modeling was performed for both the proposed Polk Station, and for all increment consuming or 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 the earlier analysis for the Environmental Impact Statement (EIS), the MESOPUFF II modeling indicated that the entire 1150 MW proposed Polk Project would not significantly contribute to a 3-hour or 24-hour increment violation. The cumulative high second-high 24-hour SO_2 concentration in that report was stated to be 5.0 $\mu g/m^3$. In the PSD modeling analysis for the Phase I application, the applicant has erroneously used the option in the MESOPUFF II model to uniformly distribute SO_2 concentrations within the puffs, instead of using the option of a gaussian distribution within the puffs. This error incorrectly produced a high second-high 24-hour SO_2 concentration of 3.8 $\mu g/m^3$. This requirement for gaussian distribution within the puffs is found in the EPA document "Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 1 Report" and contains the methodology that must be used in a Class I analysis.

We accept the results from the modeling analysis contained in the EIS that indicate the 24-hour SO_2 increment may be exceeded but not violated. However, the modeling represents the impact from the full Polk Station project of 1150 MW. While one could argue that this represents a conservative assumption, it could be construed as "increment banking," which would put future applicants in the area at risk of not having sufficient increment available for their proposed sources. It is our understanding that the State of Florida also does not accept this "increment banking" effort, and we support the State's position. For future applicants performing Class I increment analyses for Chassahowitzka WA, the emissions from the proposed TECO Polk Phase I 260 MW facility should be modeled and not the emissions from the future 1150 MW project.

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

Air Quality Related Values Analysis

In our letter to EPA of July 1993 regarding the Site Certification Application for this project, we asked that TECO 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. We asked that TECO perform an Air Quality Related Values Analysis based on the results of the deposition modeling.

EPA replied to our request in a December 1993 letter that MESOPUFF was not conducted for the requested parameters. Instead, the ISC dispersion model was used to predict deposition at Chassahowitzka WA. While we agree that TECO's contribution of sulfate and nitrate at the wilderness area is small (5.7×10^{-5} and 6.7×10^{-4} g/sq m/year, respectively), the modeling did not predict cumulative deposition. As we have stated in numerous letters to your Department, we are concerned not only with an individual source's impact to AQRVs, but with the cumulative impact of all sources in an area. EPA states that TECO's small sulfate contribution will be assimilated by the ecosystem. We are concerned that the organic soils of Chassahowitzka WA may have reached their capacity to assimilate sulfate, and that additional sulfate may oxidize the soils, resulting in their erosion.

The analysis of nitrogen deposition similarly concluded that TECO's contribution was small, and thus impacts to Chassahowitzka WA would be small. Again, we are concerned with cumulative impacts. While TECO's contribution to nitrogen deposition may only change the level of nitrogen in near shore waters by 1 percent, 20 such sources will have a much more significant impact. The analyses for mercury and beryllium deposition were not cumulative, either. We need to know: (1) the cumulative deposition of pollutants, and (2) the ecological consequences of this deposition. We ask that TECO be required to perform these analyses when they apply for permits for future phases of their Polk Power Station.

Thank you for providing us the opportunity to comment on the proposed project. If you have questions, please call Ms. Ellen Porter of our Air Quality Branch in Denver at 303/969-2071.

Sincerely yours,

James W. Pulliam, Jr.
Regional Director

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO

February 14, 1994

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

Dear Mr. Fancy:

We have reviewed the Prevention of Significant Deterioration (PSD) permit application and the Technical Evaluation and Preliminary Determination for Tampa Electric Company's (TECO) proposed 260 MW Integrated Coal Gasification Combined Cycle Unit. This is the first phase of a project at TECO's Polk Station that would eventually have a generating capacity of 1150 MW. The facility would be located in Polk County, Florida, approximately 120 km southeast of Chassahowitzka Wilderness Area (WA), a Class I air quality area, administered by the Fish and Wildlife Service (Service). The proposed project would be a significant emitter of nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM/PM_{10}), carbon monoxide (CO), volatile organic compounds (VOC), and sulfuric acid mist (H_2SO_4). The facility is also subject to PSD regulations for lead, beryllium, and mercury.

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Thank you for providing us the opportunity to comment on the proposed project. If you have questions, please call Ms. Ellen Porter of our Air Quality Branch in Denver at 303/969-2071.

Sincerely yours,

James W. Pulliam, Jr.
Regional Director

cc: L. Kirk
B. Thomas, Subject
J. Harper, EPA
B. Quinn
R. Donlan
J. Davis, EC T
Holland & Knight
L. Curtin
EFIJBIPL

STATE OF FLORIDA
BEFORE THE GOVERNOR AND CABINET
SITTING AS THE SITING BOARD

IN RE:	)	
	)	
APPLICATION FOR POWER PLANT CERTIFICATION OF TECO POLK COUNTY PROJECT, PA 92-32	)	DOAH CASE NO. 92-4896EPP OGC CASE NO. 92-1399

FINAL ORDER APPROVING CERTIFICATION

On January 25, 1994, this matter came before the Governor and Cabinet, sitting as the Siting Board, pursuant to the Florida Electrical Power Plant Siting Act (PPSA), Section 403.501 **et seq.**, Florida Statutes (1993), for final agency action concerning a recommended order dated November 30, 1993, attached as Exhibit 1, which recommends site certification for the Tampa Electric Company Polk Power Station project. By order dated January 26, 1993, the Board found the Polk site to be consistent and in compliance with existing land use plans and zoning ordinances. On March 2, 1992, the Public Service Commission certified the need for 260 MW of integrated combined cycle coal-gasification (IGCC) generating capacity at the site.

No party has filed exceptions to the Recommended Order.

Having reviewed the recommended order and otherwise being fully advised, it is ORDERED:

1. Pursuant to Section 120.57 (1)(b)(10), Florida Statutes (1993), the Recommended Order dated November 30, 1993, (Exhibit 1) is APPROVED and ADOPTED by the Board.

2. The Board APPROVES certification for the location,

construction and operation of 260 MW of integrated gasification combined cycle generating capacity at the the Tampa Electric Company Polk Power Station Site as proposed in the Site Certification Application, subject to the Conditions of Certification contained in Appendix A to Exhibit 1.

3. The Tampa Electric Company Polk Power Station Site is certified for an ultimate site capacity of 1150 MW fueled by coal gas and natural gas, subject to need determination by the Florida Public Service Commission as required by law, supplemental application review and approval by the Board pursuant to Section 403.517, Florida Statutes, and compliance with the Conditions of Certification contained in Appendix A to Exhibit 1.

4. The Board DELEGATES to the Department of Environmental Protection the authority to assure and enforce compliance by Tampa Electric Company and its agents with all of the Conditions of Certification imposed by this Order.

NOTICE OF RIGHTS

Any party to this certification proceeding has the right to seek judicial review of this Order under Section 120.68, Florida Statutes, by the filing of a notice of appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection, Office of General Counsel, 2600 Blair Stone Road, Tallahassee, FL 32399-2400; and by filing a copy with the appropriate District Court of Appeal.

The notice of appeal must be filed within 30 days from the date this Order is filed with the Clerk of the Siting Board.

DONE and ORDERED this 27th day of January, 1994, at Tallahassee, Florida, pursuant to a vote of the Governor and Cabinet sitting as the Siting Board, at a duly-noticed and constituted Cabinet meeting on January 25, 1994.

THE GOVERNOR AND CABINET
SITTING AS THE SITING BOARD

BY: _____
THE HONORABLE LAWTON CHILES

FILING AND ACKNOWLEDGEMENT

FILED, on this date, pursuant to S120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

_____ 1/27/94
Clerk Date

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been sent by U.S. Mail, to the following listed persons:

Hamilton S. Oven
Office of Siting Coordination
Department of Environmental Protection
3900 Commonwealth Blvd Ste 953
Tallahassee FL 32399-3000

Karen Brodeen, Esq.
Assistant General Counsel
Department of Community Affairs
2740 Centerview Dr Rm 138
Tallahassee FL 32399-0863

Michael Palecki, Esquire
Division of Legal Services
Public Service Commission
101 E Gaines St Rm 212
Tallahassee FL 32399-0850

Carolyn S. Holifield, Esq.
Administrative Law Section
Department of Transportation
Haydon Burns Bldg
605 Suwannee St MS 58
Tallahassee FL 32399-0458

R. Douglas Leonard
Executive Director
Central Florida Regional Planning Council
409 E Davidson St
Bartow FL 33830

James Antista
General Counsel
Florida Game & Fresh Water Fish Commission
Bryant Bldg
620 S Meridian St
Tallahassee FL 32399-1600

Mark Carpanini, Esquire
Office of County Attorney
Polk County
P O Box 60
Bartow FL 33830-0060

Julia Greene
Executive Director
Tampa Bay Regional Planning Council
9455 Koger Blvd
St Petersburg FL 33702

John J. Dingfelder, Esquire
Hillsborough County
P O Box 1110
Tampa FL 33601-1110

Martin D. Hernandez, Esquire
Southwest Florida Water Management District
2370 Broad St
Brooksville FL 34609-6899

Certificate of Service (continued)

Sara Fotopulos, Chief Counsel
EPC of Hillsborough County
1900 9th Ave
Tampa FL 33605

Lawrence N. Curtin, Esq.
Holland and Knight
P.O. Drawer 810
Tallahassee, FL 32302

this 27th day of January, 1994.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

R T Donelan, Jr.

RICHARD T. DONELAN, JR.
Assistant General Counsel

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee FL 32399-2400
Telephone: (904)488-9314

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

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

JAN 2 6 1994

4APT-AEB

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

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

Dear Mr. Fancy:

This is to acknowledge receipt of your technical evaluation, preliminary determination, and draft Prevention of Significant Deterioration (PSD) permit for the above referenced facility by your letter dated December 20, 1993. Tampa Electric Company (TECO) proposes to construct and operate a 1,150 MW power plant consisting of an integrated coal gasification combined-cycle (IGCC) facility, two additional combined-cycle (CC) units, and six simple-cycle combustion turbines (CTs) fueled primarily by natural gas. As discussed between Mr. Syed Arif of your staff and Mr. Stan Kukier of my staff on January 24, 1994, we have reviewed the package as submitted and have no adverse comments.

We agree that the use of low sulfur coal and the integral sulfur removal and recovery processes can be considered BACT for control of IGCC facility sulfur dioxide and acid gas emissions. Good combustion practices are considered BACT for control of CO and VOC emissions from the IGCC facility, CC units, and CTs. Use of clean, low ash fuels, and good combustion techniques are also considered BACT for particulate emissions from all combustion units. We also agree that dry low-NO_x burners and water injection are representative of BACT for NO_x emissions from the CC units and CTs. The Florida Department of Environmental Protection will make a BACT determination for IGCC facility combustion turbine NO_x emissions based on the results of NO_x emission testing. NO_x emission testing will be performed on the IGCC facility combustion turbine every two months over a twelve to eighteen month period.

We also agree that wet suppression methods, enclosing coal unloading, conveyor, and transfer points, and applying both crusting agents and surfactants, are representative of BACT for control of fugitive particulate emissions from coal storage and reclaiming operations.

Mr. Arif has indicated that the air quality analysis concerns have been addressed satisfactory.

Thank you for the opportunity to comment on this package. If you have any questions, please contact Mr. Stan Kukier of my staff at (404) 347-5014.

Sincerely yours,

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

cc: I. Arif
D. Outlaw
J. Rogers
J. Bunyak, NPS
C. Holladay
B. Thomas, SW Dist
B. Open
R. Donlan
G. Nelson, TECO

LAW OFFICES

HOLLAND & KNIGHT

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

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JACKSONVILLE
LAKELAND
MIAMI
ORLANDO
ST. PETERSBURG
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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)
ST. PETERSBURG, FL 33701
(813) 896-7171 FAX (813) 822-8048

SPECIAL COUNSEL
LITIGATION & BANKRUPTCY
SHAW, LICITRA, PARENTE
ESERNIO & SCHWARTZ, P.C.
1010 FRANKLIN AVENUE
GARDEN CITY, NY 11530
(516) 742-0610 FAX (516) 742-2670
300 EAST 42ND STREET
NEW YORK, NY 10017
(212) 338-0970

January 13, 1994

RECEIVED

JAN 13 1994

Bureau of
Air Regulation

VIA HAND DELIVERY

Mr. Clair Fancy
State of Florida Department
of Environmental Protection
111 South Magnolia Courtyard
Suite 4
Tallahassee, Florida 32399-2400

Re: Polk Power Station; Affidavits of Publication of Notice of Intent to Issue PSD Permit (PSD-FL-194)

Dear Mr. Fancy

Attached are copies of the Affidavits of Publication from the Lakeland Ledger, the Tampa Tribune, and the Mulberry Press relating to the Department's Notice of Intent to Issue the above referenced PSD permit to Tampa Electric Company.

Please give me a call if you have any questions.

