TECO

TAMPA ELECTRIC

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AIR REGULATION

May 26, 1999

Mr. Sterlin Woodard, P.E.
Environmental Protection Commission of
Hillsborough County
Air Management Division
1410 N. 21st St.
Tampa, Florida 33605

Via Fax and U.S. Mail

Re: Tampa Electric Company (TEC) - F. J. Gannon Station
Fuel Yard Construction/Modification Permit
Request for Time Extension for Condition #21
FDEP Permit No. 0570040-006-AC

Dear Mr. Woodard:

Tampa Electric is requesting a time extension of three (3) months to conduct the ESP Optimization study required per Condition #21 of the aforementioned permit. This request is being made due to the lack of unit and personnel availability as a result of the Gannon Unit #6 explosion on April 8, 1999.

Permit Condition #21 requires that the "Electrostatic Precipitator Optimization Study shall be conducted for all six units at the facility within six months of the permit being issued." The permit was issued on February 09, 1998 and would therefore require that the Electrostatic Precipitator Optimization Study be conducted by August 09, 1999. Meeting this deadline will be very difficult due to the disruption the explosion has caused to all of the Gannon unit's outage/operating schedules and the extreme burden of the repairs placed on the personnel of the Gannon Station. Given these delays in unit and personnel availability, Tampa Electric believes that the study can be conducted on the Gannon units by a deadline of November 09, 1999.

Tampa Electric is also requesting an extension of the second deadline requiring full implementation of the study within 12 months of the permit issuance date. Tampa Electric will attempt to meet the existing second time requirement, but is asking for this extension in the event of additional difficulties related to Gannon's recovery from the April 8 explosion.

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

Thank you for your attention to this matter. If you have any concerns or questions feel free to contact me at (813) 641-5210.

Sincerely,

Patrick L. Shell
Engineer
Environmental Planning

EP\gm\PLS125

cc: Mr. Al. Linero-FDEP
Mr. Jerry Kissel, FDEP SW District

Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

NOTICE OF PERMIT ISSUANCE

In the matter of an
Application for Permit by:

Mr. Gregory M. Nelson
Mgr., Environmental Planning
Tampa Electric Company
6944 U.S. Highway 41 North
Apollo Beach, FL 33572-9200 /

DEP File No.: 0570040-006-AC
County: Hillsborough

Enclosed is Permit Number 0570040-006-AC for the construction/modification of the Gannon Station Fuel Yard, issued pursuant to Section 403.087, 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, Douglas Building, 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 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tampa, Florida.

Sincerely,

George W. Richardson
Air Permitting Engineer
Southwest District

cc: Mirza Baig, EPA
T.W. Davis, P.E., Environmental Consulting & Technology, Inc.
Rick Kirby, EPCHC
AL Linero, DEP

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT ISSUANCE was sent to the addressee by certified mail and all copies were sent by regular mail before the close of business on FEB 0 9 1999 to the listed persons, unless otherwise noted.

Clerk Stamp

FILING AND ACKNOWLEDGEMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Patricia G. Puckett — FEB 0 9 1999

(Clerk) (Date)

Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

PERMITTEE:

Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Permit No: 0570040-006-AC
County: Hillsborough
Effective Date: 02/09/1999
Expiration Date: 10/15/2000
Project: Gannon Station
Fuel Yard

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rules 62-4, 62-200 through 62-297. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans and other documents, attached hereto or on file with the Department and made a part of hereof and specifically described as follows:

For the construction/modification of the F.J. Gannon Station fuel yard which serves Boilers No. 1.through 6. This modification is to increase the fuel yard coal throughput from 2.85 to 3.3 million tons per year. For the construction of the auxiliary fuel unloading and handling system to handle up to 362,025 tpy & 400 tph of alternate fuel (i.e., Tire Derived Fuel (TDF), Wood Derived Fuel (WDF), etc). This permit does not authorize the burning of alternate fuels; it only authorizes their handling at the fuel yard. Yard activities include barge (East and West) and railcar unloading of coal, and/or flux, truck unloading of limestone or iron ore, and transfer and storage of these materials. The iron ore is shipped, stored and handled in the same manner as limestone. A description of the fuel yard parameters, etc. are included on Pages 2 and 3.

The modifications at the fuel yard are considered to be a Pollution Control Project (PCP) for the reduction of NOx, as described in Attachment 1 and agreed to by TECO in their 12/23/97 Title IV Acid Rain Phase II NOx Control Plan. In order to maintain the status of this modification as a PCP, i.e., allowing "small" increases in other pollutants, this permit includes limits on heat input and emission rates at the boilers.

Activities at the fuel yard prior to the issuance of this permit may have resulted in violations subject to enforcement. Nothing in this permit shall be construed as ratifying or validating those prior activities or changing the situation relative to potential enforcement.

Location: Port Sutton Road, Port Sutton, Tampa

UTM: 17-360.0 E 3087.5 N Facility ID No.: 0570040 Emission Unit ID No: 008

Replaces Permit No.: AO29-216480

Emission Point Description	Emission Point ID	Throughput (tph)	Control Method*	Efficiency
Barge to clamshell	FH-002	2,300	DS	95%
Barge to continuous unloader	FH-003	2,300	DS	95%
Clamshell to barge unloading hopper	FH-005	2,300	DS	95%
Continuous unloader to conveyor A	FH-006	2,300	**DS	95%
Conveyor A to continuous feeder	FH-007	2,300	DS/E	95%
Barge unloading hopper to conveyor B	FH-009	2,300	**DS/E	95%
Conveyor B to conveyor C	FH-011	2,300	DS/E	90%
Conveyor C to conveyors D1, D2	FH-012	2,300	**DS/E	90%
Railcar to rail unloading hopper	FH-013	2,300	DS/E	95%
Rail unloading hopper to conveyor L	FH-014	2,300	**DS/E	95%
Conveyor L to conveyors D1, D2	FH-015	2,300	**DS/E	95%
Conveyor D1 to conveyor M1	FH-016	2,300	**DS/E	90%
Conveyor D2 to conveyor M2	FH-017	2,300	**DS/E	90%
Conveyor M1 to conveyor E1	FH-018	2,300	**DS/E	90%
Conveyor M2 to conveyor E2	FH-019	2,300	**DS/E	90%
Conveyor E1 to fuel storage pile	FH-020	2,300	DS	70%
Conveyor E2 to fuel storage pile	FH-021	2,300	DS	70%
Fuel storage pile	FH-022/023		DS	50%
Underground reclaim to conveyor F1	FH-024	1,600	DS/E	85%
Underground reclaim to conveyor F4	FH-025	1,600	DS/E	85%
Underground reclaim to conveyor F3	FH-026	1,600	DS/E	85%
Underground reclaim to conveyor F2	FH-027	1,600	DS/E	85%
Conveyor F1 to conveyors G1, G2	FH-028	1,600	**DS/E	90%
Conveyor F4 to conveyors G1, G2	FH-029	1,600	**DS/E	90%
Conveyor F3 to conveyors G1, G2	FH-030	1,600	**DS/E	90%
Conveyor F2 to conveyors G1, G2	FH-031	1,600	**DS/E	90%
Conveyor G1 to crushers	FH-032	800	DS/E	90%
Conveyor G2 to crushers	FH-033	800	DS/E	90%
Crushers to conveyor H1	FH-034	800	**DS/E	90%
Crushers to conveyor H2	FH-035	800	**DS/E	90%
Conveyor H1 to bunkering	FH-036/041		Rotoclones	75%
Conveyor H2 to bunkering	FH-036/041		Rotoclones	75%

Conveyor D1 to conveyors G1, G2	FH-042	2,300	**DS/E	90%
Conveyor D2 to conveyors G1, G2	FH-043	2,300	**DS/E	90%
Dozer operations of storage piles	FH-044		DS	50%
Truck unloading - auxiliary	AH-001	400	DS	85%
Storage pile to auxiliary hopper	AH-002	400	DS/E	90%
Auxiliary hopper to conveyor T	AH-003	400	DS/E	90%
Conveyor T to conveyor U	AH-004	400	DS/E	90%
Conveyor U to conveyors G1, G2	AH-005	400	DS/E	90%

**Dust Suppressant Application Point

* DS=Dust Suppressant E=Enclosure

SPECIFIC CONDITIONS:

1. A part of this permit is the attached 15 General Conditions. [Rule 62-4.160, F.A.C.].

2. Attachment No. 1 is made a part of this permit.

3. In order to maintain the status of this modification as a PCP, the following limits shall apply; on a 12 month rolling average basis:

   a. Starting January 1, 1999 total combined coal heat input to boilers 1 through 6 shall not exceed 69.9×10^6 mmBtu/year.
   b. Starting January 1, 1999, SO_2 total combined emissions from boilers 1 through 6 shall not exceed 66,400 tons per year (tpy).
   c. Starting January 1, 1999, NOx total combined emissions from boilers 1 through 6 shall not exceed 33,100 tons per year, and starting January 1, 2000, NOx total combined emissions from boilers 1 through 6 shall not exceed 31,800 tons per year.
   d. Starting January 1, 1999, and continuing until superceded by the results of the Precipitator Optimization Study (Reference Specific Condition No. 21) PM total combined emissions from boilers 1 through 6 shall not exceed 1,940 tons per year.

   [Rule 62-212.400(2)(a)2., F.A.C.].

4. The Gannon Station fuel yard is permitted to operate continuously, 8,760 hours/year. [Rules 62-4.160(2) and 62-210.200, F.A.C., P.T.E.].

5. The coal throughput shall not exceed 3,304,646 tons per 12 consecutive month period. The auxiliary fuel, consisting of TDF and WDF, throughput shall not exceed 362,025 tons per 12 consecutive month period. [application received 6/3/97 and addendum received 6/98, and Rules 62-4.160(2) and 62-210.200, F.A.C.].

Specific Condition No. 5. continued:

5. a. The primary NOx control strategy for the facility is the combustion of high moisture, low BTU coal, and is the basis of the Department's determination that this fuelyard throughput increase qualifies for the PSD exemption as a Pollution Control Project (PCP). If the permittee chooses an alternate NOx control strategy, then this project loses its PCP status and the fuelyard throughput reverts to its previous limitation of 2.85 million tons in any 12 consecutive month period. Use of the two new coal crushers, or any other physical changes made to accommodate this project, would then be prohibited until the permittee submits a construction permit application and receives a Department permit addressing their use.

6. Dust suppressants shall be applied to the fuel either prior to or at the time of delivery and at all emission points where specified on Pages 2 and 3 as necessary to control fugitive PM emissions as specified in Specific Condition No. 8. For the application of dust suppressants prior to delivery, TECO shall keep monthly records of 1) the amount of dust suppressant applied for each type and amount of coal delivered, and 2) type of dust suppressant used (e. g., MSD sheets, product name). [application received 7/3/97].

7. All controls associated with the transfer points (i.e., the grab buckets, the windshield, the enclosures and the wet spray systems) shall be maintained to the extent that the capture efficiencies referenced on Pages 2 and 3 will be achieved [Permit AO29-216480].

8. Visible emissions generated by fugitive or unconfined particulate matter from fuel handling systems and storage areas shall not exceed 5% opacity. [Construction Permit AC29-152987].

9. A thirty (30) minute visible emissions test shall be performed at the following material transfer operations at 12 month intervals on or within 90 days prior to December 31. One copy of each test data shall be submitted to both the Environmental Protection Commission of Hillsborough County and the Florida Department of Environmental Protection [Rule 62-297.310(4(a)2., F.A.C.].

A) The west bucket to the west hopper
B) The railcar to the hopper
C) Either the conveyor E1 or E2 to their respective stockpiles where the initial free fall is at least 30 feet
D) The hammermill crusher to either the conveyor H1 or H2
E) The conveyors D1 or D2 to either conveyor G1 or G2
F) Either the conveyor J1 or J2 to their respective bunkers

10. Compliance with the emission limitation of Specific Condition No. 8 shall be determined using EPA Method 9. The minimum requirements for stack sampling facilities, source sampling and reporting shall be in accordance with Rule 62-297, F.A.C. [Rules 62-204.800, 62-297.310(7)(a)4. and 62-297.400, F.A.C.].

11. All compliance testing shall be conducted during normal operation and at the maximum material (including limestone or iron ore where applicable) transfer rate attainable during the test period. Actual material handling rates will be determined using the totalizer readings obtained from scales located on C, L, and H conveyors. The readings from these scales will be recorded at the start and finish of the visible emissions test. The difference between the values recorded divided by the test duration will be the value used to represent the material handling rate. Alternatively, values from the circular chart recorders located in the coal field control room will be used in the event a problem with a scale totalizer arises. The test results shall indicate if iron ore has been included in the corresponding material transfer rate. Failure to include the actual process or production rate in the results may invalidate the test. [Rule 62-4.070 (3), F.A.C. and Supplement to Application, December 18, 1992]

12. Compliance with the limitations in Specific Condition No. 3 shall be determined on a monthly basis. Heat input shall be determined from the actual fuel input to the boilers and its corresponding heat content, or CEM data, while the SO_2 and the NOx emissions shall be derived from the CEM data. PM emissions shall be based on the most recent stack tests, and TECO shall have the option of conducting additional tests, in addition to those specified in the current boiler operating permit(s) per the conditions in the current boiler operating permit(s).

13. Water sprays or chemical wetting agents and stabilizers are acceptable methods to be used on coal storage piles as necessary to maintain an opacity of less than or equal to 5%. Other appropriate methods may be applied to maintain this opacity, after they are approved by the Department. [AC29-114676].

14. Should the Department have reason to believe the visible emission standards are not being met, the Department may require that compliance with the visible emission standards be demonstrated by testing in accordance with Rule 62-297, F.A.C.

15. <u>Test Reports</u>:

a) The owner or operator of an emission unit for which a compliance test is required shall file a report with both the Environmental Protection Commission of Hillsborough County and the Air Compliance Section of the Southwest District Office of the Department on the results of each such test.

b) The required test report shall be filed as soon as practical but no later than 45 days after the last test is completed. [Rule 62-297.310(8), F.A.C.].

16. The permittee shall notify the Environmental Protection Commission of Hillsborough County at least 15 days prior to the date on which each formal compliance test is to begin of the date, time, and place of each such test, the test contact person who will be responsible for coordinating and having such test conducted. [Rule 62-297.310(7)(a)9., F.A.C.].

17. Operation and Maintenance Plan for Particulate Control:

(A) Process Parameters:

1. For all sources covered under this permit, permitted operation schedule:
   24 hrs./day, 7 days/wk.; 52 wks./yr.
2. Equipment Data:
   Conveyor Hoods: Corrugated Aluminum
   Transfer Point Enclosures: Carbon Steel
3. Wet Dust Suppression:
   Manufacturer: Martin Marietta

(B) Inspection and Maintenance Procedures:

The fuel yard particulate control equipment receives regular preventative maintenance as follows:

Conveyor Enclosures:

1. Daily random visual inspections of conveyor hoods.
2. Daily random visual inspections of the transfer points chute work.

Dust Suppression System:

1. Quarterly inspection of system for water leaks.
2. Quarterly inspection of spray nozzles.

The pumps, tanks, etc., that make-up the dust suppression system undergo normal maintenance including lubrication, flushing, and draining. Should these procedures indicate repairs are necessary, maintenance job requests are initiated. All records are maintained for a minimum of five years.
[Rule 62-296.700, F.A.C. and Application for Renewal, July 16, 1992].