Sincerely,

HOLLAND & KNIGHT

Samuel J. Morley

Attachments
SJM/mrh
TAL-38029

cc w/att:
Sayed Arif (via hand delivery)
Lawrence N. Curtin
Richard Donelan
Buck Oven
Tom Davis
Jewell Harper
Thomas, SW Dist
G. Bunyak, NPS

AFFIDAVIT OF PUBLICATION

THE LEDGER
Lakeland, Polk County, Florida

Case No.....

STATE OF FLORIDA)
COUNTY OF POLK)

Before the undersigned authority personally appeared Tharon Honeycutt, who on oath says that he is Controller of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Notice of intent to issue permit

in the matter of

PSD-FL-194

in the

Court, was published in said newspaper in the issues of

January 3;

1994

Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the post office in Lakeland, in said Polk 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.

Signed ..... Controller

by Tharon Honeycutt who is personally known to me.

Sworn to and subscribed before me this 3rd day of January A.D. 1994

(Seal)

BILLIE MORLAN
MY COMMISSION # CC 191354
EXPIRES: Oct 6, 1996
Bonded Thru Notary Public Underwriters

Billie Morlan
Notary Public

My Commission Expires BILLIE MORLAN

Holland & Knight
Acct #12610

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT

The Department of Environmental Protection gives notice of its intent to issue a PSD permit (PSD-FL-194) to Tampa Electric Company, located 13 miles south of Bartow, Polk County, Florida, to construct a 260 MW integrated coal gasification combined cycle facility. A determination of Best Available Control Technology (BACT) was required. The total PSD increments consumed by all sources, including this facility, in the Class I and II areas are:

Class I Area Parameter	Averaging Period	Total PSD Impact From All Sources (ug/m3)	Class I PSD Increment (ug/m3)	Increment Consumed (%)
SO2	3-hour	12.9	25	52
	24-hour	3.8	5	76
	Annual	0.4	2	20
NO2	Annual	0.8	2.5	32
PM	24-hour	5.7	10	57
	Annual	1.1	5	22

Class II Area Parameter	Averaging Period	Total PSD Impact From All Sources (ug/m3)	Class I PSD Increment (ug/m3)	Increment Consumed (%)
SO2	3-hour	104	512	20
	24-hour	27	91	30
	Annual	0	20	0
NO2	Annual	3.3	25	13
PM	24-hour	31.8	37	86
	Annual	5.4	19	28

The Department is issuing this intent to issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Park Courtyard
Tallahassee, Florida 32301

Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Any person may send written comments on the proposed action to Mr. Preston Lewis at the Department's Tallahassee address. All comments received within 30 days of the publication of this notice will be considered in the Department's final determination.

Further, a public hearing can be requested by any person(s). Such requests must be submitted within 30 days of this notice.

D-93 -- 1-3; 1994

D-93

THE TAMPA TRIBUNE

Publi[illegible] Daily
Tampa, Hillsborough County, Florida

State of Florida
County of Hillsborough } ss

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

STATE OF FLORIDA

was published in said newspaper in the issues of

DECEMBER 27, 1993

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

Sworn to and subscribed before me, this 27 *day of* DECEMBER, *A.D. 19* 93

*Personally Known*____ *or Produced Identification*____

*Type of Identification Produced*____

(SEAL)

[illegible]

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT

The Department of Environmental Protection gives notice of its intent to issue a PSD permit (PSD-FL-194) to Tampa Electric Company, located 13 miles south of Bartow, Polk County, Florida, to construct a 250 MW integrated coal gasification combined cycle facility. A determination of Best Available Control Technology (BACT) was required. The total PSD increments consumed by all sources, including this facility, in the Class I and II areas are:

Class I Area

Pollutant	Averaging Period	Total PSD Impact From All Sources (ug/m³)	Class I PSD Increment (ug/m³)	Increment Consumed (%)
SO_2	3-hour	12.9	25	52
	24-hour	3.8	5	76
	Annual	0.4	2	20
NO_2	Annual	0.8	2.5	32
PM	24-hour	5.7	10	57
	Annual	1.1	5	22

Class II Area

Pollutant	Averaging Period	Total PSD Impact From All Sources (ug/m³)	Class I PSD Increment (ug/m³)	Increment Consumed (%)
SO_2	3-hour	[illegible]	512	20
	24-hour	[illegible]	91	30
	Annual	[illegible]	20	0
NO_2	Annual	3.3	25	13
PM	24-hour	[illegible]	37	86
	Annual	5.4	19	28

The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-[illegible] F.A.C.

The application is available for public inspection during business normal hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Park Courtyard
Tallahassee, Florida 32301

Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Any person may send written comments on the proposed action to Mr. Preston Lewis at the Department's Tallahassee address. All comments received within 30 days of the publication of this notice will be considered in the Department's final determination. Further, a public hearing can be requested by any person(s). Such requests must be submitted within 30 days of this notice.

5735 12/27/93

AFFIDAVIT OF PUBLICATION

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Mulberry, Florida
33860-2040

Published Weekly

Mulberry, Polk County, Florida

Case No. ..... Docket ..... Page No. .....

STATE OF FLORIDA
COUNTY OF POLK } as.

Before the undersigned authority personally appeared .....
William M. Histed, who on oath says that he is
Publisher of the Mulberry Press, a newspaper published at
Mulberry, in Polk County, Florida; that the attached copy of advertisement,
being a Public Legal Notice
in the matter of State of Florida Department of
Environmental Protection Notice of Intent
in the ..... Court, was published in said newspaper in the
issues of December 30, 1993

Affiant further says that the MULBERRY PRESS is a newspaper published at Mulberry, in said Polk County, Florida, and that said newspaper has heretofore been continuously published in said Polk County, Florida, each Thursday, and has been entered as second class matter at the post office in Mulberry, in said Polk 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 as 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 said newspaper.

Signed William M. Histed
William M. Histed

Sworn to and subscribed before me this 4th day of Jan 19 94 by
WILLIAM M. HISTED who is personally known to
me or who has produced ..... as
identification.

Carole M. Histed
Carole M. Histed Notary Public

My commission Expires:

NOTARY PUBLIC STATE OF FLORIDA
My Comm. Exp. 5/21/97
Bonded By Service Ins
No. CC274601

[ ] Personally Known [ ] Other I.D.

LEGAL NOTICE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT

The Department of Environmental Protection gives notice of its intent to issue a PSD permit (PSD-FL-194) to Tampa Electric Company, located 13 miles south of Bartow, Polk County, Florida, to construct a 260 MW integrated coal gasification combined cycle facility. A determination of Best Available Control Technology (BACT) was required. The total PSD increments consumed by all sources, including this facility, in the Class I and II areas are:

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PM	24-hour	5.7	10	57
	Annual	1.1	5	22

Class II Area

Parameter	Averaging Period	Total PSD Impact From All Sources (μg/m³)	Class I PSD Increment (μg/m³)	Increment Consumed (%)
SO_2	3-hour	104	512	20
	24-hour	27	91	30
	Annual	0	20	0
NO_2	Annual	3.3	25	13
PM	24-Hour	31.8	37	86
	Annual	5.4	19	28

The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

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Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Park Courtyard
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Further, a public hearing can be requested by any person(s). Such requests must be submitted within 30 days of this notice.

TAL-36986

Published Mulberry Press, Mulberry, Florida December 30, 1993

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

December 20, 1993

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Jewell A. Harper
Air Enforcement Branch
U.S. EPA, Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Harper:

Re: Tampa Electric Company
260 MW Integrated Coal Gasification Combined Cycle Unit
Federal Number: PSD-FL-194
Site Certification Number: PA-92-32

Enclosed for your review and comment is a copy of the Technical Evaluation and Preliminary Determination for the above referenced project. Please submit any comments or questions within 30 days to Preston Lewis at the above address or call (904) 488-1344 at your earliest convenience.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/SA/bjb

Enclosure

cc: Bill Thomas, Southwest District
Chris Shaver, NPS
Greg Nelson, TECO

Technical Evaluation and Preliminary Determination

Tampa Electric Company
260 MW - Integrated Coal Gasification Combined Cycle Unit
Polk County, Florida

Permit No. PSD-FL-194
(PA-92-32)

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

December 20, 1993

State of Florida Department of Environmental Protection
Tampa Electric Company
Polk Power Station
Case No. PA92-32

I. INTRODUCTION

Pursuant to the Florida Power Plant Siting Act, Sections 403.501-519, Florida Statutes, the Tampa Electric Company (TECO) applied on July 30, 1992 for certification of 260 MW integrated coal gasification combined cycle (ICGC) unit at a site located in Southwest Polk County, Florida.

Filing of a complete application triggers an assessment process of environmental, socioeconomic, cultural and land-use impacts from construction and operation of the proposed unit. The electrical need for the unit may have already been determined at the time of site certification application filing, or the determination may be made concurrent with the impact assessment process. The Public Service Commission, pursuant to s. 403.519, F.S., is the determining body for need issues.

The Department of Environmental Protection (DEP) was made lead agency in the state impact assessment process and is responsible for preparation of the written analysis required by the Power Plant Siting Act. Both the Power Plant Siting Act and DEP's comparison rule, Chapter 17-23, F.A.C., identify the minimum criteria which must be studied in the review of the proposed electric generation facility. These include: Accessibility to transmission corridors, proximity to transportation systems, cooling systems requirements, soil and foundation conditions, impact on water supplied, impact on terrestrial and aquatic plant and animal life, impacts on air and water quality, impact on surrounding land uses, impact on public lands and submerged lands, impact on archaeological sites and historic preservation areas, construction and operational safeguards, "environmental" impacts (such as impacts from solid and hazardous waste disposal, noise, site modifications, wastewater disposal techniques, and meteorological changes) and, finally, site specific studies, which can address any feature not covered elsewhere.

While the majority of these studies are environmental in nature, some of the studies pertain to socioeconomics, archaeology, land-use planning, and other disciplines outside DEP's statutory charges. Accordingly, the Power Plant Siting Act (PPSA) also requires the participation of certain other state agencies.

The result of assessments is a set of specific conditions that must be met as a part of the certification process. The recommended Conditions of Certification for the TECO IGCC unit are part of the permit conditions.

II. SITE DESCRIPTION

A. Power Plant

The site for the proposed Polk Power Station consists of 4,348 acres, located 17.4 miles south of the City of Lakeland, 11.2 miles south of the City of Mulberry, 10.8 miles west of Fort Meade, 4.4 miles south of unincorporated Bradley Junction, and 13 miles southwest of the City of Bartow in southwest Polk County, Florida. The site is bordered by the Hillsborough County line along the western boundary; Fort Green Road on the east; County Road (CR) 630, Bethlehem, and Albritton Roads along the north; and State Road (SR) 674 and several phosphate clay settling ponds on the south. SR 37 bisects the property from the southwest to the northeast. The proposed location for the Polk Power Station is a remote area, and most of the property consists of land mined for phosphate or heavily impacted by phosphate mining activities. The majority of the site has been mined by the IMC-Agrico Company. The main power plant facilities will be located east of SR 37 on approximately 150 acres of unmined but disturbed land. The surrounding mined-out land to the east and south will be developed as a cooling reservoir with earthen berms, constructed from fill from phosphate mine cuts. The 1,511 acres to the west of SR 37 are currently being mined for phosphate matrix and will be reclaimed into wildlife habitat of uplands and wetlands. Some of the remaining land will be reclaimed pursuant to phosphate mining regulations, while other portions will be used as buffer and conservation areas. The main power plant facilities will be located in the central area of the portion of the site east of SR 37. The main power plant facilities will be located more than 2,500 feet away from offsite properties and more than 1.5 miles from residential areas to the west and 2.8 miles from residential areas to the southeast. A vegetated buffer area will be provided along public roadways surrounding the eastern portion of the site.

TECO proposes to construct and operate a nominal net 1,150 MW power plant, consisting of an IGCC facility, two additional combined cycle (CC) units, and six simple-cycle combustion turbines (CTs) fueled primarily by natural gas. The Polk Power Station will initially consist of a nominal net 190 MW combustion turbine (CT), a nominal net 70 MW HRSG, and coal gasification facilities, providing a total category of nominal net 260 MW of electric generating capacity. The coal gasification facilities will produce synthesis gas (syngas), which will be used to fuel the IGCC unit, with No. 2 fuel oil as the backup. Later facilities will consist of two nominal net 220 MW CC generating units and six stand-alone nominal net 75 MW CTs fueled primarily by natural gas, with low sulfur No. 2 fuel as a backup.

The Polk Power Station IGCC unit will consist of the following major systems: coal grinding and slurry preparation systems; an air separation unit; a gasification and syngas cooling system; slag handling and storage facilities; syngas scrubbing and cooling systems; a gasification process black water handling, grey water handling, and brine concentration system; an acid gas removal unit; a hot gas cleanup (HGCU) system; sulfuric acid by-product handling and storage facilities; and the power block.

Associated facilities will consist of the following: auxiliary boiler; access roadways and a rail spur; coal delivery, handling and storage facilities; natural gas and fuel oil delivery and storage facilities; propane unloading facilities; process, service, and potable water supply facilities; domestic and industrial wastewater treatment systems; cooling reservoir and discharge facilities; by-product slag and sulfuric acid handling temporary storage and shipping facilities; stormwater collection and management systems; a substation and associated electric transmission line facilities; and a wildlife management/corridor area.

Under an agreement with the Department of Energy (DOE), TECO will demonstrate the IGCC facility with a hot gas cleanup (HGCU) system for a two-year period to determine cost and performance of the HGCU system, as well as the overall integration of the coal gasification and combined cycle technologies. The demonstration project will be undertaken pursuant to the DOE's Clean Coal Technology Demonstration Program. The IGCC facilities will include an oxygen-blown, entrained-flow gasification system to produce syngas for the CT. The demonstration is expected to show that such facilities can achieve significant reductions of sulfur dioxide and nitrogen oxide emissions when compared to existing coal technologies. In an IGCC, coal is ground up and mixed with water, creating slurry, and then pumped into the gasifier, where it is mixed with high-purity oxygen, creating syngas. As the syngas exits the gasifier, it is cooled by syngas coolers, generating high pressure steam. The steam then flows to the combined cycle unit to generate electricity. The coal ash is water-cooled and exits from the bottom of the unit as slag, a by-product of the unit. The slag will later be sold for use in other industries. The syngas, after cooling, still contains particulates and sulfur compounds, which must first be removed in the gas cleanup system to meet environmental and CT fuel requirements. In a conventional IGCC system, the syngas is cooled prior to sulfur removal and then reheated prior to firing in the CT, a process known as cold gas cleanup (CGCU). As part of the demonstration project with the DOE, TECO will utilize a HGCU system, which cleans the syngas without first cooling it. HGCU systems are more efficient than CGCU systems. The Polk Power Station will utilize both HGCU and CGCU systems. The sulfuric acid resulting from sulfur removal will also be sold for use in other industries. IGCC facilities are among the cleanest and most efficient of the emerging clean coal technologies.

Roadway access to the main power facilities will be provided by two entrances on SR 37 and an entrance from Fort Green Road. All entrance roads will include appropriate improvements as necessary at the intersections with existing roadways. All entrance roads will have security gates to control access. A railroad spur will be constructed for the existing CSX Railroad line, which runs along the east side of Fort Green Road to the main power plant area for the delivery of construction materials, coal, large equipment, and other materials.

At the Polk Power Station, TECO will provide its own electricity, potable water, domestic and industrial wastewater treatment services, and brine storage services. Solid waste disposal services will be provided by licensed waste carriers/contractors serving the region.

TECO will be responsible for project management at the Polk Power Station and plans to incorporate security measures at the site, such as fencing, security gates at the entrances, and staffing. TECO expects a full-time staff for plant operations of approximately 130 workers for the initial IGCC unit and 210 workers at full buildout, to be drawn from the surrounding counties. The employees will undergo in-depth power plant training and safety programs sponsored by TECO.

B. Description of Electrical Transmission Line Corridors

Four 230-kV electric transmission circuits will be needed to connect the Polk Power Station with the TECO and Florida transmission grid. Two of the circuits will run northeast from the onsite Polk Power Station Substation to interconnect with TECO'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 onsite substation to SR 37, then north along SR 37 approximately 5 miles to interconnect with TECO'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 5.2-mile corridor adjacent to SR 37, ranging in width from 0.5 to 1.0 mile. To the extent feasible, TECO will avoid guyed transmission line structures in any residential areas and will locate the linear facilities within existing utility rights-of-way and away from residences, schools, and places of employment.

III. AMBIENT AIR QUALITY ANALYSIS FOR TECO POLK POWER STATION

A. Introduction

The proposed 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 approximately 13 miles southwest of the City of Bartow in southwest Polk County, Florida.

The applicant's proposed maximum annual emissions, along with the prevention of significant deterioration (PSD) significant emission rates, are presented in Table 1. As presented in Table 1, PSD review was required for the pollutants carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM_{10}), total suspended particulates (TSP), volatile organic compounds (VOC), beryllium (Be), sulfuric acid mist (H_2SO_4), lead (Pb) and mercury (Hg). In addition to the PSD pollutants, the project will also emit several air contaminants considered to be air toxics by the Department, which are also presented in Table 1.

As part of the PSD review process, the Department reviewed analyses on existing air quality, PSD increment consumption (Class I and II areas), ambient air quality standards (AAQS), soils, vegetation and wildlife impacts, visibility, growth-related air quality impacts, and proposed stack heights. In addition, an air toxics analysis was conducted in accordance with the Department's draft "Air Toxics Guidelines".

B. Modeling Methodology

In support of the PSD permit application, the applicant was required to demonstrate to the Department that the proposed project would not cause or contribute to an exceedance of any federal or state AAQS, PSD increment, visibility limit of Florida Ambient Reference Concentration (Department's draft "Air Toxics Guidelines"). These demonstrations were conducted by dispersion modeling techniques approved by the Department.

For emissions from combustion turbines (CT's) and combined cycle units, operating load and ambient temperature can affect plume dispersion, and therefore, ground-level impacts. For each fuel (oil, syngas with 100% cold gas cleanup, and syngas with 50% hot gas cleanup and 50% cold gas cleanup), two or three operating load cases (100%, 75%, and 50%) at three ambient temperatures (20 F, 59 F, and 90 F) were analyzed at the screening level. The model used was SCREEN, an EPA-approved model. The load/temperature case shown in the screening analysis to cause the highest impacts for each source were used in the refined modeling analysis (See application Volume 4, Tables 7-1 through 7-7).

For estimating ambient impacts on air quality from the proposed project, the applicant used the refined Industrial Source Complex (ISC2) dispersion models and the MESOPUFF-II long-range transport model. ISCLT2 was used for annual and quarterly computations, while ISCST2 was used for short-term concentrations. The applicant's choice of models for compliance demonstration purposes was acceptable to the Department. In conducting the ISC modeling, the applicant applied the model's building downwash option, the rural dispersion option, and chose the regulatory default option, which are all acceptable to the Department.

The applicant modeled the proposed project's ambient impacts at the nearest PSD Class I area (Chassahowitzka National Wilderness Area), located approximately 120 km to the Northwest as well as the area surrounding the Polk County Site. The MESOPUFF-II model was used in conjunction with the ISCST2 model, to address impacts in the PSD Class I area. The methodology used to run the MESOPUFF-II model is discussed in detail in Section 9.0 of the original application.

Initial modeling used the SCREEN model. For this model the receptor grid started at 1000 meters, since this distance approximates the distance between the proposed sources and the nearest property line. For the refined modeling, discrete receptors were places at the property boundary. Receptor rings were placed at distances beginning at 2000 meters; note that for the 2000 meter ring receptors at 40, 100, 110, 120, 140, 190, 200, 210, 220, 230, 240, and 250 degree radials fell within the property boundary. Receptor rings were placed at distances of 2000, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 8000, 9000, 10,000, 12,500, 15,000, 17,500, 20,000, 22,500, 25,000, 27,500, 30,000, 32,500, 35,000, 40,000, 45,000, and 50,000 from the grid center.

For the ISCST2 model, meteorological data used by the applicant was supplied by the Department in the form of hourly preprocessed National Weather Service (NWS) data from Tampa, Florida and twice-daily upper air soundings from Ruskin, Florida, for the five years 1982 through 1986. For the ISCLT2 model, the applicant used Tampa STAR (STability ARray) data for the same period.

The applicant's proposed maximum annual emissions are summarized in Table 1. All sources of SO_2, NO_x and TSP associated with the Polk County Site are considered "increment consuming" in relation to the PSD Class I and II areas.

C. Analysis of Existing Air Quality

The proposed project will be located in a PSD Class II area currently classified as attainment for all criteria pollutants, except PM_{10}, by both the U.S. Environmental Protection Agency (EPA) and the Department. The entire state is unclassified for PM_{10}.

For each pollutant identified in Table 1 as having a significant emission rate (with the exception of volatile organic compounds and sulfuric acid mist), the applicant determined the highest annual or quarterly predicted impact or the highest and second-highest predicted ambient impacts for shorter time periods, using the ISCST dispersion models. The results of the applicant's modeling exercise, as well as the Department's significant impact levels and de minimis levels are presented in Table 2. Volatile organic compounds, an ozone precursor, can not be adequately modeled at present and are addressed in the BACT determination. Sulfuric acid mist was modeled. The results of this modeling are presented in Section VI. Air Toxics Analysis.

The applicant's modeling revealed SO_2, NO_2 and PM_{10} as the only pollutants for which a predicted off-site impact was greater than the significant impact level.

The applicant was required to establish an ambient air monitoring program for SO_2, PM_{10} and ozone (O_3) based on a comparison with the de minimis levels established by the Department.

D. PSD Increment Analyses (NO_2, TSP and SO_2)

i. Class I Area

The Polk Power Station is approximately 120 km from the nearest PSD Class I area (Chassahowizka National Wilderness Area). Prior to receiving a PSD permit the applicant must demonstrate to the Department that the proposed project will not "cause or contribute" to an violation of a PSD Class I increment. The ISCST2 and MESOPUFF-II models were used to estimate the impacts on the Class I area. The applicant's predicted ambient impacts of the proposed project on the PSD Class I area revealed NO_2, PM_{10} and SO_2 as having significant impacts (significant as defined by the values suggested by the National Park Service and the U.S. Fish and Wildlife Service). This analysis, including other increment-consuming sources, revealed that no allowable PSD Class I increment was exceeded (Table 3).

ii. Class II Area

The applicant's significant impact area analysis (Table 2) identified SO_2, NO_2 and PM_{10} as the only pollutants having an off-site significant impact. The modeling analysis performed by the applicant revealed predicted ambient impacts from all PSD sources including the Polk Power Station to be within the allowable PSD Class II increments for these pollutants. The results of analysis are presented in Table 4.

E. AAQS Analysis

Background air quality concentrations were based on information contained in the Department's 1992 air quality data base and information collected from an on-site air monitoring station. The applicant provided on-site monitoring for SO_2, PM_{10} and ozone during the period 3/91 through 3/92. The background concentrations are presented in Table 5.

The applicant's maximum predicted SO_2, NO_2 and PM_{10} concentrations in the vicinity of the Polk Power Station are presented in Table 5. The maximum concentrations represent the sum of the applicant's proposed project impacts, the modeled impacts of other nearby sources and the monitored background concentrations. The sum of these concentrations is below both the federal and state AAQS. Since the project's impacts for lead and CO were not significant, it was not required that other sources of these pollutants be modeled. However, the project's impacts plus a background concentration is provided in Table 5 for informational purposes.

Ozone cannot be explicitly modeled. However, the Department has addressed ozone via BACT for volatile organic compounds and nitrogen oxides. The maximum hourly concentration of ozone measured by the applicant's required pre-construction monitor near the proposed construction site was below the ambient air quality standard of .120 ppm for ozone.

F. Air Toxics Analysis

The applicant's predicted ambient air quality impact of various trace metals are contained in Table 6. A comparison of the predicted impacts versus the Department's draft "Air Toxics Guidelines" reveals that the project's maximum impacts are less than the Florida Ambient Reference Concentrations.

G. Additional Impact Analysis

Potential impacts of the proposed project on the vegetation, soils, and wildlife of the PSD Class I area were examined by the applicant. The applicant compared maximum concentrations with values described in the literature as having adverse impacts on the various vegetation, soils, and/or wildlife near the proposed facility. Based on this analysis, predicted impacts from the proposed facility are not expected to result in any harm or damage to the vegetation, soils, and/or wildlife of the PSD Class I area.

In addition to the analysis on impacts to vegetation, soils, and wildlife, the applicant also examined the impact of the proposed project on the visibility of the PSD Class I area. In this analysis, the applicant used the VISCREEN computer model which reported impact values inside the Class I area that were well below

the screening thresholds. Therefore, emissions from this facility are not expected to cause impairment of visibility in the Class I area.

Growth-related air quality impacts associated with the project were examined by the applicant. The analysis addressed impacts resulting from industrial, commercial and residential growth in the vicinity of the Polk County Site potentially associated with the project. The analysis addressed only growth which would be considered permanent. In the analysis, the applicant projected a population increase of approximately 310 people, by 2010, into the area. This projected increase represents much less than 1 percent of the population of Polk County as reported in 1990. The applicant anticipates no air quality impacts due to associated industrial/commercial growth since existing infrastructure should be more than adequate to provide the necessary services.

The applicant also performed an analysis of impacts on soils and vegetation, and visibility impairment potential for the region immediately surrounding the proposed facility. The results of these analyses suggest that the proposed facility will not have a significant adverse impact on soils and vegetation, or significantly contribute to any visibility degradation.

The applicant addressed the Department's stack height policy (Rule 17-2.270, F.A.C.) by use of the Bowman GEP computer modeling program for downwash analysis. As designed, the applicant's proposed stack heights are within the requirements of the stack height policy.