18. All reasonable precautions shall be taken to prevent and control generation of unconfined emissions of particulate matter in accordance with the provision in Rule 62-296.320, F.A.C. These provisions are applicable to any source, including, but not limited to, vehicular movement, transportation of materials, construction, alterations, demolition or wrecking, or industrial related activities such as loading, unloading, storing and handling. Reasonable precautions include but are not limited to the following:

A. Chemical or water application to:
   1. Unpaved roads
   2. Unpaved yard areas
B. Paving and maintenance of roads, parking areas, and yards
C. Landscaping or planting of vegetation
D. Confining abrasive blasting where possible
E. Other techniques, as necessary

19. Submit to the Air Management Division of the Environmental Protection Commission of Hillsborough County and the and the Air Compliance Section of the Southwest District Office of the Department each calendar year on or before March 1, completed DEP Form 62-210.900(4), "Annual Operating Report for Air Pollutant Emitting Facility," for the preceding calendar year. [Rules 62-210.370(2), F.A.C.].

20. Issuance of this permit does not relieve the permittee from complying with applicable emission limiting standards or other requirements of Rules 62-200 through 297, or any other requirements under federal, state or local law. [Rule 62-200.300, F.A.C.].

21. As part of the PCP, an Electrostatic Precipitator Optimization Study shall be conducted for all six units at the facility within six months of the permit being issued. A report shall be due at that point and submitted to both the Environmental Protection Commission of Hillsborough County (EPC) and the Department. The study shall be subject to EPC and Department approval and full implementation of the study shall be completed within twelve months of the permit issue date, or within a period mutually agreed to by the permittee and the EPC. The permittee's application to revise their Title V operating permit shall include verifiable and enforceable operating parameters for the ESPs which reflect the results of the optimization study.

22. The permittee shall provide timely notification to the Environmental Protection Commission of Hillsborough County and the and the Air Permitting Section of the Southwest District Office of the Department prior to implementing any changes that may result in a modification to this permit. The changes may include, but are not limited to, the following, and may also require prior authorization before implementation [Rules 62-210.300 and 62-4.070 (3), F.A.C.]:

A) Alteration or replacement of any equipment* or parameter listed on Pages 2 and 3 of this permit.
B) Installation or addition of any equipment* which is a source of air pollution.
C) Any changes in the method of operation, raw materials, products or fuels.

* Not applicable to normal maintenance and repairs, and vehicles used for transporting material.

23. After construction/modification is complete, TECO shall make proper application to revise the associated final Title V permit (or to revise the application for a Title V permit, as appropriate) [Rule 62-4.090(1), F.A.C.].

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

W.C. Thomas, P.E.
Air Program Administrator
Southwest District

PRELIMINARY DETERMINATION
POLLUTION CONTROL PROJECT AND
PSD APPLICABILITY REVIEW
TAMPA ELECTRIC GANNON COAL PROJECT

BACKGROUND

Tampa Electric Company (TEC) operates the Gannon power plant and coal yard in Tampa, Hillsborough County. In June, 1997, TEC applied to increase the permitted coal throughput at the coal yard from 2.85 million tons per year (mmTPY) to 3.77 mmTPY. An addendum submitted in June, 1998 revised the throughput requirement to 3.305 mmTPY. The reason for the increase is that TEC has been progressively using more high moisture/low heat content coals to comply with nitrogen oxides (NO_X) requirements for Phase II units pursuant to the Title IV Acid Rain requirements of the Clean Air Act.

Unless a throughput increase is permitted, use of the lower heat content coals will limit the electrical power production of the Gannon Plant compared to use of high heat content coal. Historically this has not been a problem since the coalyard throughput limit was compatible with use of high heat content fuel and demand. However, with growing electrical demand, lower state-wide electrical reserve capacity, and use of low heat content coal, the throughput limit has become an actual restriction on the overall plant availability. This maximum availability of the plant is approximately 66 percent when burning historical coals, but would be reduced to 57 percent if high moisture, low Btu coals are used while the mass throughput limit is maintained.

TEC maintains that "the coalyard and steam generating units are separate entities with respect to existing operating permits and that the fuel yard permit conditions apply only to the fuel yard, not to the entire facility." Under this view, the coalyard throughput increase would be permitted separately without regard to any emissions changes that might occur from the boilers. Without conceding that the coalyard and steam generating unit permit conditions are mutually applicable, TEC has presented information in subsequent submittals in support of its contention that the project is exempt from the rules for the Prevention of Significant Deterioration (PSD) as a Pollution Control Project."

REGULATIONS

Presuming that the coalyard and the steam units comprise a single facility, an increase in coalyard throughput would result in emissions increases of at least nitrogen oxides (NO_X), sulfur dioxide (SO_2), and particulate matter (PM/PM_{10}). There could also be increases in carbon monoxide (CO) and sulfuric acid mist (SAM).

The change in the coalyard throughput limit is a relaxation of a federally enforceable limitation on the capacity of the facility and is therefore a modification. As such, the PSD requirements in Rule 62-212.400, F.A.C. may apply as described in Rule 62-212.400(2)(g), F.A.C. Modifications to Major Facilities are those that result in a *significant net emissions increase* as described in Rule 62-212.400(2)(d)4.a(ii) and 62-212.400(2), F.A.C.

Per Rule 62-212.400(5)(c), F.A.C.:

> *The proposed facility or modification shall apply Best Available Control Technology (BACT) for each pollutant subject to preconstruction review requirements as set forth in Rule 62-212.400(2)(f), F.A.C.*

It is obvious that the definitions and applicability of facility, modification, and any exemptions are of key importance in this review.

A pollution control project (PCP) is defined at 40CFR52.21(b)(32) as:

> *Any activity or project undertaken at an existing electric steam generating unit for purposes of reducing emissions from such unit. Such activities and projects are limited to:*
>
> *(I) The installation of conventional or innovative pollution control technology, including but not limited to advanced flue gas desulfurization, sorbent injection for sulfur dioxide control and nitrogen oxides control and electrostatic precipitators;*
>
> *(2) An activity or project to accommodate switching to a fuel which is less polluting than the fuel in use prior to the activity or project, including, but not limited to natural gas or coal reburning, or the co-firing of natural gas and other fuel for the purpose of controlling emissions;*
>
> *(3) A permanent clean coal technology demonstration project conducted under title II, Section 101(d) of the Further Continuing Appropriations Act of 1985....................; or*
>
> *(4) A permanent clean coal technology demonstration project that constitutes a repowering project.*

The above definition is not specifically listed in the State Rules in Chapter 62, F.A.C. However it is obvious that it is the intent of the State to abide by the Federal definition. Per Rule 62-212.400(2)(a)2., F.A.C., Pollution Control Project Exemption:

> *A pollution control project that is being added, replaced, or used at an existing electric utility steam generating unit and that meets the requirements of 40CFR52.21(b)(2)(iii)(h) shall not be subject to the preconstruction requirements of this rule.*

According to **40CFR52.21(b)(2)(iii)(h)**, one of the exemptions from review for PSD is:

> *The addition, replacement or use of a pollution control project at an existing electric utility steam generating unit, unless the Administrator determines such addition, replacement, or use renders the unit less environmentally beneficial, or except (1) When the Administrator has reason to believe that the pollution control project would result in a significant net increase in representative actual annual emissions of any criteria pollutant over levels used for that source in the most recent air quality impact analysis in the area conducted for the purpose of title I if any, and (2) The Administrator determines the increase will cause or contribute to a violation of any national ambient air quality standard or PSD increment, or visibility limitation.*

A fuel switch is not actually included in the definition of PCP nor is it listed as an activity in support of a PCP. However, it is not excluded. Furthermore, according to the EPA rule analysis at FR Vol. 57, No. 140, Pages 32320-32321:

> *"Thus EPA is today adopting revisions to its PSD and nonattainment regulations for the addition, replacement or use at an electric steam generating unit of any system or device whose **primary function is the reduction of pollutants (including the switching to a less-polluting fuel where the primary purpose of the switch is the reduction of air pollutants)**."*

If it is established that the primary purpose of the switch is to reduce emissions, then it can be evaluated for qualification as a PCP. Even if there is an increase in a PSD pollutant associated with the project, it is not necessarily precluded from consideration as a PCP. Per the EPA analysis:

> *"Several commentors pointed out that a pollution control project that reduces one pollutant should not be allowed to increase emissions of another pollutant if that increase will cause or exacerbate a different pollution problem................... **Although a pollution control project could theoretically cause a small collateral increase in some emissions, it will substantially reduce emissions of other pollutants.** In recognition of this, **the rule provides for a case-by-case assessment** of the pollution control project's net emissions and overall impact on the environment."*

Therefore, the criteria which the Department must follow are clear. **The collateral increase in any PSD pollutant should be small and the decrease in one or more PSD pollutants should be substantial. The increases in any pollutant should not cause or contribute to violation of an ambient air quality standard or PSD increment.**

DESCRIPTION OF PROJECT

The project is the **use of Powder River Basin (PRB) coal** in Units 1-4. According to TEC, there has been a marked reduction in NO_X emissions from using PRB coal at Units 1-4. This has resulted in emissions reductions approaching the "Phase II" NO_X limit of 0.86 pounds per million Btu heat input (lb/mmBtu) at Units 3 and 4 without physical modification of the wet bottom cyclone units. TEC has also experimented with high moisture/low heat content Indonesian coal. For reference following is a comparison of various coals used at the Gannon Plant.

Table 1 - Comparison of 1994 TEC Gannon Coal with 1997 Indonesian and PRB Coals

	Gannon Coal[1]	Indonesian Coal[2]	PRB Coal[3]
Sulfur (%)	1.13	0.35	0.43
Heating Value (Btu/lb)	12,773	9,614	8,720
Ash (%)	6.99	1.44	5.29
Moisture (%)	<10	>25	31[4]

The choice of dates and data for comparison purposes was made by the Department and not TEC. In 1993, TEC imported no Indonesian coal. Receipts of Indonesian coal were 0.147, 0.349, 0.808, and 0.741 mmTPY for 1994, 95, 96, and 97, respectively. In 1994 use of PRB coal by TEC was insignificant. In 1996 and 1997 receipts of PRB coal by TEC (presumably for use at Gannon) were 0.591 and 0.971 mmTPY respectively. The above data indicate that:

1. Use of PRB and Indonesian coals is a recent and increasing practice by TEC.
2. PRB and Indonesian coals have lower sulfur content and lower ash content indicating at least an initial potential for reductions of some pollutants.
3. PRB and Indonesian coals have lower heat content indicating that it is necessary to use more of these coals to achieve the same heat input or electrical power production as achieved with lesser quantities of historical coal used at TEC Gannon.
4. PRB and Indonesian coals have higher moisture content. If NO_X emissions are reduced by the higher moisture content (and presumably some adjustments in combustion practices), then PRB and Indonesian coals have a potential for reductions in NO_X emissions.

EFFECT OF HIGH MOISTURE COAL ON NO_X EMISSIONS

Following the establishment of the above criteria, the Department requested on August 10, 1998 that TEC provide reasonable assurance that high moisture coals do in fact result in NO_X reductions.[5] The Department specifically requested the Sargent & Lundy[6] study and any other information that TEC has to indicate that the actual reason high moisture coal will be used is to reduce NO_X emissions.

TEC promptly provided the Sargent & Lundy Report on August 11 as well as a report submitted to the Public Service Commission (PSC) on NO_X controls[7], a Memorandum of Understanding (MOU) with Hillsborough County on NO_X reductions[8], and an internal summary of NO_X compliance activities[9].

According to the 1998 Compliance Activities document:

> *TEC's cyclone units have shown a reduction in NO_X close to the rule requirements as a result of burning high moisture western coals. However, there are significant penalties as a result and TEC is continuing to investigate other reasonable options.............To continually use this fuel will require changes in the coal preparation to reduce operating difficulties. This work will be complete in 1999.*

According to the MOU:

> *Whereas the Tampa Electric Company has already taken the initiative to reduce the nitrogen oxide emissions from some of the individual affected units by more than 20 percent, resulting in an overall reduction of over 10,000 tons from the 1995 levels;*
> *Whereas the EPC believes the modifications and fuel switching proposed by the Tampa Electric Company will address the secondary environmental impacts associated with nitrogen oxides emissions in the Tampa Bay area...........*

Regarding Gannon 1-4, the May 1997 document submitted to the PSC stated:

A blend of Powder River Basin (PRB) and Western Kentucky coal has been used in the cyclone units. The PRB is a low BTU, high moisture, low sulfur coal. The original blend of 75% PRB has been reduced to 70% in order to minimize the problems associated with this fuel. Problems associated with this coal blend include: load restrictions due to low BTU value of the PRB, high fly ash LOI [loss on ignition], slag tank problems (tapping and explosions), fuel switching problems and fires due to spontaneous combustion of the PRB. NO_X was reduced to the 0.8-0.95 lb./MMBTU for a short period of time. It has not been demonstrated that a higher percentage of PRB in the blend will further lower the NO_X emissions rate.

A series of solutions to the problems were described. Of note is one that clearly associates the purpose of the crusher/grinder project to the problems caused by the use of PRB coal. If the use of high moisture coal is a PCP, then the crusher/grinder project can be a project in support of a PCP. Specifically the document states:

Fly ash LOI appears to be controllable by improving the grind of the coal. To meet the required grind, an increase in coalfield crusher operation and maintenance of up to $600,000 per year may be necessary along with probable crusher upgrades which could cost up to $2,500,000.

The summary of conclusions in the document to the PSC states that:

*TEC has concluded that combustion modification of its Riley Turbo Furnace boilers (Gannon Units 5 and 6) can achieve significant reductions in NO_X emissions but only at the expense of incurring significant capital and O&M costs .... Furthermore, TEC has concluded that **significant NO_X emission** reductions on its cyclone boilers(Gannon Units 1-4) can only be reasonably obtained through **fuel switching to a low btu, high moisture fuel** with the resulting expense and risk of sole sourcing these units fuel supply.*

An independent corroboration of the possible reduction of NO_X by use of PRB coal at the Gannon Plant exists in an inspection report.[10] The letter states:

*......**NO_X emissions from two cyclone units, at or below** the proposed EPA limits of 0.94 lb/mmBtu (operation was near full load).......... During my visit I noted that these units had recently **switched to Powder River Basin coal**. During a visit on August 16, a representative from Hillsborough County noted that NO_X emissions from the two wet bottom turbo units [Units 5 and 6] at the Gannon station were below the proposed levels of 0.86 lb/mmBtu...........Can you confirm if fuel switching for SO_2 allowances have a co-benefit of reducing NO_X?*

It is clear from the record that:

1. TEC has a recent history of using the high moisture fuels
2. NO_X reduction through use of high moisture, low Btu fuels has been demonstrated.
3. The use of high moisture, low Btu fuels is in fact the primary strategy employed by TEC at Gannon Units 3 and 4 to comply with the requirements of the Phase II Rules for NO_X control pursuant to Title IV, Acid Rain, Clean Air Act.
4. Additional projects are needed to facilitate the switch to low Btu, high moisture coals.

OTHER CONSIDERATIONS

Based on the application and initial information submitted by TEC, the EPCHC and some Department staff expressed various concerns about the ability of the project to qualify as a PCP. These concerns are:

1. Significant collateral increases of SO_2.[11]
2. Possible impacts on ambient SO_2 concentrations.
3. The possibility that increased annual power generation from the Gannon Plant is the actual reason that greater throughput is needed.
4. The possibility that use of PRB coal is being implemented for economic rather than environmental reasons.
5. Lack of detailed analysis on the collateral increase or decreases of particulate matter, fluorides, and other PSD pollutants.
6. Doubts that it is the use of high moisture coals that causes the lower NO_X emissions.

TEC fully disclosed in its final information submittal that SO_2 emissions may indeed increase. However, it is clear that on balance, the use of PRB coal will actually lower SO2 emissions. TEC stated that the increase is related to the use of a scrubber at Big Bend units 1 and 2 will result in substantial reductions in SO_2 emissions at Big Bend and on a corporate-wide basis as required by Title IV of the Clean Air Act. TEC's reduction at Big Bend will result in available SO_2 allowances, some of which might be sold or possibly used at the Gannon Plant. The emissions are not collateral with the use of high moisture PRB coal, but rather incidental and mostly unrelated.