IV. Conclusion

Based on the information presented by the applicant in the above analysis, the Department has been provided reasonable assurances that the proposed project as described in the applicant and subject to the conditions of approval proposed herein will not cause or contribute to any violation of any PSD increment or ambient air quality standard.

Note: Subsequent to the initial analysis, described in this report, the applicant made some revisions in plant design. The effects of these changes on air quality were reviewed by the Department. In general, air quality impacts decreased, with the single exception of PM_{10} for the 24-hour averaging period. The modeled increase in PM_{10} was minor (approximately 3 ug/m^3) and not considered significant in light of the conservative assumptions used in determining PM_{10} impacts.

Therefore, the Department has reasonable assurance that the revised project will not cause or significantly contribute to any violation of any PSD increment or air quality standard.

12/16/93

the screening thresholds. Therefore, emissions from this facility are not expected to cause impairment of visibility in the Class I area.

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Therefore, the Department has reasonable assurance that the revised project will not cause or significantly contribute to any violation of any PSD increment or air quality standard.

D. Buck 12/16/93

TABLE 1

TECO POLK POWER STATION
MAXIMUM POTENTIAL ANNUAL EMISSIONS
AND PSD SIGNIFICANCE VALUES

Pollutant	Proposed Maximum Emissions (TPY)[1]	PSD Significant Emission Rate (TPY)	PSD Review Required (Yes/No)
Carbon Monoxide	2526	100	Yes
Nitrogen Oxides	5250	40	Yes
Sulfur Dioxide	3917	40	Yes
Particulate Matter (PM_{10})	917	15	Yes
Total Suspended Particulates (TSP)	917	25	Yes
Volatile Organic Compounds	394	40	Yes
Lead	0.6	0.6	Yes
Asbestos	0.0	10	No
Beryllium	.03	0.0004	Yes
Mercury	0.5	0.1	Yes
Vinyl Chloride	0.0	1	No
Total Fluorides	1.2	3	No
Sulfuric Acid Mist	393	7	Yes
Hydrogen Sulfide	7.1	10	No
Total Reduced Sulfur	7.1	10	No
Arsenic	.52	NA	NA
Cadmium	.18	NA	NA
Chromium	1.5	NA	NA

(1) Emissions include the highest annual emission estimates from the 7F CT, plus other related combustion emissions (e.g., thermal oxidizer), plus other associated process and fugitive emissions, plus four stand-alone CT's in CC mode, plus six stand-alone CT's in simple-cycle mode.

TPY = Tons per year.
NA = Not Applicable.

TABLE 2

TECO POLK POWER STATION
MAXIMUM AIR QUALITY IMPACTS FOR COMPARISON TO THE SIGNIFICANT IMPACT AND DE MINIMUS AMBIENT LEVELS

Pollutant	Averaging Time	Highest Predicted Impact ($\mu g/m^3$)	Highest, Second-Highest Predicted Impact ($\mu g/m^3$)	Sign. Impact Level ($\mu g/m^3$)	De Minimus Level ($\mu g/m^3$)
Carbon Monoxide	1-hour	169.2	168.1	2000	NA
	8-hour	67.1	63.3	500	575
Nitrogen Dioxide	Annual	1.8	NA	1.0	14
Sulfur Dioxide	3-hour	68.6	51.7	25	NA
	24-hour	19.0	18.1	5	13
	Annual	1.6	NA	1	NA
PM_{10} or TSP	24-hour	29.4	24.6	5	10
	Annual	1.5	NA	1	NA
Lead	Quarterly	.0018	NA	NA	.1
VOC's	Annual	394 TPY	NA	NA	100 TPY
Beryllium	24-hour	.00075	.00069	NA	.001
Mercury	24-hour	.005	.004	NA	.25

TABLE 3

TECO POLK POWER STATION
PSD CLASS I AREA INCREMENT ANALYSIS

Pollutant	Averaging Time	Maximum Predicted Impact ($\mu g/m^3$)	PSD Class I Increment ($\mu g/m^3$)
Sulfur Dioxide	3-hour	12.9	25
	24-hour	3.8	5
	Annual	0.4	2
Nitrogen Dioxide	Annual	0.8	2.5
TSP	24-hour	5.7	10
	Annual	1.1	5

Note: Maximum short-term values less than annual concentrations are highest, second-highest values.

TABLE 4

TECO POLK POWER STATION
PSD CLASS II AREA INCREMENT ANALYSIS

Pollutant	Averaging Time	Maximum Predicted Impact ($\mu g/m^3$)	PSD Class II Increment ($\mu g/m^3$)
Sulfur Dioxide	3-hour	104.0	512
	24-hour	27.0	91
	Annual	0.0	20
Nitrogen Dioxide	Annual	3.3	25
TSP	24-hour	31.8	37
	Annual	5.4	19

Notes: Maximum short-term values less than annual concentrations are highest, second-highest values.

Increment consumption for the annual average of sulfur dioxide was negative over the entire receptor grid.

TABLE 5

TECO POLK POWER STATION
AMBIENT AIR QUALITY STANDARDS (AAQS) ANALYSIS

Pollutant	Averaging Time	Modeled Impact ($\mu g/m^3$)	Backgrnd. Conc ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Florida AAQS ($\mu g/m^3$)
Sulfur Dioxide	3-hour	616.1	26	642.1	1300
	24-hour	213.7	13	226.7	260
	Annual	40.4	5	45.4	60
Nitrogen Dioxide	Annual	5.9	19	24.9	100
PM_{10}	24-hour	101.5	45.4	146.9	150
	Annual	15.4	18.4	33.8	50
Lead	Quarterly	.0018	0.0	.0018	1.5
Carbon Monoxide	1-hour	168.1	8015	8183.1	40,000
	8-hour	63.3	4580	4643.3	10,000

Notes: Maximum short-term values less than annual concentrations are highest, second-highest values.

Sulfur dioxide and PM_{10} background concentrations obtained from TECO AQ1 monitoring station (3/91 - 3/92).

Nitrogen dioxide background value obtained from FDER site 4360-065 located in Hillsborough County (1992).

Carbon monoxide background values obtained from FDER site 4360-060 located in Hillsborough County (1992).

TABLE 6

TECO POLK POWER STATION
AIR TOXICS IMPACT ANALYSIS

Pollutant	Averaging Time	Maximum Impact ($\mu g/m^3$)	Florida Ambient Reference Concentration ($\mu g/m^3$)
Sulfuric Acid	8-hour 24-hour	3.76 1.64	10 2.4
Fluorides	1-hour	0.06	25
Mercury	8-hour 24-hour	0.011 0.0048	0.1 0.024
Beryllium	Annual	0.00006	0.0004
Arsenic	Annual	0.00019	0.0002
Cadmium	Annual	0.000126	0.00056
Chromium	Annual	0.000062	0.000083

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:
Tampa Electric Company
702 North Franklin Street
Tampa, Florida 33602

Permit Number: PA-92-32
PSD-FL-194
Expiration Date: June 1, 1996
County: Polk
Latitude/Longitude: 27°43'43"N
81°59'23"W
Project: 260 MW Integrated Coal Gasification Combined Cycle Combustion Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-212 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For one 260 MW integrated coal gasification combined cycle (IGCC) combustion turbine (GE 7F CT or equivalent) with maximum heat input at 59°F of 1,755 MMBtu/hr (syngas) and 1765 MMBtu/hr (oil) to be located at the Polk County site near Bowling Green, Florida. The coal gasification facility will consist of coal receiving, storage and process facilities, air separation unit, gasifier, product gas cleaning facilities, acid gas removal unit, and auxiliary equipment. The first phase will also include a 49.5 MMBtu/hr auxiliary boiler and a 71,450 barrel fuel oil storage tank.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Tampa Electric Company (TECO) application received July 30, 1992.
2. Department's letter dated September 22, 1992.
3. TECO's letter dated April 12, 1993.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a. Have access to and copy any records that must be kept under the conditions of the permit;

b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a. A description of and cause of non-compliance; and

b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

GENERAL CONDITIONS:

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

(X) Determination of Best Available Control Technology (BACT)
(X) Determination of Prevention of Significant Deterioration (PSD)
(X) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

GENERAL CONDITIONS:

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

A. Operation and Construction

The construction and operation of Polk Power Station (Project) shall be in accordance with all applicable provisions of Chapter 17, F.A.C. The following emission limitations reflect final BACT determinations for Phase I (integrated gasification, combined cycle (IGCC) combustion turbine and auxiliary equipment) of the project fired with syngas or fuel oil. BACT determinations for the remaining phases will be made upon review of supplemental applications. In addition to the foregoing, the Project shall comply with the following conditions of certification as indicated.

B. Heat Input

The maximum heat input to the IGCC combustion turbine (CT) shall neither exceed 1,755 MMBtu/hr while firing syngas, nor 1765 MMBtu/hr while firing No. 2 fuel oil at an ambient temperature of 59° F. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the heat input correction to other temperatures shall be provided to DEP for review 120 days after the siting board approval of the site certification. Subject to approval by the Department, the manufacturer's curve may be used to establish heat input rates over a range of temperature for the purpose of compliance determination.

SPECIFIC CONDITIONS:

C. Hours of Operation

The IGCC unit in Phase I may operate continuously, i.e., 8,760 hrs/year.

D. Fuel

Only syngas and low sulfur fuel oil shall be fired in the IGCC combustion turbine. Only low sulfur fuel oil shall be fired in the auxiliary boiler. The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent, by weight.

E. Auxiliary Boiler

The maximum heat input to the auxiliary boiler shall not exceed 49.5 MMBtu/hr when firing No. 2 fuel oil with 0.05 percent maximum sulfur content (by weight). All fuel consumption must be continuously measured and recorded for the auxiliary boiler.

F. Fuel Consumption

The maximum coal input to the coal gasification plant shall not exceed 2,325 tons per day, on a dry basis.

G. Fugitive Dust

Fugitive dust emissions during the construction period shall be minimized by covering or watering dust generation areas. Particulate emissions from the coal handling shall be controlled by enclosing all conveyors and conveyor transfer points (except those directly associated with the coal stacker/reclaimer for which an enclosure is operationally infeasible). Fugitive emissions shall be tested as specified in Specific Condition No. J. Inactive coal storage piles shall be shaped, compacted, and oriented to minimize wind erosion. Water sprays or chemical wetting agents and stabilizers shall be applied to uncovered storage piles, roads, handling equipment, etc. during dry periods and, as necessary, to all facilities to maintain an opacity of less than or equal to five percent. When adding, moving or removing coal from the coal pile, an opacity of 20 percent is allowed.

SPECIFIC CONDITIONS:

H. Emission Limits

1. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and low sulfur fuel oil, in accordance with the BACT determination, shall not exceed the following:

POLLUTANT	FUEL	BASIS[a]	EMISSIONS LIMITATIONS - 7F CT Post Demonstration Period LB/HR*	TPY[b]
NOx	Oil	42 ppmvd**	311	N/A
	Syngas	25 ppmvd	222.5	1,044
VOC[c]	Oil	0.028 lb/MMBtu	32	N/A
	Syngas	0.0017 lb/MMBtu	3	38.5
CO	Oil	40 ppmvd	99	N/A
	Syngas	25 ppmvd	98	430.1
PM/PM_{10}[d]	Oil	0.009 lb/MMBtu	17	N/A
	Syngas	0.013 lb/MMBtu	17	74.5
Pb	Oil	5.30E-5 lb/MMBtu	0.101	N/A
	Syngas	2.41E-6 lb/MMBtu	0.0035	0.067
SO_2	Oil	0.048 lb/MMBtu	92.2	N/A
	Syngas	0.17 lb/MMBtu	357	1563.7

Visible Emissions Syngas 10 percent opacity
Oil 20 percent opacity

(*) Emission limitations in lbs/hr are 30-day rolling averages. "Pollutant emission rates may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the emission rate correction to other temperatures at different loads shall be provided to DEP for review 120 days after the siting board approval of the site certification. Subject to approval by the Department, the manufacturer's curve may be used to establish pollutant emission rates over a range of temperature for the purpose of compliance determination."

(**) The emission limit for NO_x is adjusted as follows for higher fuel bound nitrogen contents up to a maximum of 0.030 percent by weight:

SPECIFIC CONDITIONS:

FUEL BOUND NITROGEN (% by weight)	NO_x EMISSION LEVELS (ppmvd @ 15% O_2)
0.015 or less	42
0.020	44
0.025	46
0.030	48

using the formula STD = 0.0042 + F where:

STD = allowable NO_x emissions (% by volume at 15% O_2 and on a dry basis).

F = NO_x emission allowance for FBN defined by the following table:

FUEL BOUND NITROGEN (% by weight)	F (NO_x % BY VOLUME)
$0 < N < 0.015$	0
$0.015 < N < 0.03$	0.04 (N-0.015)

N = nitrogen content of the fuel (% by weight).

NO_x emissions are preliminary for the fuel oil specified in Specific Condition XIII.C of Conditions of Certification. The permittee shall submit fuel bound nitrogen content data for the low sulfur fuel oil prior to commercial operation to the Bureau of Air Regulation in Tallahassee, and on each occasion that fuel oil is transferred to the storage tanks from any other source to the Southwest District office in Tampa. The % FBN (Z) following each delivery of fuel shall be determined by the following equation:

$x(Y) + m(n) = (x+m)(Z)$

where x = amount fuel in storage tank
y = % FBN in storage tank
m = amount fuel added
n = % FBN of fuel added
Z = % FBN of composite

(a) Syngas lb/MMBtu values based on heat input (HHV) to coal gasifier and includes emissions from H_2SO_4 plant thermal oxidizer. Pollutant concentrations in ppmvd are corrected to 15% oxygen.

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

$\frac{\text{Load (\%)}}{100} \times$ hours of operation ≤ 876 for fuel oil.

SPECIFIC CONDITIONS:

(c) Exclusive of background concentrations.

(d) Excluding sulfuric acid mist.

2. The maximum allowable emissions from the IGCC combustion turbine, when firing syngas and No. 2 fuel oil **during the two year demonstration period**, shall not exceed the following:

		EMISSIONS LIMITATIONS 7FCT	
POLLUTANT	**FUEL**	**LB/HR***	**TPY[a]**
NO_x	Oil	311	N/A
	Syngas	664.2	2,908.3
VOC[b]	Oil	32	N/A
	Syngas	3	38.5
CO	Oil	99	N/A
	Syngas	99	430.1
PM/PM_{10}[c]	Oil	17	N/A
	Syngas	17	74.5
Pb	Oil	0.101	N/A
	Syngas	0.023	0.13
SO_2	Oil	92.2	N/A
	Syngas	518	2,269
Visible Emissions		Syngas 10 percent opacity Oil 20 percent opacity	

(*) Emission limitations in lbs/hr are 30-day rolling averages.

(a) Annual emission limits (TPY) based on 10-percent annual capacity factor firing No. 2 fuel oil.

$\frac{\text{Load (\%)}}{100}$ x hours of operation $\leq$ 876 for oil.

(b) Exclusive of background concentrations.

(c) Excluding sulfuric acid mist.

SPECIFIC CONDITIONS:

3. The following allowable turbine emissions, were determined by BACT, and are also tabulated for PSD and inventory purposes:

ALLOWABLE EMISSIONS

POLLUTANT	FUEL	IGCC POST DEMONSTRATION LB/HR	IGCC POST DEMONSTRATION TPY[a]	IGCC 2-YEAR DEMONSTRATION LB/HR	IGCC 2-YEAR DEMONSTRATION TPY[b]
Sulfuric Acid[c]	Syngas	55	241	55	241
Inorganic Arsenic	Syngas	0.0006	0.019	0.08	0.35
Beryllium	Syngas	0.0001	0.0029	0.0001	0.0029
Mercury	Syngas	0.0034	0.017	0.025	0.11

(a) Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

(b) Based on baseload operations firing syngas, with a maximum of 8760 hrs/yr of HGCU operations; up to 10 percent annual capacity factor firing fuel oil.

(c) Sulfuric acid mist emissions assume a maximum of 0.05 percent sulfur in the fuel oil.

4. Excess emissions from the turbine resulting from startup, shutdown, malfunction, or load change shall be acceptable providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24-hour period unless specifically authorized by the Department for a longer duration. Best operating practices shall be documented in writing and a copy submitted to the Department along with the initial compliance test data. The document may be updated as needed with all updates submitted to the Department within thirty (30) days of implementation and shall include time limitations on excess emissions caused by turbine startup.

5. After the demonstration period, permittee shall operate the combustion turbine to achieve the lowest possible NO_x emission limit but shall not exceed 25 ppmvd corrected to 15% oxygen and ISO conditions.

SPECIFIC CONDITIONS:

6. The combustion turbine will be operated for 12-18 months after the demonstration period (estimated to be from Mid 1998 until December 31, 1999). During that period NO_X emission testing will be performed on the turbine at a regular interval of every 2 months. The Department shall be provided with a test protocol including a time schedule 15 days prior to the initial test. The permittee will provide the Department the emission test results 30 days after the test is performed. These results are not for compliance purposes. The Department shall be notified and the reasons provided if a scheduled test is delayed or canceled.

7. One month after the test period ends (estimated to be by February 2000), the permittee will submit to the Department a NO_X recommended BACT Determination as if it were a new source using the data gathered on this facility, other similar facilities and the manufacturer's research. The Department will make a determination on the BACT for NO_X only and adjust the NO_X emission limits accordingly.

I. Auxiliary Boiler Operation

Operation of the auxiliary boiler shall be limited to a maximum of 1,000 hours per year and only during periods of startup and shutdown of the IGCC unit, or when steam from the IGCC unit's heat recovery steam generator is unavailable. The following emission limitations shall apply:

1. NO_X emissions shall not exceed 0.16 lbs/MMBtu for oil firing.

2. Sulfur dioxide emissions shall be limited by firing low sulfur fuel oil with a maximum sulfur content of 0.05 percent by weight.

3. Visible emissions shall not exceed 20 percent opacity (except for one six-minute period per hour during which opacity shall not exceed 27 percent), while burning low sulfur fuel oil.

J. Performance Testing

Initial (I) compliance tests shall be performed on the turbine using both fuels and on the auxiliary boiler using fuel oil. The stack test for the turbine and the auxiliary boiler shall be performed with the sources operating at capacity (maximum heat rate input for the tested operating temperature). Capacity is defined as 90 - 100 percent of rated capacity. If it is impracticable to test at capacity, then sources may be tested at less than capacity; in this case subsequent source operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no

SPECIFIC CONDITIONS:

more than fifteen days for purposes of additional compliance testing to regain the rated capacity in the permit, with prior notification to the Department. Annual (A) compliance tests shall be performed on the turbine and the auxiliary boiler with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests for the applicable emission limitations shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Rule 17-297, F.A.C., and the requirements of 40 CFR 75:

1. Combustion Turbine

   a. Reference Method 5B for PM (I, A, for oil only).

   b. Reference Method 8 for sulfuric acid mist (I, for oil only).

   c. Reference Method 9 for VE (I, A).

   d. Reference Method 10 for CO (I, A).

   e. Reference Method 20 for NO_X (I, A).

   f. Reference Method 18 for VOC (I, A).

   g. Trace elements of Lead (Pb), Beryllium (Be) and Arsenic (As) shall be tested (I, for oil only) using Emission Measurement Technical Information Center (EMTIC) Interim Test Methods. As an alternative, Method 104 for Beryllium (Be) may be used; or Be and Pb may be determined from fuel analysis using either Method 7090 or 7091, and sample extraction using Method 3040 as described in the EPA solid waste regulations SW 846.

   h. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I,A).

   i. ASTM D 1072-80, D 3031-81, D 4084-82, or D 3246-81 for sulfur content of natural gas (I, and A if deemed necessary by DEP).

   j. Reference Method 22 for fugitive emissions (I,A).

2. Auxiliary Boiler

   a. Reference Method 9 of VE (I,A).

   b. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I,A).

SPECIFIC CONDITIONS:

c. Reference Methods 7, 7A, 7C, 7D, or 7E for NO_x (I,A).

Other DEP approved methods may be used for compliance testing after prior departmental approval.

K. Sulfur Content of Fuel

The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334 by testing for sulfur content of the fuel oil in the storage tanks once per day when firing oil. Testing for fuel oil heating value, shall also be conducted on the same schedule.

L. Monitoring Requirements

A continuous emission monitoring system (CEMS) shall be installed, operated, and maintained in accordance with 40 CFR 60, Appendix F, for the combined cycle unit to monitor nitrogen oxides and a diluent gas (CO_2 or O_2). The applicant shall request that this condition of certification be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75 when those requirements become effective within the state.

1. Each CEMS shall meet performance specifications of 40 CFR 60, Appendix B.

2. CEMS data shall be recorded and reported in accordance with Chapter 17-297.500, F.A.C., 40 CFR 60 and 40 CFR 75. The record shall include periods of startup, shutdown, and malfunction.

3. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

4. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission concentration, as determined pursuant to Specific Condition No. H.4. herein, which exceeds the applicable emission limits in Condition No. 1.

SPECIFIC CONDITIONS:

M. Notification, Reporting and Recordkeeping

To determine compliance with the syngas and fuel oil firing heat input limitation, the permittee shall maintain daily records of syngas and fuel oil consumption for the turbine and the heating value for each fuel. All records shall be maintained for a minimum of two years after the date of each record and shall be made available to representatives of the Department upon request.

N. Applicable Requirements

The project shall comply with all the applicable requirements of Chapters 17-209 through 17-297, F.A.C., and 40 CFR 60 Subparts A and GG. The requirements shall include:

1. 40 CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

2. 40 CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial startup of each turbine and the auxiliary boiler not more than 60 days nor less than 30 days prior to such date.

3. 40 CFR 60.7(a)(3) - By postmarking or delivering notification of the actual startup of each turbine and the auxiliary boiler within 15 days of such date.

4. 40 CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMSs performance, no less than 30 days prior to such date.

5. 40 CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

6. 40 CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any startup, shutdown or malfunction of a turbine and the auxiliary boiler, of the air pollution control equipment, and when the CEMS is inoperable.

7. 40 CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days of the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d).

8. 40 CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine and boiler firing rates, but not more than 180 days after the initial startup of each turbine and the auxiliary boiler.

SPECIFIC CONDITIONS:

9. 40 CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

10. 17-297.345 - By providing stack sampling facilities for the combustion turbine and the auxiliary boiler.

All notifications and reports required by this specific condition shall be submitted to the Department's Air Program, within the Southwest District office. Performance test results shall be submitted within 45 days of completion of such test.

O. Submission of Reports

The following information shall be submitted to the Department's Bureau of Air Regulation within 12 months of issuance of this permit:

1. Description of the final selection of the turbine and the auxiliary boiler to be installed at the facility. Descriptions shall include the specific make and model numbers, any changes in the proposed method of operation, fuels, emissions or equipment.

2. Description of the CEMS selected. Description shall include the type of sensors, the manufacturer and model number of the equipment.

3. If construction has not commenced within 18 months of issuance of this permit, then the permittee shall obtain from DEP a review and, if necessary, a modification of the BACT determination and allowable emissions for the unit(s) on which construction has not commenced [40 CFR 52.21(r)(2)]. Units to be constructed or modified in later phases of the project will be reviewed and limitations revisited under the supplementary review process of the Power Plant Siting Act.

P. Protocols

The following protocols shall be submitted to the Department's Air Program, within the Southwest District office, for approval:

1. CEMS Protocol - Within 60 days of selection of the CEMS, but prior to the initial startup, a CEMS protocol describing the system, its installation, operating and maintenance characteristics and requirements. The Department shall approve the protocol provided that the system and the protocol meet the requirements of 40 CFR 60.13, 60.334, Appendix B and Appendix F. This condition of certification shall be amended to reflect the Federal Acid Rain Program requirements of 40 CFR 75 when those requirements become effective within the State.

SPECIFIC CONDITIONS:

2. Performance Test Protocol - At least 90 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Air Program, within the Southwest District office, a protocol outlining the procedures to be followed, the test methods and any differences between the reference methods and the test methods proposed to be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

Q. Modifications

The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change.

Issued this _____ day
of _____, 1993

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

_____
Virginia B. Wetherell, Secretary
Department of Environmental
Protection

Best Available Control Technology (BACT) Determination
Tampa Electric Company
Polk County
PSD-FL-194
PA-92-32

The applicant is proposing to construct, in phases, a 1,150 MW power plant in Polk County. The proposed facilities will be known as the Tampa Electric Company Polk Power Station. The first phase will consist of an Integrated Coal Gasification Combined Cycle (IGCC) unit with heat recovery steam generator (HRSG) and steam turbine (ST) for a nominal net 260 MW IGCC unit. The coal-fueled advanced CT will be capable of baseload operations (i.e., 100 percent capacity factor) on syngas, while retaining the option to fire fuel oil as backup (maximum 10 percent capacity factor). Units proposed to be added at Polk Power Station include two combined cycle (CC) units totaling 440 MW (nominal) and six simple cycle (SC) CTs totaling 450 MW (nominal). All of these units will be fired with natural gas as the primary fuel and No. 2 fuel oil as backup. The phased schedule for construction and operation of the proposed generating units at the Polk Power Station is presented in Table 1.