Any negative impacts on ambient SO_2 concentrations are not related to the use of PRB coal. The subject is being reviewed under Title V permitting. The Department and TEC are working out ways to insure that emission limits are set in the Title V permit to avoid exeedances of the Florida Ambient Air Quality Standard for SO_2.

The electrical generation capacity in the State has fallen below the minimum reserve requirements. Usage of quite a number of plants and even peaking units has increased. Increases in generation due to system-wide growth in demand are normally left out of the calculations for determining increases and decreases in emissions due to modifications at existing power plants. TEC actually left in the future emissions increases attributable to increased growth in demand as well as the unrelated increases due to the scrubber project at Big Bend 1 and 2.

Obviously TEC will ultimately be limited by the coalyard throughput whether it uses high Btu or low Btu fuel. However the use of the low Btu fuel is for reduction of emissions. A compensating increase in allowable coal throughput is a logical way to encourage the use of a less polluting type of coal, while insuring that it does not inadvertently "debottleneck" the rest of the plant.

The Department has seen no evidence that the motivation for using PRB coal is to stimulate demand. Based on the DOE data, the cost of PRB coal delivered to the company's Davant, Louisiana Transfer Station is about the same as other fuels used by TEC. When forwarded to Florida, the cost could be greater than the other fuels because of the low Btu value. As documented above, there is actually a risk related to sole-sourcing the fuel for the Gannon Units using PRB coal. Additionally a host of potential problems were identified by the company that are being progressively solved. The main economic incentive appears to be minimization of the cost to achieve the required NO_X reductions. There appears to be no appreciable economic advantage to using PRB coal that would result in increased unit availability.

TEC submitted estimates on the collateral increases and decreases in particulate emissions. These appear small and controllable. The low sulfur in PRB coal can actually reduce electrostatic precipitator performance. TEC has sulfur trioxide injection systems that can be adjusted to correct for drops in particulate collection efficiency. The Department did not specifically require TEC to document possible small collateral increases and decreases in other PSD pollutants. The changes are difficult to quantify and there is no reason to expect any significant differences attributable to the use of the PRB coal.

The reduction in NO_X at Gannon Units 1-4 has clearly been documented and is attributable to the use of low moisture coals such as PRB coal. Obviously some relatively inexpensive associated fuel system, ash handling and boiler modifications, as well as combustion optimization contribute to the reduction.

Following are the required emissions reductions that TEC must achieve from the units actually covered by the NO_X Acid Rain requirements:

Table 2 - Comparison of NO_X Emissions From Gannon Units 3-6 Before and After Control Projects and Fuel Use Strategies (pounds per million Btu)

	1995	Future
Gannon Unit 3	1.29	0.86
Gannon Unit 4	1.34	0.86
Gannon Unit 5	0.95	0.84
Gannon Unit 6	1.15	0.84

In its application, TEC assumed that Units 3 and 4 would be required to meet 0.95 pounds of NO_X per million Btu (lb/mmBtu) while Units 5 and 6 will have to meet 0.85. A recent Court decision upheld EPA's final determination on the emissions allowed for these units. Therefore TEC will actually have to achieve somewhat greater NO_X reductions than given in the application. Though not regulated by Phase II Rules, Units 1 and 2 will also achieve some NO_X emissions reductions due to the use of high moisture, low Btu fuel.

CONCLUSION

Based on the foregoing analysis, the Department's Preliminary Determination is that TEC's use of high moisture, low Btu coals such as Indonesian and Powder River Basin coals constitutes a Pollution Control Project per Department and EPA regulations. Additionally the coal yard modifications and the installation of new crusher/grinders constitute projects and activities to accommodate switching to a fuel that is less polluting than the fuel in use prior to the project.

To insure that the increase in permitted coal throughput does not result in emissions increases, limits will be set for "total annual heating value throughput." In this manner, the increase in physical throughput will only compensate for the decrease in fuel heating value. Assuming a conservative heating value of 12,250 Btu per pound from the higher Btu coals exclusively used before 1996, the Department estimates that the required heat throughput is 6.98×10^7 mmBTU per year. This limit should be incorporated into the coalyard permit or adjusted in accordance with more detailed information submitted by TEC. For reference, according to the EPA's Acid Rain database, the heat input to the Gannon Plant in 1995 and 1996 was 6.69 and 6.89 x 10^7 mmBtu respectively.[12]

The Southwest District is directed to process the permit for the coal yard modifications. Although the actual coalyard projects are to accommodate the use of a PCP, emissions should still be minimized. TEC should also describe to the District its plans to minimize any collateral particulate and carbon monoxide increases from the boilers. This Preliminary Determination may be public noticed in conjunction with the coalyard permit Intent or separately at an earlier date. The details of the notice may be finalized between TEC and the District.

REFERENCES

1 Department of Energy. Receipts and Average Cost of Coal by Type, Electric Utility, and Plant (TEC Gannon), 1994

2 Department of Energy. Receipts, Quality, and Average Delivered Cost of Imported Coal (TEC Davant Transfer - Indonesian Coal), 1997.

3 Department of Energy. Receipts of Western Region Coal (TEC), 1997.

4 Babcock and Wilcox Analysis of Campbell County, Wyoming Subbituminous C.

5 Telecon. Linero, A.A., DEP with Watley, T.J., TEC. August 10, 1998. Need for substantiation of properties of high moisture coals with respect to NO_X controls.

6 Carnot/Sargent & Lundy. "Nitrogen Oxide Limitation Study prepared for Tampa Electric company." March 15, 1996.

7 Tampa Electric Company. "Evaluation of NO_X Controls for Tampa Electric Company's Group II Wet Bottom and Cyclone Boilers." May, 1997.

8 TEC and EPCHC. "Memorandum of Understanding Nitrogen Oxides Emissions Rate Reductions." October 29, 1997.

9 TEC. "Tampa Electric Company NOX Compliance Activities." Undated.

10 Letter from Costello, M., DEP to Ho, P., TEC. Request for Information. October 9, 1996.

11 Memorandum from Anderson, L., DEP to Linero, A., DEP. TEC's Coal Modification Project. August 11, 1998.

12 www.epa.gov/acidrain/ardhome.html. Data summarized in Tables accompanying Reference 11 above.

ATTACHMENT - 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 403.141, 403.727, or 403.859 through 403.861, Florida.Statutes (F.S.). 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), F.S., 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 this permit.

4. Not applicable to Air Permits.

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 and used by the permittee to achieve compliance with the conditions of this permit, are 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.

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 reasonable times, 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 conditions of the permit;

GENERAL CONDITIONS:

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 reasonable 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 noncompliance; and

b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to educe, eliminate, and prevent recurrence of the noncompliance. 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 Section 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

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 Rule 62-4.120 and 62-730.300 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.

GENERAL CONDITIONS:

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) 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.

c. Records of monitoring information shall include:

1. the date, exact place, and time of sampling or measurements;
2. the person responsible for performing the sampling or measurements;
3. the dates analyses were performed;
4. the person responsible for performing the analyses;
5. the analytical techniques or methods used;
6. 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 the 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.

16. Not applicable to Air Permits.

17. Not applicable to Air Permits.

TAMPA ELECTRIC

January 28, 1999

RECEIVED

FEB 04 1999

BUREAU OF AIR REGULATION

Via Fax and U.S. Mail

Mr. Jerry Kissel, P.E.
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Re: Tampa Electric Company (TEC) - F. J. Gannon Station
Fuel Yard Construction/Modification Permit
Proof of Publication of the Intent to Issue
FDEP File No. 0570040-006-AC

Dear Mr. Kissel:

Pursuant to Rule 62-110.106(5), F.A.C., enclosed is the proof of publication of the Notice of Intent to Issue the Tampa Electric Company F.J. Gannon Station Fuel Yard Construction/Modification Permit. This notice was published in the legal section of the Tampa Tribune on Friday, January 22, 1999.

Thank you for your attention to this matter. If you have any concerns or questions feel free to contact me at (813) 641-5034.

Sincerely,

Theresa J.L. Watley
Consulting Engineer
Environmental Planning

c/enc: Mr. Al. Linero-FDEP
Mr. Richard Kirby-EPCHC

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

THE TAMPA TRIBUNE
Published Daily
Tampa, Hillsborough County, Florida

State of Florida }
County of Hillsborough } ss.

Before the undersigned authority personally appeared J. Rosenthal, who on oath says that she is Classified Billing 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

in the matter of

STATE OF FLORIDA

was published in said newspaper in the issues of

JANUARY 22, 1999

OFFICIAL NOTARY SEAL
SUSIE LEE SLATON
COMMISSION NUMBER
CC639424
MY COMMISSION EXP.
APRIL 16, 2001
NOTARY PUBLIC STATE OF FLORIDA

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 she has neither paid nor promised any person, this advertisement for publication in the said newspaper.

J Rosenthal

Sworn to and subscribed before me, this 22 day

of JANUARY, A.D. 1999

Personally Known____or Product Identification______
Type of Identification Produced__________________

(SEAL)

Susie Lee Slaton

PO# N17008

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 an air pollution permit (Permit File No. 0570040-006-AC) to Tampa Electric Company for the construction/modification of the Gannon Fuel Yard at the Gannon Electric Generating Station located at Port Sutton Road, Port Sutton, Tampa, Hillsborough County. This permit will allow the Gannon fuel yard throughput to be increased from 2,850,000 tpy to 3,304,646 tpy.

MAILING ADDRESS - 694 U.S. Highway 41 North, Apollo Beach, FL 33572-9200 to the attention of Mr. Gregory M. Nelson, Manager, Environmental Planning.

The Department will issue the permit with its 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 procedure for petitioning for a hearing are set forth below.

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, 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 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), F.S. 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), F.S., 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, F.A.C.

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, F.A.C.

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 permit. 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.

Mediation is not available in this proceeding.

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 8407 Laurel Fair Circle, Tampa, Florida.

Any person may request to obtain additional information, a copy of the application (except for information entitled to confidential treatment pursuant to Section 403.111, F.S.), all relevant supporting materials, a copy of the permit draft, and all other materials available to the Department that are relevant to the permit decision. Additionally, the Department will accept written comments concerning the proposed permit issuance action for a period of 14 (fourteen) days from the date of publication of "Public Notice of Intent to Issue Permit." Requests and written comments filed should be provided to the Florida Department of Environmental Protection at 3804 Coconut Palm Drive, Tampa, FL 33619 to the attention of Mr. Jerry Kissel (phone no. 813-744-6100 ext. 107) referencing Permit File No. 0570040-006-AC. 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 and require, if applicable, another Public Notice.

1191 1/22/99

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

RECEIVED
NOV 20 1998
Dept. of Environmental Protection
Office of General Counsel

IN RE:
AN APPLICATION FOR PERMIT BY:

TAMPA ELECTRIC COMPANY,
F. J. GANNON STATION,
HILLSBOROUGH COUNTY, FLORIDA.

DEP
DRAFT PERMIT NUMBER:
0570040-006-AC

PETITION FOR FORMAL ADMINISTRATIVE HEARING

Petitioner, **ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY, FLORIDA** (EPC), through its undersigned counsel, hereby files this petition for administrative proceeding pursuant to Chapter 120.569 and 120.57 Florida Statutes, in the matter of TAMPA ELECTRIC COMPANY, F. J. GANNON STATION, CONSTRUCTION/MODIFICATION PERMIT NO. 0570040-006-AC, in Hillsborough County, Florida. More specifically, EPC objects to the **STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION's** (the "Department") draft conditions included in and subject of their Notice of Intent to Issue Air Construction Permit. In support of this petition, EPC states the following:

BACKGROUND

1. EPC is an environmental regulatory agency with jurisdiction in Hillsborough County, Florida pursuant to 84-446, Laws of Florida, as amended. EPC's address and telephone number are: 1900 Ninth Ave. Tampa, Florida 33605, (813) 272-5960.

2. The Department's address and telephone number is: 3900 Commonwealth Blvd., Mail Station #35, Tallahassee, Florida, 32399-3000; Office of General Counsel-(850) 488-9314.

3. The project, subject of this petition, is the proposed TAMPA ELECTRIC COMPANY (hereinafter "TECO") Air Construction Permit for their F.J. Gannon Station Facility, permit number 0570040-006-AC.

4. On June 30, 1997, TECO applied for an increase in the coal throughput at the F.J. Gannon Station Facility in Hillsborough County, Florida. In that application (0570040-006AC), TECO referenced the replacement of two (2) coal crushers at the facility, but did not make application for a permit for that replacement. TECO subsequently claimed Pollution Control Project (PCP) status for the project. The claim is based on projected nitrogen oxide (NOx) removal achieved by use of Powder River Basin (PRB) Coal. An associated emissions increase of over 7000 tons per year of SO_2 was also requested by TECO as part of the project. On May 28, 1998, TECO applied to the permitting authority for an Air Construction Permit for the additional coal crushers at the Gannon Station. That proposed project (0570040-007AC) is the subject of EPC Petition for Formal Administrative Hearing, pending before DOAH Administrative Law Judge, William F. Quattlebaum as case number 98-4594, presently set for hearing February 17 and 18, 1999.

5. The Department's current draft permit conditions will allow the subject TECO facility to conduct activities in violation of Department rules. The activities allowed by the draft permit consist of (1) increase in coal throughput, and (2) addition of equipment to allow handling of alternate fuels in the coal yard. TECO has failed to provide reasonable assurance that the proposed project meets the requirements of a Pollution Control Project (PCP). The activities associated with the subject Air Construction Permit would have the potential to significantly impact the air quality within Hillsborough County by allowing a potential increase in the emissions of sulfur dioxide of over 7000 tons and particulate matter 10 (PM10) of over 90 tons for any 12 consecutive month period. Hillsborough County is designated an "Air Quality Maintenance Area" by the State for the pollutant particulate matter, and is unclassified for the pollutant sulfur dioxide. The County has already experienced actual sulfur dioxide (SO_2) emissions which exceeded state ambient air standards, and TECO's own Title V permit application based on the existing State Implementation Plan showed modeled concentrations of sulfur dioxide which exceed state and federal ambient air standards.

6. The Department's draft permit grants the project PCP status which exempts it from being subject to PSD and BACT requirements. By allowing an increase of greater than 7000 tons of sulfur dioxide emission per 12 consecutive months, the draft permit does not meet the regulatory criteria for a PCP.

7. Petitioner received notice of the Department's Intent to Issue Air Construction Permit, by copy on November 6, 1998.

STATEMENT OF SUBSTANTIAL INTERESTS

8. EPC's substantial interests will be affected by the proposed permit, in that, the facility is located within Hillsborough County and residents of Hillsborough County own property adjacent to and in the vicinity of the facility. Furthermore, residents of Hillsborough County live near and use the subject area for recreational purposes. The proposed activity will have the effect of impairing, polluting, or otherwise injuring the air, water and other natural resources of the county and the state all in violation of the Department's rules. The Department's failure to obtain reasonable assurance that their rules will be met and its decision to issue the permit with the proposed conditions substantially affects Hillsborough County, its citizens and natural resources.

DISPUTED ISSUES OF MATERIAL FACT

9. Material facts specifically disputed by EPC (apparently relied upon by the Department in its intent to issue the subject permit with proposed conditions) include the following:

A) Separation of Projects: Whether the addition of two (2) coal crushers, proposed to be allowed by permitting action 057004-007-AC, and the increase in coal yard throughput, proposed by this permitting action (0570040-006-AC), should be reviewed as separate projects or considered together as one project since both projects are inextricably intertwined.

B) Designation as Pollution Control Project (PCP): Whether the coal throughput increase and associated addition of 2 coal crushers qualify as a PCP (as defined in 40 CFR 52.21(b)(32)).

C) Prevention of Significant Deterioration (PSD) Applicability: Whether the coal yard throughput increase and associated coal crushers addition is subject to PSD and Best Available Control Technology (BACT) as defined in 40 CFR 52.21(b)(12) and Rule 62-212, FAC.

D) Baseline Emissions: Whether the appropriate time and actual emissions were selected to establish the validity of this project as a PCP.

E) Particulate Matter: Whether appropriate emission factors were used to determine potential and actual emissions of particulate matter 10 (PM10) from coal handling and whether it is appropriate to issue the permit without limits for particulate matter emissions.

FACTS WARRANTING MODIFICATION OF PROPOSED AGENCY ACTION

10. The facts warranting modification of agency action are as follows:

A) Separation of Projects: Application was initially made with the 2 projects combined. TECO has stated that both modifications are necessary due to switching from low moisture to high moisture coal. Both modifications should be reviewed as one project and subjected to the requirements of PSD and BACT since they would not qualify for consideration under the Pollution Control Project (PCP) exemption, 40 CFR 52.21(b)(2)(iii)(h).

B) Designation as a Pollution Control Project (PCP): In order to qualify under the PCP exemption, the project must not be less environmentally beneficial, and the effective increase must not cause or contribute to a violation of a national air quality standard. Hillsborough County has experienced measured ground level exceedances of sulfur dioxide (SO_2). Modeling performed by FDEP engineers has shown exceedances of ground level SO_2 for both federal and state ambient air standards. Hillsborough County is designated by the State as a maintenance area for the pollutant particulate matter. The proposed projects could lead to an increase in actual emissions of over 7,000 tons of sulfur dioxide and over 90 tons of PM10 in any 12 consecutive month period. Also, the draft permit does not contain emission limits for PM10, SO_2 and NOx required to establish the projects' eligibility to be considered a PCP.

C) Prevention of Significant Deterioration (PSD): Since the project does not qualify as a PCP, as explained in B above, it then should fall under Rule 62-212.400(2)(d)(4)(a)(ii), FAC. As such, TECO should provide assurance that all requirements of PSD and BACT are met.

D) Baseline Emissions & Particulate Matter: There is no connection between a baseline timeframe in which emissions of NOx will be reduced and net emissions of PM10 and SO2 are quantified and limited.

11. As to those points raised in Paragraphs 9 and 10 above, nothing provided to EPC in the TECO's application supports the conclusion drawn by the Department that reasonable assurance has been provided that TECO's activities will comply with applicable regulations.

LAWS ENTITLING PETITIONER TO RELIEF

12. Rule 62-212.400(2)(d)4.a.(ii) requires BACT for each modification which results in a significant net emissions increase.

REQUEST FOR RELIEF

Wherefore, EPC requests that it be granted a formal hearing on this matter and the Department conclude that:

A) TECO has not provided reasonable assurance that the departments regulations will be complied with.

B) The coal crushers and coal yard throughput increase modifications are one project.

C) The coal yard throughput increase and coal crushers do not qualify, together or separately, as a pollution control project.

D) The department require TECO to demonstrate that BACT has been provided for this project.

Vernon R. Wagner

Vernon R. Wagner, Chief Counsel
Florida Bar # 0826261
Patrick B. Courtney, Esquire
Florida Bar # 063533
ENVIRONMENTAL PROTECTION COMMISSION
of Hillsborough County
1900 Ninth Avenue
Tampa, Florida 33605
(813) 272-5960

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Petition for Formal Administrative Hearing has been sent via Federal Express Overnight Delivery to Office of General Counsel, Florida Department of Environmental Protection, 3900 Commonwealth Blvd., Mail Station #35, Tallahassee, Florida, 32399-3000; and by first class to Karen Sheffield, P.E., General Manager, Tampa Electric Company, P.O. Box 111, Tampa, Florida 33601-0111, and to Lawrence N. Curtin, Esq., Holland and Knight, P.O. Drawer 810, Tallahassee, Florida, 32302-0810, this 19th day of November, 1998.

Vernon R. Wagner

Vernon R. Wagner, Esquire

ENVIRONMENTAL PROTECTION COMMISSION
HILLSBOROUGH COUNTY

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MEMORANDUM

DATE: November 3, 1998

TO: Jerry Kissel, P.E.

FROM: RK Richard C. Kirby IV, P.E. THROUGH: Jerry Campbell, P.E.

SUBJECT: TECO Gannon Station Coal Throughput Increase 0570040-006-AC

EPC engineering staff has reviewed the predraft permit received on October 22, 1998. The permit allows an increase in allowable coal throughput at the coal yard. The permit also contains conditions intended to provide verification that this project continues to meet the Department's determination that the increase in coal throughput is a pollution control project (PCP). Most important to EPC is that SO_2 emissions are not allowed to increase regardless of their stated intentions to increase the stack height on units 5 and 6. Based on our review and the meeting last week between FDEP SWD, EPCHC, and TECO, we offer the following comments.

1. We agree with your decision to remove references to the Big Bend Plant and removing conditions connecting emissions from the two facilities.
2. We agree with the need for specific conditions in the permit which demonstrate validity of the PCP status of this project. These should include limits on SO_2 and particulate matter (PM) to less than PSD significant increases over the baseline. TECO's proposed NOx reductions should also be included as a permit requirement. The baseline for SO_2 and PM limits should be the same baseline used as a starting point for required NOx reductions. This should be clearly spelled out in the technical evaluation and the permit.
3. Per our discussions during the meeting, wording will be added to the permit which clearly describes this modification as allowing only handling of the listed alternate fuels. A separate permit modification will be needed prior to using alternate fuels in any of the boilers.
4. We still strongly disagree with the use of the drop equation AP42 has a section (11.9) with emission factors specifically for western coal. Powder River coal is listed in this section. An emission factor is given for truck loading, which is equivalent to a single drop, and for bulldozing, which is done constantly at the Gannon Coal Yard. I have performed preliminary calculations using these factors and determined the increase to be over 90 tons per 12 consecutive months. Although this may be overly conservative, it shows the extreme

leniency of using the drop equation. As long as the project is viewed as a PCP, then this significant increase in PM will not trigger PSD and a BACT determination.

5. We agree that it is necessary to include limits for both heat input and coal throughput in the permit. These are necessary to establish the validity of the project as a PCP.
6. As we discussed during the meeting, it is critical to insure that if facility emissions caps are given, they do not constitute a relaxation of SIP requirements. In some recent Title V reviews the EPA has determined that overall facility caps given to sources previously subject to individual limits could inadvertently result in an unintended relaxation.
7. It should be clear that the PCP status is based on the use of the high moisture coal. If the TECO abandons the use of this high moisture coal and attempts to use another means to achieve the NOx reductions, then the fuel throughput should be rolled back to 2.85 million tons per 12 consecutive months.

Thank you for the opportunity to provide comments.

cag

EMISSION ANALYSIS

of

COAL HANDLING MODIFICATIONS
AT THE GANNON COAL YARD

EMISSION ANALYSIS

of

COAL HANDLING MODIFICATIONS
AT THE GANNON COAL YARD

prepared for

TAMPA ELECTRIC COMPANY

by

George Noble, P.E.
NOBLE & ASSOCIATES

June 11, 1982

EMISSION ANALYSIS OF COAL HANDLING MODIFICATIONS AT THE GANNON COAL YARD

PROJECT DESCRIPTION

It is proposed to modify the existing coal handling system at the Gannon Coal Yard in order to handle increased quantities of coal.

Provision is also made for receiving and stockpiling washed pebble limestone which will be used to flux the coal feed.

See attached flow diagram.

Modifications include:

- Expansion of coal storage area
- Development of a limestone storage area
- Modification of existing transfer house number 1 to incorporate new conveyors
- Construction of a new transfer house number 2
- Replace existing fines crusher building by new building
- New cyclone separators will be added to the existing bunker feed

Emission Analysis

The following references will be used in the development of particulate emission factors:

The primary source is:

Reference 1.

"Fugitive Emissions from Integrated Iron and Steel Plants"
March, 1978 EPA 600/2-78-050

More recently, the equations developed in the above publication were further modified in:

Reference 2.

"Particulate Emission Factors Applicable to the Iron and Steel Industry"
September, 1979 EPA 450/4-79-028

Some useful information is also to be found in:

Reference 3.

"Iron and Steel Plant Open Source Fugitive Emission Evaluation"
May, 1979 EPA 600/2-79-103

The method described in the above references is now widely accepted throughout the U.S. as a reasonable approach to emission estimating. It represents the only approach which makes allowance for varying climatological conditions and material characteristics.

Permit applications prepared by the author using this methodology have been approved by the following agencies:

U.S. EPA Region V
U.S. EPA Region VII
Minnesota Pollution Control Agency
New Jersey Department of Environmental Protection
N. Carolina Department of Natural Resources and Community Development
S. Carolina Department of Health and Environmental Control
Georgia Department of Natural Resources
Texas Air Control Board
Washington Department of Ecology
Kentucky Department of Natural Resources

Throughput

In deriving particulate emissions, the material throughput plays a significant role.

Existing System

Coal Throughput 1,269,950* tons/year
Inbound rail = 86% = 1,092,000 tons/year
Inbound barge = 14% = 178,000 tons/year

Proposed System

Coal Throughput 2,400,000** tons/year
Inbound rail = 1,500,000 tons/year
Inbound barge = 900,000 tons/year

Limestone

Limestone to be added to 40% of annual coal throughput at a rate of 2% to 4%.

40% of coal throughput = 960,000 tons/year
4% limestone = 38,400 tons/year

* Based on last two years of operation
** Design basis

Point Sources

The basic emission factor for continuous coal loading or unloading is given by:

$$E = \frac{0.0018 \left(\frac{s}{5}\right) \left(\frac{U}{5}\right) \left(\frac{h}{10}\right)}{\left(\frac{M}{2}\right)^2}$$

Where s = Silt content (% less than #200 mesh)
U = Mean wind speed (mph)
H = Height of drop (feet)
E = Particulate emission (lbs/ton)
M = Moisture content (% by weight)

Input data:

s Coal = 5% (See page 51, Reference 2)
Limestone = Washed Pebble Limestone
Specified 1% less than #8 mesh
Estimated 0.1% less than #200 mesh

M Coal
Unit train = 8.12%
Barge = 11.96%
Limestone
12.5% average

U = 8.7 mph (See local Climatological Data, Tampa, Florida 1980, Based on record for the 1941-1970 period) (See Appendix A)

h = variable depending upon source

For Unit Train Coal

$$E = \frac{0.0018\ (\frac{5}{5})\ (\frac{8.7}{5})\ (\frac{h}{10})}{(\frac{8.12}{2})^2}$$

$$E = \frac{0.0018\ (1)\ (1.74)\ (0.1h)}{16.484}$$

$$\underline{E = 20h \times 10^{-6} \text{ lbs/ton}}$$

Barge Coal

$$E = \frac{0.0018\ (\frac{5}{5})\ (\frac{8.7}{5})\ (\frac{h}{10})}{(\frac{11.96}{2})^2}$$

$$E = \frac{0.0018\ (1)\ (1.74)\ (0.1h)}{35.76}$$

$$\underline{E = 9h \times 10^{-6} \text{ lbs/ton}}$$

Limestone

$$E = \frac{0.0018\ (\frac{0.1}{5})\ (\frac{8.7}{5})\ (\frac{h}{10})}{(\frac{12.5}{2})^2}$$

$$E = \frac{0.0018\ (0.02)\ (1.74)\ (0.1h)}{39.06}$$

$$\underline{E = 0.2h \times 10^{-6}\ \text{lbs/ton}}$$

Total Limestone throughput is 38,400 tons. The application of this factor indicates that the limestone emissions will be negligible due to the low silt content.

Area Sources

Similarly, the equation for particulate emission from an active storage pile due to wind erosion is given by:

$$E = 0.05\ \left(\frac{s}{1.5}\right)\ \left(\frac{d}{235}\right)\ \left(\frac{f}{15}\right)\ \left(\frac{D}{90}\right)$$

Where s = Silt content (%)

d = Number of dry days per year

f = Percentage of time wind speed exceeds 12 mph

D = Duration of material storage (days)

E = Particulate emission (lbs/ton)

Input data:

s = As before

d = 258 (See Local Climatological Data, Tampa, Florida 1980, Based on record for the 1941-1970 period)

f = 18 (See Appendix B)

D_d = Average for dead storage (Variable)

D_l = Average for live and active storage (Variable) thus, for coal

$$E = 0.05 \left(\frac{5}{1.5}\right) \left(\frac{258}{235}\right) \left(\frac{18}{15}\right) \left(\frac{D}{90}\right)$$

$$E = 0.05 \ (3.34) \ (1.098) \ (1.2) \ \left(\frac{D}{90}\right)$$

$$\underline{E = 0.00245 \ D}$$

For limestone

$$E = 0.05 \left(\frac{0.1}{5}\right) \left(\frac{258}{235}\right) \left(\frac{18}{15}\right) \left(\frac{D}{90}\right)$$

$$E = 0.05 \ (0.02) \ (1.098) \ 1.2) \ \left(\frac{D}{90}\right)$$

$$\underline{E = 0.0000146 \ D \text{ lbs/ton}}.$$

Derivation of Storage Parameters

Existing system

Live and active storage capacity = 80,000 tons
Dead storage capacity = 150,000

Throughput = 1,269,950 tons

Throughput to live and active storage = 1,119,950 tons
Throughput to dead storage = 150,000 tons

Period in live and active storage

$$= \frac{80{,}000 \times 365}{1{,}119{,}950} = \underline{26 \text{ days}} = D_L$$

Period in dead storage = 365 days = D_D

Proposed system

Coal

Coal throughput = 2,400,000 tons/year

Live and active storage capacity = 80,000 tons

Dead storage capacity = 300,000 tons

There will be a provision in the new system for by-passing storage.

Assume 10% direct feed i.e. 240,000 tons/year

Total to storage = 2,160,000

Throughput to live and active storage = 1,860,000 tons/yr.

Throughput to dead storage = 300,000 tons/year

Period in live and active storage

$$= \frac{80,000 \times 365}{1,860,000} = \underline{15.70 \text{ days}} = D_L$$

Period in dead storage = 365 days = D_D

Limestone

Limestone throughput = 38,400 tons/year

Storage capacity = 4,187 tons

$$\text{Period in storage} = \frac{4,187 \times 365}{38,400} = 40$$

Period in storage = 40 days

Area Source Emission Factors

Emission factors for these various conditions are as follows:

	Period in Storage (days)		Emission Factor (lbs./ton)	
	Live & Active	Dead	Live & Active	Dead
Existing System				
Coal	26	365	0.0637	0.894
Proposed System				
Coal	15.70	365	0.0385	0.894
Limestone	26.5		0.00039	

Vehicular Entrainment

The equation for vehicular entrainment is given by:

$$E = 0.09\ I\ \left(\frac{4}{n}\right)\ \left(\frac{s}{10}\right)\ \left(\frac{L}{1000}\right)\ \left(\frac{W}{3}\right)^{0.7} \quad \text{(Reference 3)}$$

Where I = Industrial road augmentation factor

n = Number of traffic lanes

s = Silt content (%)

L = Surface dust loading (lbs/mile)

W = Average vehicle weight (tons)

From references cited:

I = 3.5 (See page 80, Reference 3)

n = 2

s = 5

L = 1000 (average of reported dust loadings, page 81, Reference 3)

L = 400 (estimated for site roads)

W = 3 tons

thus, for dozers

$$E = 0.09 \times 3.5\ \left(\frac{4}{2}\right)\ \left(\frac{5}{10}\right)\ \left(\frac{1000}{1000}\right)\ \left(\frac{3}{3}\right)^{0.7}$$

$$E = 0.09 \times 3.5\ (2)\ (.5)\ (1)\ (1)$$

$$\underline{E = 0.31 \text{ lbs/vehicle mile}}$$

for site roads

$$E = 0.31 \times \frac{400}{1000}$$

$$\underline{E = 0.124 \text{ lbs/vehicle mile}}$$

A total daily mileage of 25 miles is assumed.