Table 1

Proposed Schedule for Construction and Operation of Generating Units for ultimate capacity at the Polk Power Station Site

Activity/Unit	Start Construction	Completion/ In-Service
Advanced CT, CG & HRSG/ST for 260-MW IGCC unit[a]	First Half 1994	July 1995
75-MW CT	April 1998	January 1999
75-MW CT	April 1999	January 2000
HRSG/ST for conversion of two 75-MW CTs for 220-MW CC unit	April 2000	January 2001
75-MW CT	April 2001	January 2002
220-MW CC	April 2001	January 2003
75-MW CT	April 2005	January 2006
75-MW CT	April 2006	January 2007
75-MW CT	April 2007	January 2008
75-MW CT	April 2008	January 2009
75-MW CT	April 2009	January 2010

a - 220 MW when fired on fuel oil and operated in CC mode.

The IGCC unit will be supported in part through funding from the U.S. Department of Energy (DOE) under the Clean Coal Technology Demonstration Program. Under the program, the IGCC unit will be used to demonstrate the integration of coal gasification (CG) and CC technologies and to demonstrate a more efficient method for removal of sulfur from syngas. The new cleanup technology is called hot gas clean up (HGCU). Conventional methods for sulfur removal for IGCC units require that the gas be cooled prior to cleaning, called cold gas cleanup (CGCU), and then reheated. By comparison, the HGCU technology efficiently cleans the gas at high temperatures, thereby increasing the overall plant efficiency. Under the agreement with DOE, Tampa Electric Company will demonstrate the HGCU system for a 2-year period.

The projected maximum tonnage of regulated air pollutants emitted from the proposed facility based on a 100 percent capacity factor and 8,760 hours per year are shown in Table 2. A simplified flow chart for the operation of the IGCC systems at the site is attached (Figures 1 - 3).

Table 2

Projected Maximum Annual Emissions (tpy)
for ultimate site capacity

Pollutant	IGCC[a]	+	CC[b]	+	SC[c]	=	Total	Significance Rate (tpy)
PM (TSP)	399		260		246		905	25
PM (PM_{10})	399		260		246		905	15
SO_2	2469		720		654		3843	40
NO_x	2923		1308		1014		5245	40
CO	453		1092		978		2523	100
VOC	45		180		168		393	40
Pb	0.15		0.28		0.17		0.6	0.6
H_2SO_4	241		80		72		393	7
Fluorides	0.92		0.17		0.10		1.2	3
Hg	0.12		0.21		0.19		0.5	0.1
Be	0.007		0.013		0.008		0.03	0.0004
Total reduced sulfur (including H_2S)	6.2		0		0		6.2	10

Rev. 2
06/18/93

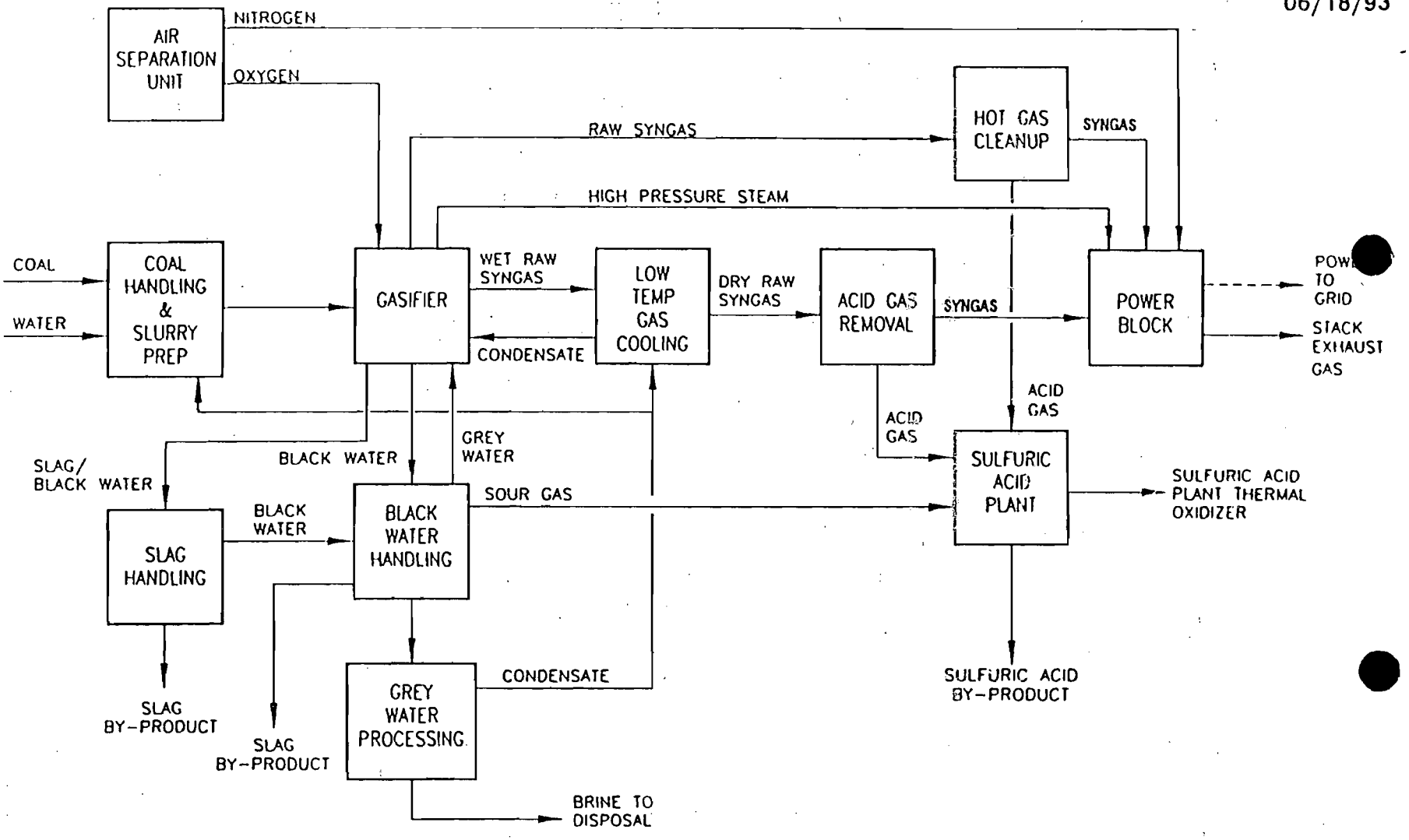

FIGURE 2-2.

GENERALIZED FLOW DIAGRAM OF IGCC SYSTEMS AND PROCESS

Source: ECT, 1993.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

FIGURE 2

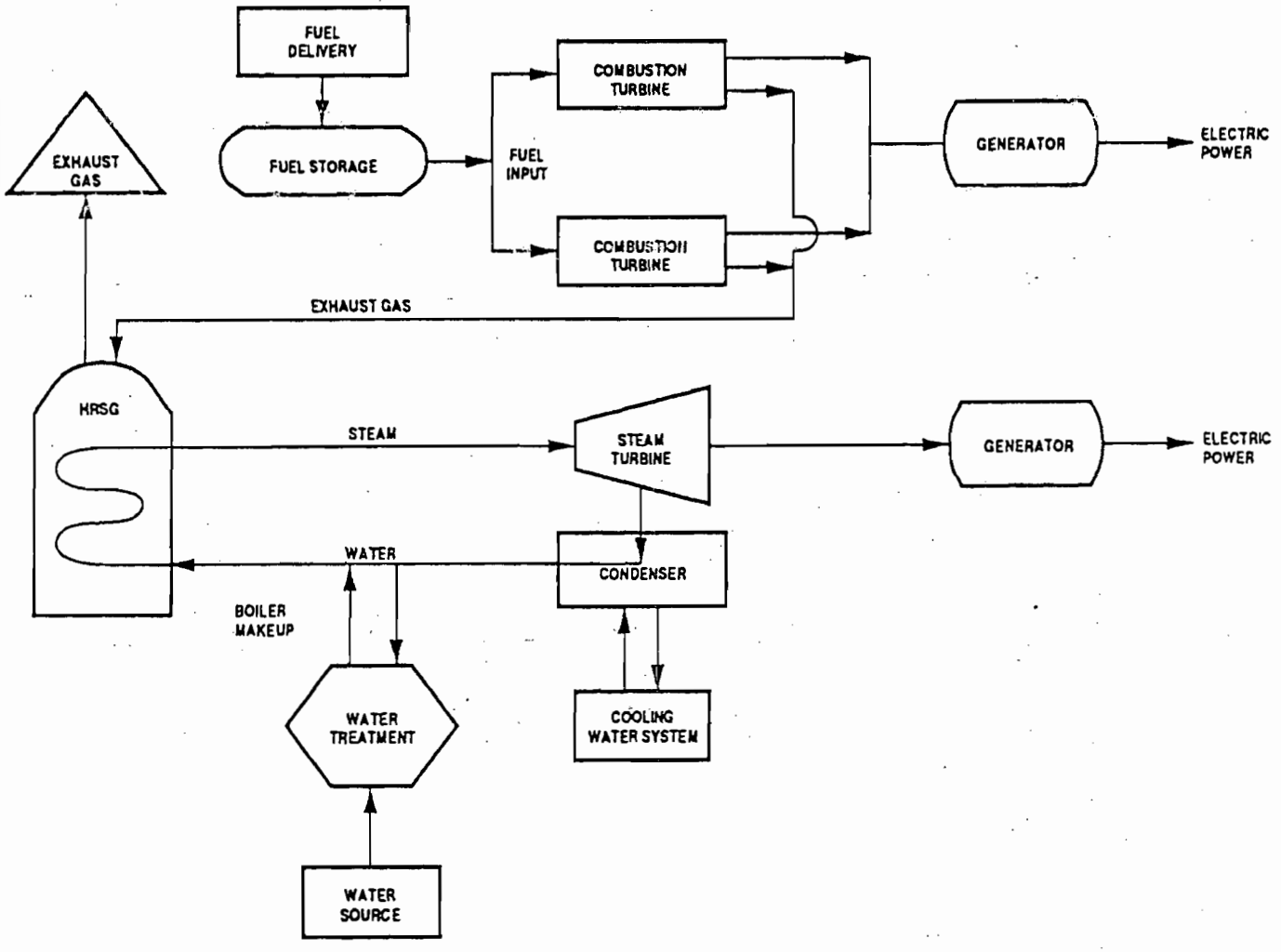

FIGURE 1.5.2-1.

SIMPLIFIED FLOW DIAGRAM OF COMBINED CYCLE POWER SYSTEM

Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

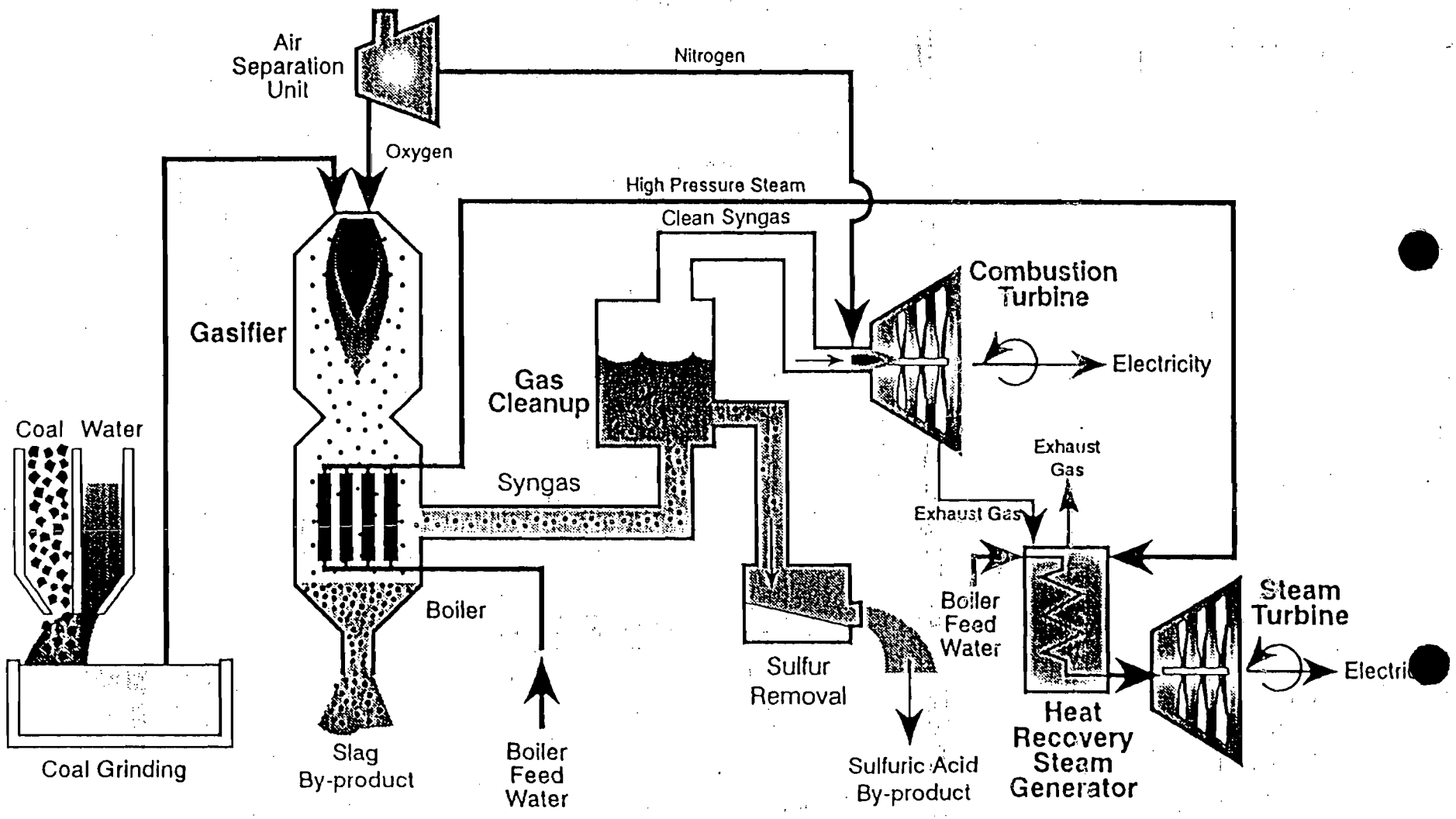

FIGURE 1.5.3-1.