Annual mileage = 365 x 25 = 9,125

In the case of dozer activity, this will be directly related to quantities in storage.

Dozer capacity = 1200 tons per hour (1500 tph at 80% efficiency, see Catapiller Performance Handbook, Edition 11)

Capacity = 26 tons per push

Pushes per hour = $\frac{1200}{26}$ =46.15

Assume 100 feet per push

Feet per hour = 46.15 x 100 = 4615 ft/hr

$= \frac{4615}{5280} = 0.87$ miles per hour

Existing system

Two thirds of coal in live and active storage requires dozer movement

Live & Active = 1,119,950 tons/year

Active $= \frac{2}{3} \times 1,119,950$

= 746,630 tons/year

Total hours per year on active storage = $\frac{746,630}{1200}$ = 622.19 hrs/yr

Total miles per year = 0.87 x 622.19 = 541 miles

On dead storage

Assume 600 feet push

Reduced capacity = 600 tph at 80%

= 480 tph

Proposed system

Coal

Live & active = 1,860,000 tons/year

Active = 1,240,000 tons/year

Hours per year = $\frac{1,240,000}{1200}$ = 1034 hours/year

Miles per year = 0.87x 1034 = 900 miles

Dead storage capacity = 300,000 tons

Hours per year = $\frac{300,000}{480}$ = 625

To and from storage = 2 x 625 = 1250

Miles per year = 0.87 x 1250 = 1088 miles

Pile maintenance = 25% = 270 miles

Total for coal = 900 + 1088 + 270 = 2258 miles

Limestone

Approximate distance to limestone storage = 0.5 miles

To and from storage = 1 mile

Truck capacity = 22 tons

Total limestone throughput = 38,400 tons

Assume 50% arrives by truck = 19,200 tons

Total truck trips = $\frac{19,200}{22}$ = 873

Total mileage = 873 miles

Dead storage capacity = 150,000 tons

Hours per year operated to push out to dead storage

$$= \frac{150,000}{480}$$

$$= 312.5$$

To <u>and</u> from dead storage = 2 x 312.5 = 625

Miles per year = 0.87 x 625 = 543 miles

Pile maintenance = 25% = 136 miles

Total mileage = 541 + 543 + 136 = 1220 miles

PARTICULATE EMISSIONS

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
							Type	Efficiency (%)	
1	Grab bucket from Barge	0.02 (Spillage)	9h	30	270	0.0027	Grab bucket	--	0.0027
2	Bucket to Hopper	0.178	9h	2	18	0.0016	Windshield	25[1]	0.0012
3	Hopper to Feeder	0.178	9h	2	18	0.0016		--	0.0016
4	Feeder to Conveyor B	0.178	9h	15	135	0.012	Enclosure	50[2]	0.006
5	Conveyor B to Conveyor C	0.178	9h	10	90	0.080	Enclosure	50	0.040
6	Conveyor C to Conveyor D	0.178	9h	26	234	0.021	Enclosure	70[3]	0.006
7	Rail car to hopper	1.092	20h	17	340	0.186	Enclosure (open-ended)	40[4]	0.112
8	Hopper to Feeder	1.092	20h	2	40	0.022	Enclosure	50	0.011
9	Feeder to Convyr.L	1.092	20h	1	10	0.005	Enclosure	50	0.003
10	Conveyor L to Conveyor D	1.092	20h	28	560	0.306	Enclosure	70	0.092
11	Conveyor D to Radial Stacker E	1.27	17h	24	408	0.259		--	0.259
									0.534

Noble & Associates

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls Type	Controls Efficiency (%)	Controlled Emissions (tons/year)
12	Stacker E to stockpile	1.27	17h	27.5 (avg.fall)	46.7	0.029	Free fall	--	0.029
13	Stockpile Live	1.12	63,700	--	63,700	35.67	Conditioned[5]	50	17.84
	Dead	0.15	894,000	--	894,000	67.05	Condit/Cmpct[6]	70	20.11
14	Underground reclaim to F_1/F_2	1.27	17h	7	11.9	0.008	Underground	85[7]	0.0012
15	F_1/F_2 to G_1/G_2	1.27	17h	5	8.5	0.005	Enclosure	70	0.0015
16	G_1/G_2 to Crusher	1.27	17h	20	50	0.032	"	70	0.0096
17	Crusher to H_1/H_2	1.27	17h	6	15.3	0.009	"	70	0.0027
18	H_1/H_2 to J_1/J_2	1.27	17h	13	221	0.140	"	70	0.042
19	J_1/J_2 to Bunker	1.27	17h	27	459	0.291	"	70	0.087
20	Vehicular entrainment	9,125	0.124 lbs/vehicle mi.	--	--	0.566	--	--	0.566
21	Dozer activity	1,220	0.31 lbs per mile	--	--	0.189	--	--	0.189
									39.41

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
							Type	Efficiency (%)	
1	Grab bucket from Barge	0.09 (Spillage)	9h	30	270	0.012	Grab bucket	--	0.012
2	Bucket to Hopper	0.9	9h	2	18	0.008	Windshield	25[1]	0.006
3	Hopper to Feeder	0.9	9h	2	18	0.008		--	0.008
4	Feeder to Conveyor B	0.9	9h	15	135	0.061	Enclosure	50[2]	0.030
5	Conveyor B to Conveyor C	0.9	9h	10	90	0.041	"	50	0.020
6	Conveyor C to D_1/D_2	0.9	9h	25	225	0.101	"	70[3]	0.030
7	Rail car to hopper	1.5	20h	17	340	0.259	Enclosure (open-ended)	40[4]	0.155
8	Hopper to Feeder	1.5	20h	2	40	0.030	Enclosure	50	0.015
9	Feeder to Convyr.L	1.5	20h	1	10	0.0075	"	50	0.004
10	Conveyor L to D_1/D_2	1.5	20h	30	600	0.450	"	70	0.135
11	D_1/D_2 to M_1/M_2	2.160	20h	17	340	0.367	"	70	0.110
12	M_1/M_2 to E_1/E_2	2.16	20h	8	160	0.173	"	70	0.052
									0.577

PARTICULATE EMISSIONS

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
							Type	Efficiency (%)	
13	E_1/E_2 to Stockpile	2.16	20h	31.5 (avg. fall)	630	0.680	--	--	0.680
14	Coal Stockpile								
	Live	1.860	38,500	--	38,500	35.81	Conditioned[5]	50	17.90
	Dead	0.3	894,000	--	894,000	134.10	Cond/Compact[6]	70	40.23
15	Limestone Live	0.057	390	--	390	0.01	--	--	0.01
16	Reclaim to $F_1/F_2/F_3/F_4$	2.16	17h	16	272	0.294	Enclosure	85[7]	0.044
17	$F_1/F_2/F_3/F_4$ to G_1/G_2	2.16	17h	24	408	0.441	"	70	0.132
18	G_1/G_2 to Crusher	2.4	17h	20	340	0.408	"	70	0.122
19	Crusher to H_1/H_2	2.4	17h	6	102	0.122	"	70	0.037
20	H_1/H_2 to J_1/J_2	2.4	17h	13	221	0.265	"	95[8]	0.013
21	J_1/J_2 to Bunker	2.4	17h	27	459	0.551	"	95	0.027
22	D_1/D_2 to G_1/G_2 By-passes storage	0.240	17h	56.5	960	0.115	"	70	0.035
									59.81

DERIVATION OF EFFICIENCY FACTORS

1. See Appendix C from Reference 1
   Generally windguards offer 50%, but 25% allows for some bucket spillage on delivery.

2. 50% allowed for ducts due to losses at entry and exit.

3. See Appendix C. Enclosed transfers = 70%

4. Generally 50%, but 40% allows for end losses.

5. The incoming coal is wet (i.e. conditioned against a certain amount of particulate loss). See Appendix C. Regular watering allows 80%. We have allowed 50%.

6. The dead storage is conditioned on arrival and carefully compacted for long term storage. We have estimated 70% for these combined controls.

7. See Appendix C, under gravity-feed-plow reclaimer. The vibratory feeders operate in the same fashion.

8. Cyclone separators.

SUMMARY OF EMISSION COMPUTATIONS

The results of the foregoing evaluation are summarized in the following table:

System	Controlled Emissions (tons/year) Point Sources	Stockpiles	Total
Existing	1.46	37.95	39.41
Proposed	1.68	58.13	59.81

Increment 59.81 - 39.41 = 20.40

Conclusion

The incremental increase in particulate emission due to the proposed modification = 20.4 tons/year.

Local Climatological Data

APPENDIX A

Annual Summary With Comparative Data

1980

TAMPA, FLORIDA

Narrative Climatological Summary

An outstanding feature of Tampa's climate is the summer thundershower season. On the average, the station has near 90 days with thundershowers occurring mostly in the late afternoons of June, July, August, and September. The resulting sudden drop in temperature from about 90° to 70° induces an agreeable physiological reaction. Between a dry spring and a dry fall, some 30 inches (about 60 percent of the annual) of rain falls during the four summer months.

Because of the flat terrain, night ground fogs occur frequently during the cool weather season. Temperature throughout the year is modified by the waters of the Gulf and bays.

Snowfall is negligible and freezing temperatures are rare. The annual temperature ranges about 22° from a mean of near 60° in January to near 82° in August. The cool-weather season is favorable for citrus, strawberries, and winter truck crops. Damaging freezes may occur once or twice in a season, although many winters have none. The winter of 1976-77 was the coldest on record. Cold season began early with November's average temperature 4.0 degrees below normal, December's 2.1 degrees below normal, January's 9.2 degrees below normal (the coldest January on record), and February's was 4.3 degrees below normal. From January 18 through 22 morning temperatures were at or below 32°. Three additional freeze periods occurred during the winter of 1976-77. Snowfall on the morning of January 19 measured 0.2 inches which was the most ever recorded.

The risk of a hurricane moving in from the Gulf of Mexico has been greatest in June and October. A tropical storm of July 28-29, 1960, brought Tampa's heaviest rain, 12.11 inches, in 24 hours. The Gulf hurricane of October 25, 1921, brought Tampa Bay's most destructive and highest tide, 10.5 feet above mean low water. Highest wind velocity, SE 75 m.p.h. for a 5-minute period, occurred during the passage of the Labor Day hurricane of September 3-5, 1935. Worst damage along local west coast beaches resulted from the small but prolonged Gulf hurricane of September 3-6, 1950. The Florida citrus belt took its worst beating in the great hurricane of October 19, 1944, which brought Tampa's lowest recorded sea level pressure, 28.55 inches. Many hurricanes, by replenishing soil moisture and raising the water table, do far more good than harm. The year 1959 was the wettest on record when 76.57 inches of rainfall was measured. In contrast, the driest year on record occurred in 1956 when 28.89 inches was recorded.

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA AND INFORMATION SERVICE / NATIONAL CLIMATIC CENTER ASHEVILLE, N.C.

Meteorological Data For The Current Year

Station: TAMPA, FLORIDA # 12842 INTERNATIONAL AIRPORT Standard time used: EASTERN Latitude: 27° 58' N Longitude: 82° 32' W Elevation (ground): 19 feet Year: 1980

Month	Temperature °F Averages Daily maximum	Daily minimum	Monthly	Extremes Highest	Date	Lowest	Date	Degree days Base 65 °F Heating	Cooling	Precipitation in inches Water equivalent Total	Greatest in 24 hrs.	Date	Snow, Ice pellets Total	Greatest in 24 hrs.	Date
JAN	70.8	53.1	62.0	81	10	35	3	136	45	1.72	0.95	26	0.0	0.0	
FEB	66.9	46.2	56.6	80	23	30	2	262	22	2.01	1.20	10	0.0	0.0	
MAR	77.1	59.1	68.1	86	27	29	3	64	164	3.09	1.14	1	T	T	3
APR	78.8	61.3	70.1	86	13	50	17	6	165	4.38	2.35	14	0.0	0.0	
MAY	85.4	68.9	77.2	91	21	61	4	0	386	3.94	2.00	9	0.0	0.0	
JUN	89.0	74.2	81.6	92	6	65	14	0	506	3.81	1.77	12	0.0	0.0	
JUL	90.4	77.6	84.0	94	8	74	25	0	598	5.66	2.24	24-25	0.0	0.0	
AUG	90.8	75.2	83.0	94	7	70	26	0	564	7.62	1.34	19	0.0	0.0	
SEP	89.1	71.4	81.3	92	23	69	10	0	493	4.05	0.81	2-3	0.0	0.0	
OCT	83.6	64.3	74.0	87	18	50	25	1	284	1.27	0.79	30-1	0.0	0.0	
NOV	75.2	57.5	66.4	85	9	43	30	65	115	2.68	1.04	16-17	0.0	0.0	
DEC	68.3	46.7	57.5	79	8	35	26	233	7	0.37	0.32	16	0.0	0.0	
YEAR	80.5	63.1	71.8	94	AUG 7	29	MAR 3	769	3349	40.60	2.35	APR 14	T	T	MAR 3

Month	Relative humidity, pct. Hour 01 (Local time)	Hour 07	Hour 13	Hour 19	Wind Resultant Direction	Resultant Speed m.p.h.	Average speed m.p.h.	Fastest mile Speed m.p.h.	Direction	Date	Percent of possible sunshine	Average sky cover, tenths, sunrise to sunset	Number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility ¼ mile or less	Temperature °F Maximum (b) 90° and above	Maximum 32° and below	Minimum 32° and below	Minimum 0° and below	Average station pressure mb Elev. 11 feet m.s.l.
JAN	85	87	63	73	06	1.2	7.4	20	14	4	59	5.6	11	4	16	7	0	1	3	0	0	0	0	1018.4
FEB	84	87	58	68	34	2.6	8.0	23	36	25	64	5.6	9	9	11	10	0	1	4	0	0	2	0	1019.6
MAR	87	89	64	74	16	2.0	9.0	26	32	2	68	6.5	5	11	15	7	0	3	5	0	0	2	0	1017.4
APR	82	89	59	67	27	1.9	8.6	20	31	15	74	5.0	11	10	9	5	0	2	2	0	0	0	0	1015.6
MAY	83	89	62	66	27	0.3	8.1	23	30	25	82	5.2	9	13	9	6	0	6	0	5	0	0	0	1014.4
JUN	86	91	62	67	27	2.1	7.4	28	29	20	86	5.0	10	12	8	4	0	7	0	12	0	0	0	1017.3
JUL	86	91	67	72	23	1.9	7.2	29	25	24	78	6.4	2	21	8	17	0	20	0	21	0	0	0	1016.6
AUG	90	94	65	79	07	1.8	6.5	26	14	4	76	6.5	3	18	10	18	0	19	0	25	0	0	0	1016.9
SEP	93	97	64	80	04	2.4	6.7	21	25	30	84	5.8	1	21	8	17	0	17	0	15	0	0	0	1016.6
OCT	92	94	59	76	04	2.8	5.4	22	33	25	72	5.0	12	11	8	10	0	0	4	0	0	0	0	1015.9
NOV	89	91	64	78	05	3.7	6.9	18	34	24	49	7.2	4	7	19	9	0	0	0	0	0	0	0	1018.0
DEC	93	97	60	77	07	4.4	7.3	22	35	25	67	5.0	12	11	8	4	0	1	1	0	0	0	0	1020.0
YEAR	88	91	62	73	03	1.0	7.4	29	25	JUL 24	72	5.7	89	148	129	113	0	77	19	78	0	4	0	1017.3

Normals, Means, And Extremes

Month	Temperatures °F Normal Daily maximum	Daily minimum	Monthly	Extremes Record highest	Year	Record lowest	Year	Normal Degree days Base 65 °F Heating	Cooling	Precipitation in inches Water equivalent Normal	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)				34		34					34		34		34		34		34	
J	70.6	50.1	60.4	84	1975	23	1971	203	60	2.33	8.02	1948	T	1950	3.29	1953	0.2	1977	0.2	1977
F	71.9	51.7	61.8	88	1971	24	1958	176	87	2.86	7.95	1963	0.21	1950	3.25	1963	T	1951	T	1951
M	76.1	55.9	66.0	91	1949	29	1980	90	121	3.89	12.64	1959	0.06	1956	5.20	1960	T	1980	T	1980
A	82.4	61.6	72.0	93	1975	40	1971	9	219	2.10	6.59	1957	T	1967	3.70	1951	0.0		0.0	
M	87.5	66.9	77.2	98	1975	49	1971	0	378	2.41	17.64	1979	0.17	1973	11.84	1979	0.0		0.0	
J	89.9	72.0	81.0	98	1977	61	1972	0	480	6.49	13.75	1974	1.86	1951	5.53	1974	0.0		0.0	
J	90.1	73.7	81.9	97	1964	63	1970	0	574	8.43	20.59	1960	2.31	1962	12.11	1960	0.0		0.0	
A	90.4	74.0	82.2	98	1975	67	1973	0	533	8.00	18.59	1949	2.35	1952	5.37	1949	0.0		0.0	
S	89.0	72.6	80.8	96	1972	59	1956	0	474	6.35	13.98	1979	1.28	1972	4.67	1950	0.0		0.0	
O	83.9	65.5	74.7	94	1959	40	1964	0	301	2.54	7.36	1952	0.16	1979	2.54	1968	0.0		0.0	
N	77.1	56.4	66.8	90	1971	23	1970	71	125	1.79	6.12	1963	T	1960	4.22	1963	0.0		0.0	
D	72.0	51.2	61.6	86	1978	18	1962	169	64	2.19	6.66	1950	0.21	1956	3.28	1969	0.0		0.0	
YR	81.7	62.6	72.2	98	JUN 1977	18	DEC 1962	718	3366	49.38	20.59	JUL 1960	T	APR 1967	12.11	JUL 1960	0.2	JAN 1977	0.2	JAN 1977

Month	Relative humidity pct. Hour 01 (Local time)	Hour 07	Hour 13	Hour 19	Wind Mean speed m.p.h.	Prevailing direction	Fastest mile Speed m.p.h.	Direction	Year	Pct. of possible sunshine	Mean sky cover, tenths, sunrise to sunset	Mean number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility ¼ mile or less	Temperatures °F Max. (b) 90° and above	Max. 32° and below	Min. 32° and below	Min. 0° and below	Average station pressure mb. Elev. 11 feet m.s.l.
(a)	17	17	17	17	34	14	28	28		34	34	34	34	34	34	34	34	34	17	17	17	17	8
J	84	86	59	73	8.9	N	35	29	1959	65	5.6	9	10	12	6	0	1	6	0	0	2	0	1020.2
F	82	84	56	69	9.4	E	50	32	1954	66	5.5	9	9	10	7	0	2	3	0	0	1	0	1019.7
M	82	85	55	67	9.7	S	43	29	1956	71	5.5	10	10	11	7	0	2	3	0	0	*	0	1018.2
A	81	86	50	61	9.6	ENE	37	29	1961	75	5.0	11	11	8	5	0	3	1	1	0	0	0	1017.7
M	81	85	53	62	9.0	E	46	36	1958	75	5.3	10	12	9	7	0	6	1	8	0	0	0	1015.4
J	83	86	59	68	8.3	E	67	31	1964	67	6.2	5	14	11	11	0	14	*	16	0	0	0	1016.5
J	84	87	63	72	7.5	E	58	32	1963	62	6.8	2	16	13	16	0	21	*	20	0	0	0	1017.6
A	86	90	64	75	7.2	ENE	38	11	1961	60	6.7	3	16	12	17	0	21	*	21	0	0	0	1017.3
S	85	90	62	75	8.1	ENE	56	34	1960	60	6.5	4	14	12	13	0	12	*	15	0	0	0	1015.2
O	84	87	56	71	8.8	NNE	38	02	1953	64	5.2	11	11	9	7	0	3	1	2	0	0	0	1016.5
N	84	87	55	73	8.6	NNE	40	29	1963	65	5.0	11	10	9	5	0	1	3	*	0	*	0	1018.8
D	84	87	58	74	8.7	N	45	36	1953	62	5.5	10	10	11	7	0	1	4	0	0	1	0	1019.7
YR	83	87	57	70	[illegible]	[illegible]	67	31	JUN 1964	66	5.7	95	143	127	[illegible]	0	87	23	81	0	4	0	1017.7

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Fastest mile wind 84 in September 1935.

(a) Length of record, years, through the current year unless otherwise noted, based on January data.
(b) 70° and above at Alaskan stations.
* Less than one half.
T Trace.

NORMALS - Based on record for the 1941-1970 period.
DATE OF AN EXTREME - The most recent in cases of multiple occurrence.
PREVAILING WIND DIRECTION - Record through 1963.
WIND DIRECTION - Numerals indicate tens of degrees clockwise from true north. 00 indicates calm.
FASTEST MILE WIND - Speed is fastest observed 1-minute value when the direction is in tens of degrees.

APPENDIX A (2)

Average Temperature

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
1941	59.4	57.3	61.7	71.6	76.2	81.7	82.2	85.0	82.0	79.4	69.2	65.6	72.6
1942	58.2	56.7	64.1	70.6	77.6	81.4	84.6	83.6	82.0	75.4	69.4	64.4	72.3
1943	62.8	59.8	66.2	71.4	79.2	82.2	81.7	82.8	80.8	71.8	65.8	62.0	72.2
1944	59.5	67.6	69.1	73.6	77.4	83.1	82.6	82.8	83.1	73.7	66.5	58.8	73.1
1945	59.8	65.0	73.2	76.0	77.0	82.6	81.7	82.0	81.6	75.2	66.2	59.4	73.4
#1946	62.8	63.6	68.0	72.8	78.9	80.2	82.1	82.4	80.6	76.1	73.6	66.1	73.9
1947	69.0	54.8	62.0	76.6	77.6	80.8	80.4	81.6	79.6	76.0	68.9	64.1	72.6
1948	59.2	66.4	71.8	74.0	78.2	82.2	82.0	81.4	81.2	74.2	73.6	66.0	74.3
1949	67.2	70.0	68.0	73.4	78.8	80.6	82.4	81.4	81.0	77.9	63.6	66.0	74.2
1950	69.6	65.3	66.6	67.7	78.5	82.5	81.4	81.9	80.2	76.9	64.1	58.3	72.8
1951	61.3	60.9	67.3	69.6	77.4	82.6	82.5	84.4	82.4	76.4	64.6	66.0	73.0
1952	63.5	61.9	67.8	69.1	76.9	83.1	82.3	82.6	80.6	72.4	66.0	58.4	72.1
1953	61.3	64.0	64.9	70.4	79.2	81.2	82.1	81.1	79.8	72.5	67.0	63.8	72.7
1954	62.4	62.8	63.8	74.9	75.3	80.4	80.7	82.5	81.0	73.1	63.9	57.7	71.6
1955	58.9	67.3	66.0	72.0	76.8	78.6	80.3	81.8	80.7	73.2	65.6	61.3	71.5
1956	55.3	66.2	65.1	69.9	78.5	79.6	81.0	82.1	78.5	74.0	64.8	65.5	71.7
1957	64.8	67.4	65.6	72.7	77.4	80.3	81.8	80.9	80.5	71.8	68.6	59.3	72.6
1958	53.3	52.9	64.1	71.6	76.7	82.1	83.1	82.9	82.9	74.2	72.7	61.8	71.5
1959	59.0	69.0	64.9	71.9	76.6	81.4	82.9	82.1	81.5	79.6	67.9	61.3	73.3
1960	60.3	60.3	62.1	73.3	75.6	80.0	82.6	83.0	81.7	77.0	70.2	58.1	72.0
1961	57.7	65.0	70.4	68.6	76.7	80.9	82.9	82.7	81.8	74.4	69.8	64.2	73.0
1962	60.5	66.8	63.8	69.4	77.9	79.6	83.0	81.9	79.7	74.8	62.5	58.2	71.5
#1963	58.6	56.8	65.4	72.3	76.5	80.7	81.7	82.8	80.1	73.7	65.6	54.9	71.0
1964	58.6	57.1	68.0	74.0	76.7	81.8	82.0	81.5	79.3	70.9	67.7	63.2	71.7
1965	58.6	63.8	66.4	72.7	76.3	79.5	80.3	81.5	80.5	72.5	67.0	60.6	71.7
1966	57.0	59.9	63.1	69.2	78.5	79.2	81.7	82.5	80.6	75.3	65.1	59.2	70.9
1967	62.3	59.5	67.8	73.2	77.3	79.9	80.8	80.3	79.2	73.5	65.3	64.8	72.0
1968	59.4	54.3	60.9	72.5	75.7	79.6	80.2	82.0	79.6	73.2	62.3	57.6	69.8
1969	58.5	55.8	58.2	72.3	76.2	82.1	83.1	80.9	80.5	76.9	62.9	58.1	70.5
1970	54.0	57.6	64.9	73.2	76.2	80.1	82.8	82.9	81.9	76.1	61.9	62.4	71.2
1971	60.0	63.1	62.2	69.4	75.8	81.2	82.3	81.8	80.3	77.5	67.7	69.4	72.6
1972	67.0	60.7	66.8	71.4	76.6	81.0	81.9	82.1	81.3	76.1	64.2	65.1	73.2
1973	61.9	57.4	70.2	69.3	76.8	81.8	83.2	81.6	81.7	75.8	70.8	60.1	72.6
1974	71.1	61.1	70.9	70.9	78.2	80.1	81.1	82.8	82.8	72.9	67.9	61.9	73.5
1975	65.1	66.6	67.6	74.0	81.5	82.6	83.2	83.7	81.9	77.9	68.3	60.2	74.4
1976	56.6	63.1	70.5	70.6	76.1	79.0	81.7	81.6	79.3	71.0	62.8	59.6	71.0
1977	51.2	57.5	70.9	73.5	76.5	83.7	82.9	83.0	82.3	72.5	67.7	58.7	71.6
1978	55.0	53.2	64.2	72.3	78.7	82.4	83.0	82.8	81.4	75.1	71.7	66.2	72.2
1979	57.8	59.3	65.4	74.2	75.9	80.8	83.9	82.2	81.9	75.2	68.7	63.0	72.3
1980	62.0	56.6	68.1	70.1	77.2	81.6	84.0	83.0	81.3	74.0	66.4	57.5	71.8
RECORD MEAN	60.9	62.0	66.7	71.5	77.0	80.7	81.8	82.0	80.6	74.6	67.1	61.9	72.2
MAX	70.2	71.4	76.1	81.1	86.3	89.1	89.6	89.9	88.5	83.2	76.4	71.3	81.1
MIN	53.5	52.6	57.3	61.9	67.6	72.2	74.0	74.1	72.6	66.0	57.7	52.5	63.3

Heating Degree Days

TAMPA, FL

Season	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Total
1960-61	0	0	0	0	16	280	231	52	22	15	0	0	616
1961-62	0	0	0	5	15	137	175	55	126	19	0	0	532
1962-63	0	0	0	2	98	240	212	229	37	2	0	0	820
#1963-64	0	0	0	14	75	316	216	227	37	4	0	0	889
1964-65	0	0	0	22	24	114	204	96	84	2	0	0	546
1965-66	0	0	0	5	37	160	267	172	93	18	0	0	752
1966-67	0	0	0	7	85	198	129	175	23	0	0	0	617
1967-68	0	0	0	0	69	95	193	306	157	0	0	0	820
1968-69	0	0	0	27	138	264	201	257	220	0	0	0	1107
1969-70	0	0	0	0	111	218	343	204	81	0	0	0	962
1970-71	0	0	0	0	145	115	201	134	139	36	0	0	770
1971-72	0	0	0	0	41	13	62	139	26	5	0	0	286
1972-73	0	0	0	0	65	132	166	223	18	21	0	0	625
1973-74	0	0	0	6	24	200	0	159	17	12	0	0	418
1974-75	0	0	0	0	39	138	84	64	61	5	0	0	391
1975-76	0	0	0	0	88	183	268	109	18	2	0	0	668
1976-77	0	0	0	11	122	209	422	214	28	6	0	0	1012
1977-78	0	0	0	18	53	222	370	273	99	4	0	0	1039
1978-79	0	0	0	0	2	75	245	190	53	0	0	0	565
1979-80	0	0	0	0	47	112	136	262	64	8	0	0	629
1980-81	0	0	0	1	65	233							

Cooling Degree Days

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1969	8	2	14	224	353	521	568	498	471	377	55	10	3101
1970	12	10	85	255	352	464	557	563	514	353	56	40	3261
1971	54	86	58	174	342	490	541	526	465	396	126	155	3413
1972	131	20	90	204	365	487	528	536	497	352	166	141	3517
1973	75	15	188	158	374	510	574	529	510	348	205	55	3541
1974	196	55	224	197	413	460	506	562	540	250	130	48	3581
1975	93	115	151	267	521	536	572	565	512	407	191	39	4034
1976	17	63	199	175	346	424	525	517	445	202	63	45	3018
1977	2	9	218	210	364	567	559	565	526	258	139	36	3453
1978	18	0	79	232	431	529	565	557	500	319	208	121	3559
1979	26	36	73	283	344	482	592	543	515	322	164	55	3437
1980	45	22	164	165	388	506	596	564	493	284	115	7	3349