SIMPLIFIED FLOW DIAGRAM OF INTEGRATED COAL GASIFICATION COMBINED CYCLE UNIT

Source: Texaco, 1992. Tampa Electric Company, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

a - IGCC emissions include the highest annual emissions estimates from the 7F CT (based on the larger of 100 percent CGCU or 50/50 CGCU/HGCU), plus related combustion emissions (e.g., thermal oxidizer), plus other associated process and fugitive emissions (PM, CO, VOC, and H_2S).

b - CC emissions represent the totals for four stand-alone CTs in CC mode.

c - SC emission represent the totals for six stand-alone CTs in simple cycle mode.

The proposed facility will also include one 49.5 MMBtu/hr auxiliary boiler fired with low sulfur (0.05% or less by weight) distillate fuel oil. The auxiliary boiler will operate only during startup and shutdown of the IGCC unit, or when steam from the IGCC unit's HRSG is unavailable. The auxiliary boiler will operate a maximum of 1,000 hours per year.

The coal gasification facility will serve as a source of medium Btu, low sulfur (0.07% or less, by weight, sulfur bearing compounds) coal-derived gas. The coal used in the gasification facility will have a maximum sulfur content of 3.05% and have a minimum heating value of approximately 11,035 Btu/lb. The coal gasification plant will consist of coal receiving, storage and process facilities, air separation unit, gasifier, product gas cleaning facilities, acid gas removal unit, and auxiliary equipment. The coal gasification unit will have two stacks, one flare stack used during startup, shutdown and emergency conditions and one thermal oxidation unit stack which will be used continuously.

The applicant has indicated the maximum tonnage of regulated air pollutants emitted from the IGCC unit CT during the initial phase, demonstration and post demonstration periods to be as shown in Table 3.

Table 3

Maximum Annual Emissions from IGCC Unit CT for Various Operating Configurations

Pollutant	Demonstration Period (tpy)[a]	Post-Demonstration Period (tpy)[b]
PM[c]	74.5	74.5
SO_2	2,269	1,564
NO_x	2,908	1,044
CO	430	430
VOC	38.5	38.5

H_2SO_4	241	241
Pb	0.13	0.067
Fluorides	0.92	0.92
Hg	0.11	0.017
Be	0.0029	0.0029

a - Based on baseload operations firing syngas, with a maximum of 8,760 hr/yr utilization of HGCU and up to 10 percent annual capacity factor firing fuel oil.
b - Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.
c - Excluding sulfuric acid mist.

Florida Administrative Code Rule 17-212.400 requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in Table 1.

Date of Receipt of A BACT Application

September 21, 1992

BACT Determination Requested by the Applicant

Combined Cycle Units

Pollutant	Determination
NO_x	9 ppmvd (NG) 25 ppmvd (Syngas firing) 42 ppmvd (No. 2 fuel oil firing)
SO_2	Firing of NG or Syngas Fuel oil with a maximum sulfur content of 0.05 % by weight, 0.048 lb/MMBtu
CO	Combustion control 25 ppmvd (NG) 40 ppmvd (No. 2 fuel oil firing) 25 ppmvd (Syngas firing)
VOC	Combustion control 7 ppmvd (NG) 7 ppmvd (No. 2 fuel oil firing) 1 ppmvd (Syngas firing)

Particulates	Good combustion, and type of fuels fired
Pb	Good combustion, and type of fuels fired
H_2SO_4	Firing of NG, Syngas and No. 2 fuel oil
Be	Firing of NG, Syngas and No. 2 fuel oil
AS	Firing of NG, Syngas and No. 2 fuel oil

Coal Gasification Plant

Raw Product Gas

Pollutant	Control Technology
Sulfur	Acid Gas Removal (95.6%)
Particulates	Water scrubbing

The raw product gas is fired in the combined cycle combustion turbine units and emissions of product gas are included in the BACT determination for those units.

CG Emission (Thermal Oxidizer)

Pollutant	Control Technology
SO_2	Fuel oil firing with a sulfur content not to exceed 0.05% by weight. (45.3 lb/hr)
NO_x	Combustion controls
CO	Combustion controls
Pb	Efficient Operation
H_2SO_4	Efficient Operation
Mercury	Efficient Operation
Beryllium	Efficient Operation
Inorganic Arsenic	Efficient Operation

Materials Handling and Storage

Fugitive Dust Source	Control Technology
Coal Unloading	Enclosed - including a Collection System
Conveyers and Transfer Points (Coal, Slag)	Transfer points enclosed with Collection System. Conveyers enclosed
Coal Storage and Reclaiming	Crusting Agent Application Wet Suppression Systems or Crusting Agents Surfactant Application[1]
Fuel Oil Storage	Bottom Loaded/Submerged Filling

Auxiliary Boiler

NO_x	Low NOx Burners and Combustion Controls, limited operation[2] (0.159 lb/MMBtu)
SO_2	Fuel oil firing with a sulfur content not to exceed 0.05 % by weight, and limited operation (0.053 lb/MMBtu)
CO	Combustion Controls (0.087 lb/MMBtu)
VOC	Combustion Controls (0.0485 lb/MMBtu)
Particulates	Combustion Controls (0.061 lb/MMBtu)
Pb	Combustion Controls
Mercury	Combustion Controls
Beryllium	Combustion Controls
Inorganic Arsenic	Combustion Controls

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1 - Total Coal Handling Sources PM Emissions are 11.2 tpy
2 - Maximum of 1000 hours of operation per year

Annual pollutant emissions are shown in Table 1 for all sources. Pollutant emission rates are listed in the section entitled "BACT Determination by DEP".

Flare Stacks

This source did not propose a BACT since its operation is expected to be infrequent (startup and shutdown, and emergencies).

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-296, Stationary Sources - Emission Standards, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from combined cycle power plants and coal fired power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- Combustion Products (Particulates and Heavy Metals). Controlled generally by good combustion of clean fuels and/or fabric filters.
- Products of Incomplete Combustion (CO, VOC, Toxic Organic Compounds). Control is largely achieved by proper combustion techniques.
- Acid Gases (SOx, NOx, HCL, Fl). Controlled generally by gaseous control devices.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

Combustion Products

The IGCC facility's projected emissions for combustion products (Particulate Matter (PM) and trace heavy metals) exceed the significant emission rates given in Florida Administrative Code Rule 17-212.410, Table 212.400-2. A review of the BACT/LAER Clearinghouse indicates that the proposed PM/PM_{10} emission level of 0.013 lbs/MMBtu (excluding H_2SO_4) for syngas for the IGCC unit is consistent with the particulate limit for recent determinations of coal fired boilers. The applicant proposed PM/PM_{10} emission level of 0.009 lbs/MMBtu for No. 2 oil firing for the IGCC unit is consistent with previous BACT determinations in Florida.

In general, the BACT/LAER Clearinghouse does not contain specific emission limits for beryllium, mercury and arsenic from turbines. BACT for heavy metals is typically represented by the level of particulate control. The emission factors for PM/PM_{10} when firing the IGCC with syngas and No. 2 fuel oil are judged to represent BACT for beryllium, arsenic and mercury.

PM/PM_{10} emissions are controlled for the auxiliary boiler by firing with No. 2 fuel oil with a sulfur concentration not to exceed 0.05%, by weight. This fuel sulfur level is consistent with recent BACT determinations for similar facilities.

Products of Incomplete Combustion

The emissions of carbon monoxide, volatile organic compounds and other organics from combustion turbines are largely dependent upon the completeness of combustion and the type of fuel used. The applicant has indicated that the carbon monoxide emissions from the proposed turbines are based on exhaust concentrations of 25 ppmvd for syngas and 30 ppmvd for No. 2 fuel oil. Volatile organic compound emissions have been based on exhaust concentrations of 7 and 1 ppmvd for fuel oil firing and syngas, respectively.

A review of the BACT/LAER clearinghouse indicates that several of the largest combustion turbines (those with heat inputs greater that 1,000 MMBtu/hour) have been permitted with CO limitations which are similar to those proposed by the applicant. For VOC, the clearinghouse also indicates that the proposed emissions are consistent with that established for other turbines of similar size, thereby suggesting that the proposed emission levels for both CO and VOC are reasonable. Although the majority of BACT emissions limitations have been based on combustion controls for carbon monoxide and volatile organic compounds minimization, additional control is achievable through the use of catalytic oxidation.

Catalytic oxidation is a post-combustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection for NO_x control. These installations have been required to utilize LAER technology, and typically have CO limits in the 10 ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, thereby reducing the amount of thermal energy required compared to thermal oxidation. For CC combustion turbines, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature and desired efficiency. Most gas turbine applications have been limited to smaller cogeneration facilities burning natural gas in nonattainment areas.

The application of oxidation catalyst is not being required as BACT for the IGCC unit due to high content of sulfur in the fuel. Syngas fuel which will be utilized at 100 percent capacity factor contains up to 0.07% by weight sulfur content. These sulfur compounds are oxidized to SO_2 in the combustion process and will be further oxidized by the catalyst to sulfur trioxide (SO_3). SO_3 will, in turn, combine with moisture in the gas stream to form H_2SO_4 mist. Therefore, the use of an oxidation catalyst system for the IGCC unit is not BACT due to corrosion problems.

Acid Gases - Sulfur Dioxide

The emissions of sulfur dioxide, nitrogen oxides, fluorides, and sulfuric acid mist, as well as other acid gases which are not "regulated" under the PSD Rule, represent a significant proportion of the total emissions and need to be controlled if deemed appropriate. Sulfur dioxide emissions from combustion turbines are directly related to the sulfur content of the fuel being combusted.

The IGCC facility's projected emissions for SO_2 exceed the significant emission rates given in Florida Administrative Code Rule 17-212.410, Table 212.400-2. A review of the BACT/LAER Clearinghouse indicates that the proposed post-demonstration SO_2 emission level of 0.17 lbs/MMBtu for syngas is consistent with the SO_2 limit for recent determinations of coal fired boilers.

For the IGCC combustion turbine, the applicant has proposed the use of Syngas, No. 2 fuel oil with a maximum sulfur content of 0.05%, by weight, and coal gasification to control sulfur dioxide emissions. In accordance with the "top down" BACT review approach, only two alternatives exist that would result in more stringent SO_2 emissions. These include the use of a lower sulfur content syngas and fuel oil or the use of wet lime or limestone-based scrubbers, otherwise known as flue gas desulfurization (FGD).

In developing the NSPS for stationary gas turbines, EPA recognized that FGD technology was inappropriate to apply to these combustion units. EPA acknowledged in the preamble of the proposed NSPS that "Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) to control SO_2 emissions from stationary gas turbines is considered unreasonable." EPA reinforced this point when, later on in the preamble, they stated that "FGD... would cost about two to three times as much as the gas turbine." The economic impact of applying FGD today would be no different.

Furthermore, the application of FGD would have negative environmental and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and water) costs associated with the operation

of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

Coal gasification sulfur content is controlled through fuel-production process controls. Sulfur removal stages in the coal gasification process include acid gas removal, and sulfuric acid plant thermal oxidizer. Acid gas removal systems remove hydrogen sulfide, carbonyl sulfide and carbon dioxide from the fuel gas using an acid gas absorbent solution. The acid gases are stripped from the adsorbent solution and sent to the sulfuric acid plant for introduction into a thermal oxidizer, where the remaining sulfur compounds are converted to SO_2, and finally converted to commercial grade liquid H_2SO_4. The overall sulfur removal efficiency is 95.6%. The sulfur bearing compounds content of the syngas is reduced to 0.07% by weight, or less.

The elimination of flue gas control as a BACT option then leaves the use of NG, CG with the sulfur removal process or low sulfur coal as the options to be investigated. The applicant has proposed the use of syngas, CG with sulfur removal or No. 2 fuel oil (maximum of 876 hours per year per IGCC combustion turbine) with a maximum sulfur content of 0.05%, by weight, as BACT for this project.