Precipitation

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
1941	3.54	3.61	4.40	5.19	0.16	7.06	5.89	3.87	6.40	2.34	4.75	7.04	54.25
1942	3.21	3.52	5.68	1.64	1.23	6.80	5.28	4.34	3.93	0.03	0.10	2.40	38.66
1943	0.35	1.24	3.75	0.75	2.05	12.54	10.80	6.35	5.07	1.04	0.59	0.36	44.89
1944	1.84	0.56	3.78	0.81	3.20	6.20	4.04	5.49	2.38	5.67	0.70	0.20	34.87
1945	4.05	0.75	0.20	1.55	0.42	18.52	12.23	12.28	8.79	4.01	0.75	3.70	66.65
#1946	2.32	5.76	2.28	0.37	3.55	11.41	13.66	6.50	7.88	4.86	0.42	0.09	59.12
1947	1.12	4.02	6.98	3.54	1.19	6.15	11.10	11.59	13.04	3.54	2.49	1.19	65.95
1948	8.02	1.00	3.37	4.28	0.51	5.07	8.33	6.43	3.36	1.02	1.57	1.63	46.59
1949	0.18	0.34	0.22	2.70	1.52	7.59	3.97	18.59	10.47	1.32	1.04	0.30	48.24
1950	T	0.21	3.83	2.13	1.91	6.81	13.77	8.04	9.79	2.84	0.23	6.66	56.22
1951	0.54	2.06	1.99	5.19	1.83	1.86	6.72	7.37	9.60	0.84	3.68	2.15	43.83
1952	0.89	3.74	8.49	1.25	2.07	2.83	10.70	2.35	5.26	7.36	1.73	0.70	45.37
1953	4.04	3.51	3.75	2.95	0.47	7.90	6.80	5.33	11.56	1.70	4.89	4.28	57.18
1954	0.99	1.58	2.01	2.48	5.90	4.57	6.73	4.73	6.35	0.63	5.38	1.85	43.20
1955	2.59	2.73	2.65	1.23	0.72	2.55	11.90	9.57	8.82	3.23	2.15	0.67	48.81
1956	2.02	1.37	0.06	2.04	2.15	2.86	3.69	6.60	3.90	3.50	0.45	0.21	28.89
1957	7.53	3.25	6.98	6.59	7.21	11.11	10.61	11.74	5.95	2.28	1.44	1.74	70.43
1958	5.41	4.17	5.21	3.61	3.15	5.78	4.83	9.59	6.75	3.38	1.99	4.16	54.03
1959	3.66	2.36	12.64	5.48	7.55	9.73	7.29	10.44	8.49	6.26	1.02	2.25	76.57
1960	1.32	3.70	11.00	1.66	1.07	6.36	20.59	7.72	8.17	2.28	T	1.57	65.44
1961	1.45	3.81	2.23	1.44	2.14	2.64	7.69	6.22	2.43	0.25	0.94	3.80	35.04
1962	1.40	1.46	4.26	1.43	2.76	6.34	2.31	10.14	7.57	1.28	2.21	0.46	41.62
1963	2.25	7.95	2.31	0.21	1.56	4.34	8.11	4.10	3.87	0.29	6.12	2.31	43.42
1964	5.08	5.37	3.92	0.53	3.58	6.64	9.75	10.73	5.89	2.86	0.38	3.19	57.92
1965	1.56	2.57	2.28	1.10	0.67	7.30	9.70	5.59	7.36	1.43	0.82	2.34	42.78
1966	4.05	3.08	1.16	1.57	0.71	6.44	7.62	4.75	4.12	1.22	0.39	0.94	36.05
1967	1.32	4.30	0.66	T	0.63	4.70	10.30	10.34	2.20	2.42	0.45	2.04	39.36
1968	0.41	1.52	1.23	0.74	2.08	6.72	8.39	6.79	3.58	4.16	3.14	0.59	39.35
1969	1.78	2.11	5.33	0.05	6.23	4.39	7.39	11.88	4.09	3.12	2.68	5.17	54.22
1970	3.10	4.02	6.12	0.49	4.12	2.05	2.77	8.43	3.45	0.89	1.08	1.25	38.27
1971	0.86	4.25	0.54	1.80	4.09	2.54	7.74	7.46	10.16	4.70	1.40	0.79	46.33
1972	0.54	4.44	3.01	0.38	1.68	5.24	6.65	9.76	1.78	3.29	3.53	2.16	42.16
1973	3.75	2.54	4.21	2.42	0.17	4.19	4.77	9.43	8.91	0.98	2.62	5.52	49.71
1974	0.17	0.89	2.35	0.38	1.11	13.75	3.43	4.67	4.00	0.23	0.12	2.80	33.90
1975	0.91	1.56	1.09	0.91	2.07	8.73	6.65	4.24	11.25	4.44	0.22	0.87	43.44
1976	0.40	0.49	1.64	1.83	8.13	7.22	4.59	7.02	6.04	1.30	1.59	2.05	42.29
1977	2.75	2.41	0.73	0.86	0.73	2.66	5.36	5.98	4.28	0.42	1.89	3.40	31.47
1978	2.82	5.17	2.44	0.94	5.00	2.03	5.89	5.07	3.04	1.42	0.01	3.12	39.85
1979	5.72	2.87	2.43	0.55	17.64	2.07	5.93	12.76	13.98	0.16	0.83	1.52	66.46
1980	1.72	2.01	3.09	4.38	3.94	3.81	5.66	7.62	4.05	1.27	2.68	0.37	40.60
RECORD MEAN	2.26	2.77	2.93	2.08	3.12	6.90	7.80	8.01	6.52	2.66	1.61	2.05	48.71

Snowfall

Season	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Total
1970-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972-73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-77	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
1977-78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	T
1980-81	0.0	0.0	0.0	0.0	0.0	0.0							
RECORD MEAN	0.0	0.0	0.0	0.0	0.0	0.0	T	T	T	0.0	0.0	0.0	T

# Indicates a station move or relocation of instruments. See Station Location table.

Record mean values above are means through the current year for the period beginning in 1890 for temperature and precipitation, 1947 for snowfall. Data are from City Office locations through 1940.

STATION LOCATION

TAMPA, FLORIDA

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above Sea level: Ground at temperature site	Ground: Wind instruments	Extreme thermometers	Psychrometer	Sunshine Switch	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Automatic Observing Equipment *	Remarks
CITY																
Allen Building 508 Franklin Street	4/1/90	4/15/92		27° 57'	82° 27'	19	52	45	45				36			T. B. gage in use beginning 7/23/01.
Knight Building 315 1/4 Franklin	4/16/92	9/30/04	2 blocks E	27° 57'	82° 27'	19	67	61	60		52	1	52			
Post Office Building 611 Florida Avenue	10/1/04	12/31/40	2 blocks NE	27° 57'	82° 27'	23	**96	*** 79	*** 79		**** 71					Separate WBAS established 12/23/38 at Peter O. Knight Airport. Raised to 83 on 7/30/31. **Lowered to 93 on 12/26/16. Lowered to 87 on 12/11/22. Raised to 197 on 12/30/29. ***Raised to 88 on 8/1/31. **** Raised to 79 on 7/1/31.
AIRPORT																
Administration Building Peter O. Knight Airport 2.5 miles south of Tampa Post Office	12/23/38	6/5/46		27° 55'	82° 27'	6	*61	**5	**5		3					WBAS and WBO consolidated at Peter O. Knight Airport 1/1/41. *Lowered to 43 on 4/19/41. **Raised to 6 on 4/19/41.
Administration Building Tampa International Airport	6/6/46	8/24/52	6 miles NW	27° 58'	82° 32'	24	36	5	5		3			b		
Airline Terminal Bldg. Tampa International Airport	8/25/52	10/1/75	3/8 mi. SW	27° 58'	82° 32'	19	c22	5	5		#22	%22		b5		# - 3 feet to 7/21/60. % - Added 7/15/58. Elevation 3 feet to 10/12/62 and 23 feet to 3/13/63. b - Telepsychrometer (4') 8/24/52-10/26/63. Hygro. comm. 10/25/63, 4000' WNW of Telepsychrometer site. c - 56 feet to 3/1/65.
2222 N. Westshore Blvd. Tampa International Airport	10/1/75	Present	1/2 mi. S	27° 58'	82° 32'	19	e22	NA	5	5	5	NA	3	e5	NA	e - Same site as prior to 10/1/75.

* Type
M = AMOS
T = AUTOB

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I certify that this is an official publication of the National Oceanic and Atmospheric Administration, and is compiled from records on file at the National Climatic Center, Asheville, North Carolina 28801.

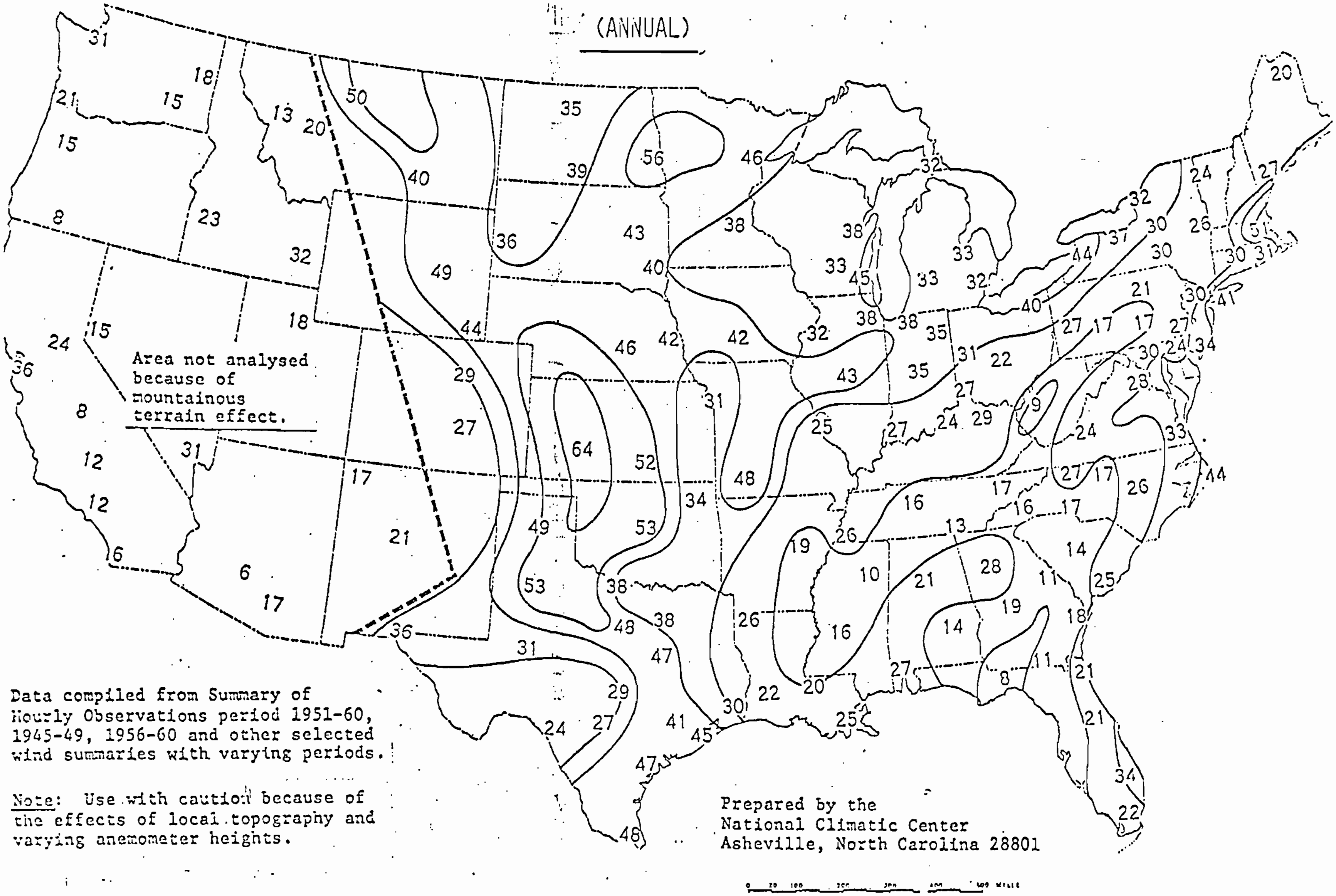
Daniel B. Mitchell
Director, National Climatic Center

USCOMM-NOAA-ASHEVILLE - 1350

APPENDIX A (4)

PERCENTAGE FREQUENCY OF WIND SPEEDS GREATER THAN 12 MILES PER HOUR

(ANNUAL)



Data compiled from Summary of Hourly Observations period 1951-60, 1945-49, 1956-60 and other selected wind summaries with varying periods.

Note: Use with caution because of the effects of local topography and varying anemometer heights.

Prepared by the
National Climatic Center
Asheville, North Carolina 28801

TABLE 6-1. MATERIALS HANDLING DUST CONTROLS

Control method	Estimated control efficiency (%)	Initial cost (1977 $)	Annual operating cost (1977 $)
Option A: Enclosures			
Railcar unloading station	99[a/]	100,000	NA
Covering conveyor	70 to 99[b/]	35 to 70/ft of conveyor[b/]	NA
Enclosing conveyor transfer station	70 to 99[c/]	3,000 to 18,000[c/]	NA
Option B: Spray systems			
Railcar unloading station	80	30,000	NA
Conveyor transfer station	70 to 95	15,000 to 200,000[d/]	0.02 to 0.04/ton material treated[e/]

NA = Not available.

a/ Utilizes high efficiency bag filter.

b/ Low value utilizes "weather tight" system; high value utilizes dust collection system.

c/ Low value simple enclosure; high value enclosure plus bag filter.

d/ Low value reflects control at one transfer station; high value reflects total cost for a multiple system handling 2.2×10^6 tons of material per year.

e/ Wetting agent cost applies only to the $15,000 single transfer station control system.

BEST AVAILABLE COPY

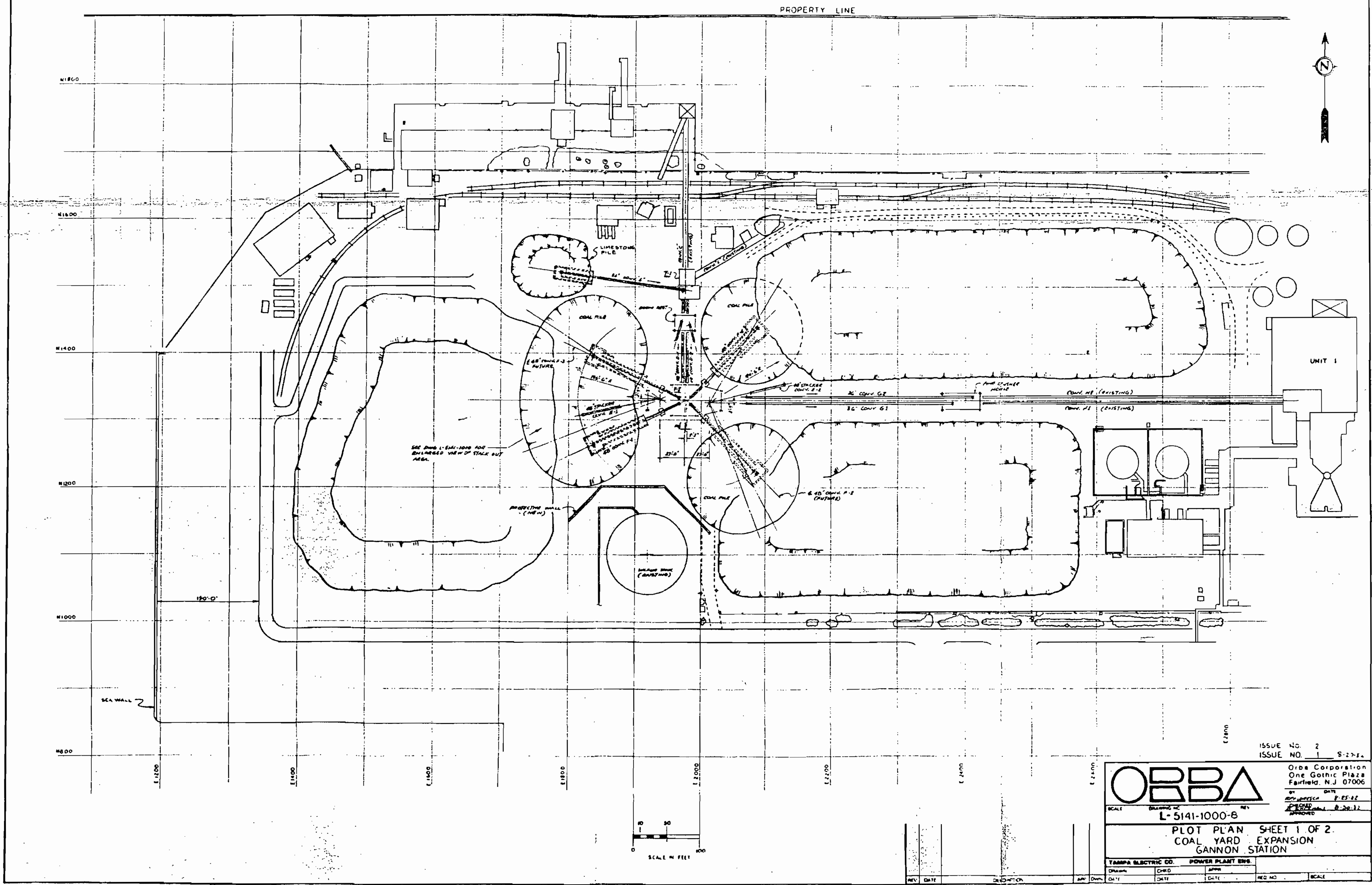


Figure 3

TABLE 6-2. STORAGE PILE ACTIVITY DUST CONTROLS

Control method	Estimated control efficiency (%)	Initial cost (1977 $)	Annual operating cost (1977 $)
Load-in			
Option A: Reduce drop distance			
Stacker - height adjustable	25	100,000 to 5,300,000	NA
Telescopic chutes	75	7,000	NA
Option B: Enclosures			
Stone ladders	80	20,000	NA
Wind guards	50	10,000 to 50,000	NA
Option C: Spray systems			
Stacker - sprays	75	60,000+	NA
Vehicular traffic around storage piles (see Table 6-4)			
Wind erosion from storage piles			
Option A: Surface stabilization			
Regular watering	80[a/]	11,000	NA
Surface crusting agents	up to 99[b/]	11,000+	0.004 to 0.1/sq ft
Option B: Enclosures			
Storage silos	100	60/ton material stored	NA
Vegetative wind breaks	30	35 to 350/tree[c/]	NA
Low pile height	30	NA	NA
Load-out			
Option A: Reduce material disturbance			
Gravity-feed-plow reclaimer	85	35 to 60/ton material stored	NA
Rake reclaimer	85	NA	NA
Bucket wheel reclaimer	80	2.2 to 5.3 x 10^6 [d/]	NA
Option B: Spray systems			
Bucket wheel reclaimer sprays	95	60,000+	NA

a/ Based on a wind-activated sprinkler system.

b/ Based on measured data, see Appendix C.

c/ Low value 8-ft trees; high value 25-ft trees.

d/ Based on a mobile stacker/reclaimer system.