Although the applicant's proposed coal gasification acid gas cleanup process is an existing technology, development is continuing on coal gasification systems. The data base to determine whether the proposed post-demonstration sulfur bearing compounds level of 0.07% by weight is reasonable for a coal gasification facility with resulting proposed emissions of 0.17 lbs/MMBtu is limited. A commercial scale demonstration of an IGCC 100 MW power plant has been conducted adjacent to Southern California Edison's Cool Water generating station. During the Cool Water demonstration project, high sulfur coals, Illinois #6 and Pittsburgh #8, with a sulfur content of about 3.1 percent were tested. The SO_2 emission rate was 0.11 lbs/MMBtu for the Pittsburgh #8 coal and was even lower for the Illinois #6 coal (Technical Brief, Cool Water Coal Gasification Program: Commercial Scale Demonstration of IGCC Technology Completed, Electric Power Research Institute). The Polk Power Station IGCC unit has been designed for a larger capacity and is expected to be capable of using coals from various sources not included in the Cool Water demonstration project tests. Although, emission rates from the Cool Water tests are representative of the SO_2 emission range that can be achieved using IGCC units, the study was conducted as a demonstration project and the unit was later converted to another fuel source.

The Polk Power Station IGCC coal gasification system includes an option for both cold gas and hot gas cleanup and emissions from the Cool Water demonstration project are not directly comparable to the hot gas cleanup system. However, an objective of the hot gas cleanup system test is to demonstrate the efficiency in decreasing sulfur emissions compared to cold gas cleanup system.

Acid Gases - Nitrogen Oxides

The applicant has stated that BACT for nitrogen oxides for the IGCC unit will be met by using nitrogen diluent injection to limit emissions to 25 ppmvd at 15% oxygen when burning syngas, and water injection to achieve 42 ppmvd at 15% oxygen when burning No. 2 fuel oil. The emission limit of 25 ppmvd when burning syngas is higher compared to 9 ppmvd when burning NG in a combustion turbine due to the difference in composition and heat content between the two fuels. In contrast to natural gas which is predominately methane, syngas is composed of a variety of constituents including CO, hydrogen, CO_2, nitrogen, and water. The combustible components of syngas are primarily CO and hydrogen instead of methane. CO and hydrogen burn at a higher adiabatic flame temperature than methane and therefore can produce approximately three times as much NO_X as natural gas.

A review of EPA's BACT/LAER Clearinghouse indicates that the lowest NO_X emission limit established to date for a combustion turbine is 4.5 ppmvd at 15 percent oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system. The two 25 MW combustion turbines are located in Kern County, California and the degree of control at this facility exceeds BACT requirements.

Selective catalytic reduction is a post-combustion method for control of NO_X emissions. The SCR process combines vaporized ammonia with NO_X in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed.

The applicant has indicated that the cost effectiveness for the application of SCR technology to the Polk Power Station IGCC project was determined to be $4,935 per ton of NO_X removed for a 50% reduction of NO_X concentration from 25 ppmvd to 12.5 ppmvd. The cost impact analysis was conducted using the OAQPS factors and project-specific economic factors. An assessment of economics impacts was performed by comparing control costs between a baseline case of advanced combustion and nitrogen injection and baseline technology with the addition of SCR controls. Baseline technology is expected to achieve NO_X exhaust concentrations of 25 and 42 ppmvd at 15% oxygen for syngas and oil-firing, respectively. Based

on Japanese experience, SCR technology was premised to achieve NO_x concentration of 12.5 and 21 ppmvd at 15% oxygen for syngas and oil-firing, respectively, representing a 50% NO_x removal efficiency.

Since SCR has been determined to be BACT for several combined cycle facilities firing natural gas, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics. In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products Inc.), the following statement is made:

"In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

The auxiliary boiler is expected to operate 1,000 hours per year or less. The applicant is proposing to control SO_2 and acid gas emissions by firing with No. 2 fuel oil with a sulfur content of 0.05% or less, by weight, and by using combustion controls. Therefore, limited operation and low sulfur distillate oil represents BACT for the auxiliary boiler.

H_2SO_4 Plant Thermal Oxidizer

The predominant emission from the thermal oxidizer is sulfur dioxide. The sulfur dioxide emissions proposed for the facility are based on the highest removal efficiency that is now being maintained at other coal gasification facilities. This is accomplished by using an acid gas removal system followed by a sulfuric plant thermal oxidizer. This process is capable of providing an overall sulfur removal rate of 95.6 percent.

Fugitive Sources

The applicant has indicated that fugitive particulate emissions may result from the storage and handling of coal, slag, and sulfur. BACT for controlling these activities is good engineering design and practices. Control measures shall include the following:

- Minimize number of material transfer points
- Apply crusting agent application to inactive storage areas
- Enclose conveyers and transfer points
- Provide induced collection systems for dust

- Provide wet suppression systems (surfactant)
- Cover by-product storage areas (upon completion of cell)
- Handle and store sulfur in a molten or continuous crystalline state

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions.

Environmental Impact Analysis

The predominant environmental impacts associated with this proposal are related to the use of SCR for NO_X control. The use of SCR results in emissions of ammonia, which may increase with increasing levels of NO_X control. In addition, some catalysts may contain substances which are listed as hazardous waste, thereby creating an additional environmental burden. Although the use of SCR does have some environmental impacts, the disadvantages do not outweigh the benefit which would be provided by reducing nitrogen oxide emissions by 50 percent. The benefits of NO_X control by using SCR is substantiated by the fact that a number of BACT determinations have established SCR as the control measure for nitrogen oxides over the last five years for combustion turbines.

In addition to the criteria pollutants, the impacts of toxic pollutants associated with the combustion of syngas and No. 2 fuel oil have been evaluated. Beryllium and Mercury exceeds the PSD significant level. Other toxics are expected to be emitted in minimal amounts, with the total emissions combined to be less than one ton per year.

Although the emissions of the toxic pollutants could be controlled by particulate control devices such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense for firing with natural gas or fuel oil. Therefore, the Department does not believe that the BACT determination would be affected by the emissions of the toxic pollutants associated with the firing of syngas or No. 2 fuel oil.

Potentially Sensitive Concerns

With regard to controlling NOx emissions from SCR the applicant has expressed concerns regarding SCR catalyst deactivation due to poisoning, oxidation of SO2 to SO3, formation of H2SO4, formation of ammonium bisulfate and ammonium sulfate, risk due to potential leaks from storage of NH3 and disposal of spent catalyst which may be considered hazardous.

A review of permitting activities for combined cycle proposals across the nation indicates that SCR has been required or proposed for installations with a variety of operating conditions including firing with fuel oil. SCR also has been accepted as BACT for boilers fired with pulverized coal. Although the concerns expressed by the applicant were valid at one time, the most recent experiences indicate that these problems have been resolved through advances in catalysts and experiences gained in operation.

BACT Determination by DEP

1. Combustion Products - PM/PM_{10} (excluding H_2SO_4)

During the two year demonstration period for the IGCC unit at the Polk Power Station, the applicant's proposed PM/PM10 emission limit of 0.013 lb/MMBtu is accepted for IGCC hot cleanup testing conducted under the Cooperative agreement with the US DOE.

For IGCC operation following the 2-year demonstration period particulate emissions control for the IGCC unit will be limited to 0.013 lb/MMBtu.

2. Products of Incomplete Combustion - CO and VOC

The use of an oxidation catalyst system for the IGCC system is not found to be BACT due to the high sulfur content in the syngas and resulting corrosion problems. Emissions are to be controlled by good combustion practices during demonstration and post demonstration periods.

3. Acid Gases - Sulfur Dioxides

During the 2-year demonstration period for the IGCC unit at the Polk Power Station, the applicant's proposed SO_2 emissions limit of 0.247 lbs/MMBtu is accepted for IGCC demonstration testing conducted under the Cooperative Agreement with the US DOE. The proposed emissions limit will allow for testing of coals with a broad range of sulfur content and for evaluation of the IGCC unit design.

For IGCC operations following the demonstration period, SO_2 emissions shall not exceed the 0.17 lbs/MMBtu limit established in a recent BACT determination for the Indiantown Cogeneration facility.

The SO_2 emissions shall be limited to 0.17 lbs/MMBtu for the IGCC unit by the use of low sulfur coal and the integral IGCC sulfur removal and recovery processes.

Acid Gases - Nitrogen Oxides

The annualized cost per ton for NO_X removal of $4,935 for the IGCC SCR estimated by the applicant exceeds recent estimates for other applications. Recent published estimates for a pulverized coal plant (Selective Catalytic Reduction for a 460 MW coal fueled unit: Overview of a NO_X Reduction System Selection, EPRI, 1993) with a NO_X reduction of 47 percent was $3,265 per ton in 1997 dollars. Costs per ton in this range indicate SCR is a reasonable alternative. However, there are significant differences between a pulverized coal-fired power plant and an IGCC unit in the design and operation of SCR NO_X control systems.

Due to the uncertainty in actual system performance and high cost of a SCR control system, NO_X BACT for the IGCC CT will be determined following a data collection period. After the demonstration phase, NO_X emission testing will be conducted on the CT every two months over a 12 to 18 month period. Test results will be provided to the Department within thirty (30) days after each test is performed. During the test period, the CT shall be operated to achieve the lowest possible NO_X emission rate and shall not exceed 25 ppmvd NO_X corrected to 15 percent oxygen and ISO conditions. This concentration limitation, equivalent to an emission rate of 0.099 lb NO_X/MMBtu, is 42 percent lower than rates recently established as BACT for other pulverized coal-fired power plant applications. One month after the test period ends, the applicant will submit a recommended BACT determination for NO_X using the test results, data obtained from other similar facilities, and research conducted by the CT manufacturer. The Department will then make a BACT determination for NO_X only and adjust the NO_X emission limits as appropriate.

The emission limits for the IGCC unit for firing with syngas and No. 2 fuel oil for the Polk Power Station are thereby established as follows:

Emission Limitations - 7F CT

Pollutant			IGCC Post Demonstration		IGCC 2-year Demonstration			
	Fuel	Basis	lb/hr	tpy[a]	Fuel	Basis	lb/hr	tpy[b]
NO_x	Oil	42 ppmvd[f]	311	N/A	Oil	42 ppmvd	311	N/A
	Syngas	25 ppmvd[f]	222.5	1,044	Syngas	81 ppmvd	664.2	2,908.3
VOC[c]	Oil	0.028 lb/MMBtu	32	N/A	Oil	0.028 lb/MMBtu	32	N/A
	Syngas	0.0017 lb/MMBtu	3	38.5	Syngas	0.0017 lb/MMBtu	3	38.5
CO	Oil	40 ppmvd	99	N/A	Oil	40 ppmvd	99	N/A
	Syngas	25 ppmvd	98	430.1	Syngas	25 ppmvd	99	430.1
PM/PM_{10}[d]	Oil	0.009 lb/MMBtu	17	N/A	Oil	0.009 lb/MMBtu	17	N/A
	Syngas	0.013 lb/MMBtu	17	74.5	Syngas	0.013 lb/MMBtu	17	74.5
Pb	Oil	5.30E-5 lb/MMBtu	0.101	N/A	Oil	5.30E-5 lb/MMBtu	0.101	N/A
	Syngas	2.41E-6 lb/MMBtu	0.0035	0.067	Syngas	1.10E-5 lb/MMBtu	0.023	0.13
SO_2	Oil[e]	0.048 lb/MMBtu	92.2	N/A	Oil	0.048 lb/MMBtu	92.2	N/A
	Syngas	0.17 lb/MMBtu	357	1563.7	Syngas	0.247 lb/MMBtu	518	2,269

NOTES: a - Based on baseload operations firing syngas, with emission rates equivalent to 100 percent CGCU operations; up to 10 percent annual capacity factor firing fuel oil.

b - Based on baseload operations firing syngas, with a maximum of 8760 hrs/yr utilization of HGCU operations; up to 10 percent annual capacity factor firing fuel oil.

c - Exclusive of background concentrations.

d - Excluding sulfuric acid mist.

e - Sulfur dioxide emissions based on a maximum of 0.05 percent sulfur, by weight.

f - ppmvd at 15% O_2 and ISO conditions.

Auxiliary Boiler

For the auxiliary boiler, BACT will be represented by a limitation on hours of operation and the use of clean fuel (maximum 1,000 hours per year firing No. 2 fuel oil with 0.05% sulfur, by weight).

H_2SO_4 Plant Thermal Oxidizer

A review of the proposed emission rates for the thermal oxidizer indicates that equipment in and of itself represents BACT for these sources.

Fugitive Sources

A review of the control strategy indicates that the applicant has proposed taking all reasonable measures to minimize fugitive particulate emissions and is representative of BACT.

Details of the Analysis May be Obtained by Contacting:
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Recommended by:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

Date 1993

Approved by:

Virginia B. Wetherell, Secretary
Dept. of Environmental Protection

Date 1993