APPENDIX C (2)

TAMPA ELECTRIC
A TECO ENERGY COMPANY

DER
OCT 11 1982
BAQM

RECEIVED
OCT 7 1982
H.C.E.P.C.

D.E.R.
OCT 7 1982
SOUTHWEST DISTRICT
TAMPA

September 30, 1982

TO WHOM IT MAY CONCERN:

Please be advised that John B. Ramil, Manager of Environmental Planning, is the authorized representative of Tampa Electric Company concerning matters with which this permit application deals.

Very truly yours,

Alex Kaiser

Alex Kaiser
Vice President
Energy Supply

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601 (813) 228-4111

State of Florida

IN GOD WE TRUST

Department of State

I certify from the records of this office that TAMPA ELECTRIC COMPANY, is a corporation organized under the laws of the State of Florida, filed on April 18, 1949.

The Charter Number for this corporation is 157782.

I further certify that said corporation has filed all annual reports and paid all annual report filing fees due this office through December 31, 1981, and its status is active.

Given under my hand and the
Great Seal of the State of Florida,
at Tallahassee, the Capital, this the
24th day of June, 1981.

George Firestone

George Firestone
Secretary of State

GREAT SEAL OF THE STATE OF FLORIDA
IN GOD WE TRUST

CER 101 Rev. 12-80

AC 29-61276

DER

OCT 11 1982

BAQM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

D.E.R.

OCT 21 1982

SOUTHWEST DISTRICT
TAMPA

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Tampa Electric Company COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Gannon Station Coal Storage Facility Modification

SOURCE LOCATION: Street Port Sutton Road City Tampa

UTM: East 360,000 North 3,087,500

Latitude 27 ° 54 ' 25 "N Longitude 82 ° 25 ' 21 "W

APPLICANT NAME AND TITLE: Tampa Electric Company

APPLICANT ADDRESS: P.O. Box 111, Tampa, FL 33601 Attn: Environmental Planning

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Tampa Electric Company

I certify that the statements made in this application for a Modification to existing permits permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: John B. Ramil

John B. Ramil, P.E., Manager, Environmental Planning
Name and Title (Please Type)

Date: 10-6-82 Telephone No. (813) 228-4111

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: Lynn F. Robinson

Lynn F. Robinson, P.E.
Name (Please Type)

(Affix Seal)

Tampa Electric Company
Company Name (Please Type)

P. O. Box 111, Tampa, FL 33601
Mailing Address (Please Type)

Florida Registration No. 20786 Date: 10/6/82 Telephone No. (813) 228-4111

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Modification to Gannon coal handling system to serve reconverted Units 1 through 4.

See Attachment A for additional information

B. Schedule of project covered in this application (Construction Permit Application Only) See detailed schedule, Attach. E

Start of Construction March 1983 Completion of Construction June 1984

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Conveyor and transfer point enclosures: $239,550

Cyclone Dust Collectors: $71,865

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates. Units 1-4 reconversion permits:

	Issued	Expires
DER Permit AC29-41943	8/7/81	3/15/87
DER Permit AC29-41942	8/7/81	3/15/86
DER Permit AC29-41941	8/7/81	1/15/85
DER Permit AC29-41940	8/7/81	2/15/84

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24; days/wk 7; wks/yr 52; if power plant, hrs/yr ____;

if seasonal, describe:

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
   a. If yes, has "offset" been applied? No
   b. If yes, has "Lowest Achievable Emission Rate" been applied? No*
   c. If yes, list non-attainment pollutants.
      Particulate
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

* See attachment "Emission Analysis of Coal Handling Modifications at the Gannon Coal Yard" and Attachment C

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: Not Applicable

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) Not Applicable

1. Total Process Input Rate (lbs/hr): ____________________

2. Product Weight (lbs/hr): ____________________

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Particulate	Not Applicable	59.81*	See Attachment D	Not Applicable	Not Applicable	279.20	Fig. 1

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Enclosed Transfers	Particulate	70%	Not Applicable	See
Enclosed Conveyor	Particulate	40-50%	Not Applicable	Attached
Cyclones	Particulate	95%	1 and above	Emission
				Analysis

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard

[4] Emission, if source operated without control (See Section V, Item 3)

[5] If Applicable

* Existing Emissions - 39.41 Tons/year
Proposed Emissions - 59.81 Tons/year
Incremental Emission - 20.40 Tons/year
See Emissions Analysis.

E. Fuels Not Applicable

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Not Applicable Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal. Not Applicable

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack): Not Applicable

Stack Height: ______ ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (^oF)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

Gas Flow Rate: ______________ ACFM ______________ DSCFM* Velocity ______________ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. See Emission Analysis
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). See Emission Analysis
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). See Figure 4
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). See Emission Analysis
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. See Figure 1
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). See Figure 2
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. See Figure 3

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

Not Applicable

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power — KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*: 3. Capital Cost:

4. Life: 5. Operating Cost:

6. Energy: 7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

Not Applicable

A. Company Monitored Data

1. ____________ no sites ____________ TSP ____________ ( ) SO^2* ____________ Wind spd/dir

Period of monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded ____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? _____ Yes _____ No

b) Was instrumentation calibrated in accordance with Department procedures? _____ Yes _____ No _____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location) ____

3. Upper air (mixing height) data obtained from (location) ____

4. Stability wind rose (STAR) data obtained from (location) ____

C. Computer Models Used

1. ____ Modified? If yes, attach description.

2. ____ Modified? If yes, attach description.

3. ____ Modified? If yes, attach description.

4. ____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	____________ grams/sec
SO^2	____________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

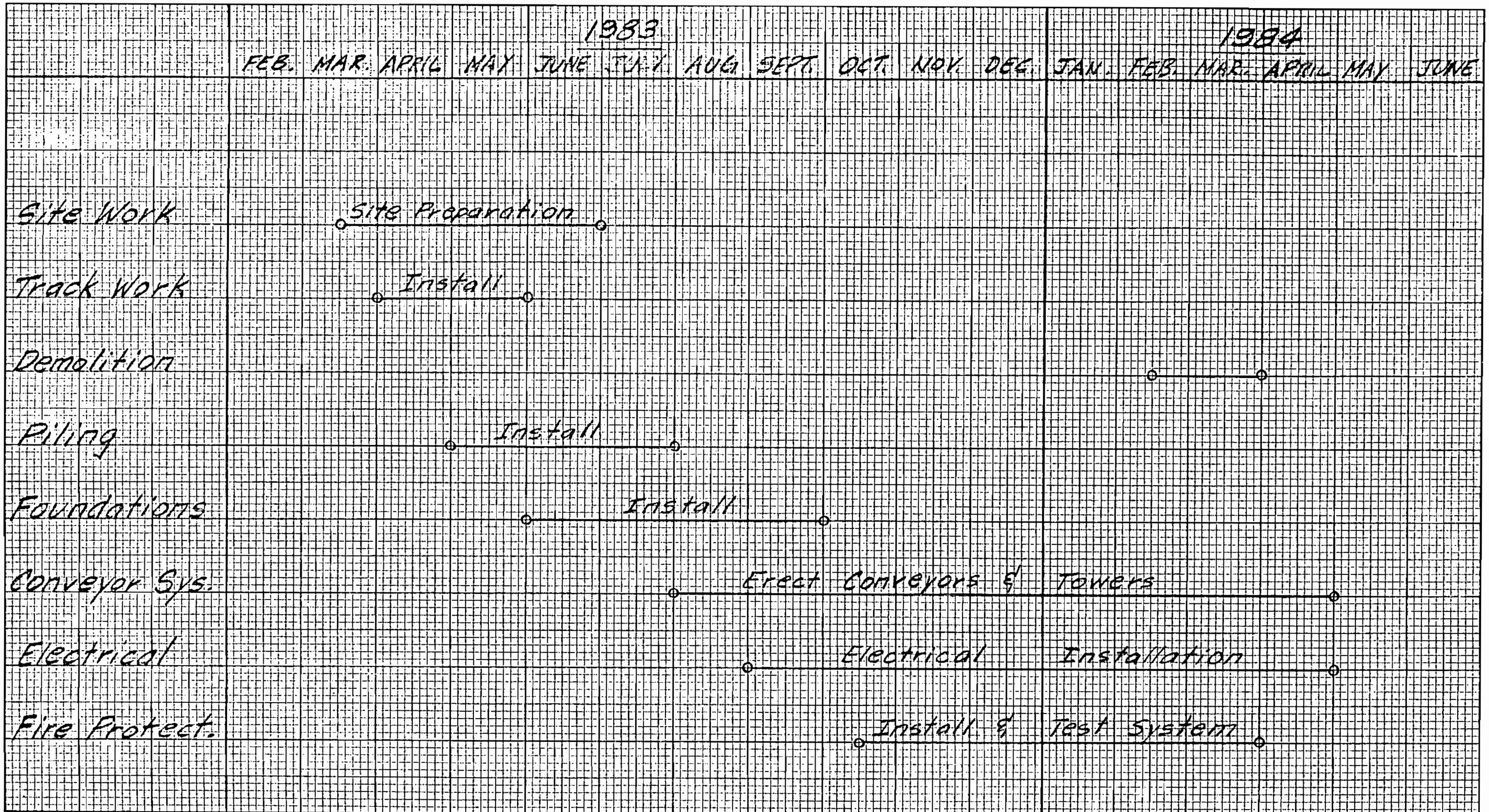
ATTACHMENT A

Section II.A.

The source is a coal storage facility that supplies the F.J. Gannon Power Plant. Presently only Units 5 and 6 are being served by the coal yard. It is proposed that the source be modified to also supply Gannon Units 1, 2, 3, and 4 after reconversion from oil to coal.

The modification is required to allow for efficient stockpiling and reclaiming of the various sulfur content coals, this will provide the flexibility necessary for blending the coals to achieve the required sulfur content and heating values. A limestone stockpile is also proposed to allow for fluxing of the boilers.

Enclosed conveyors, enclosed transfer points and cyclone dust collectors will be utilized to control emissions.



COAL YARD EXPANSION
GANNON STATION

CONSTRUCTION SCHEDULE

Attachment B

ATTACHMENT C

Section II G b

The modifications to the coal yard are not expected to produce a "Significant Net Emission Increase" in particulates. Thus, pursuant to Florida Administrative Code 17-2.510(2)(d)4a, Preconstruction Review Requirements, including "Lowest Achievable Emission Rate", are not applicable.

ATTACHMENT D

Section III C

Per Section 17-2.650(2)(C)11 b

- Visible emissions: 5% except 10% when material is being discharged into hold of ship.

- Vented emissions: 0.03 gr/dscf
  (eg: cyclones)

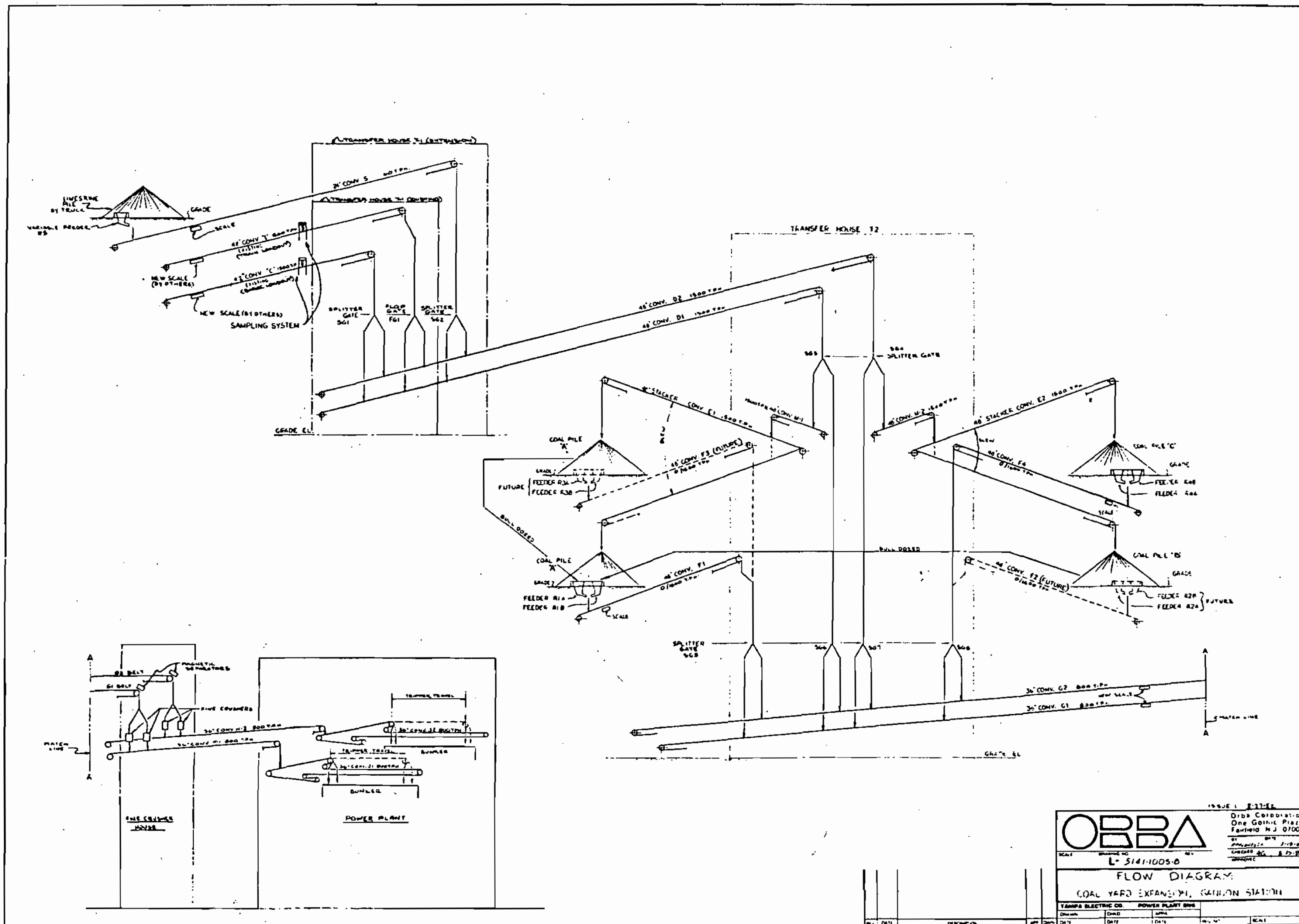

TRANSFER HOUSE T2
SAMPLING SYSTEM
COAL PILE "A"
COAL PILE "C"
COAL PILE "B"
BULL DOZED
GRADE EL
FINE CRUSHER HOUSE
POWER PLANT
BUNKER
FLOW DIAGRAM
COAL YARD EXPANSION, GANNON STATION
TAMPA ELECTRIC CO.

Figure 1

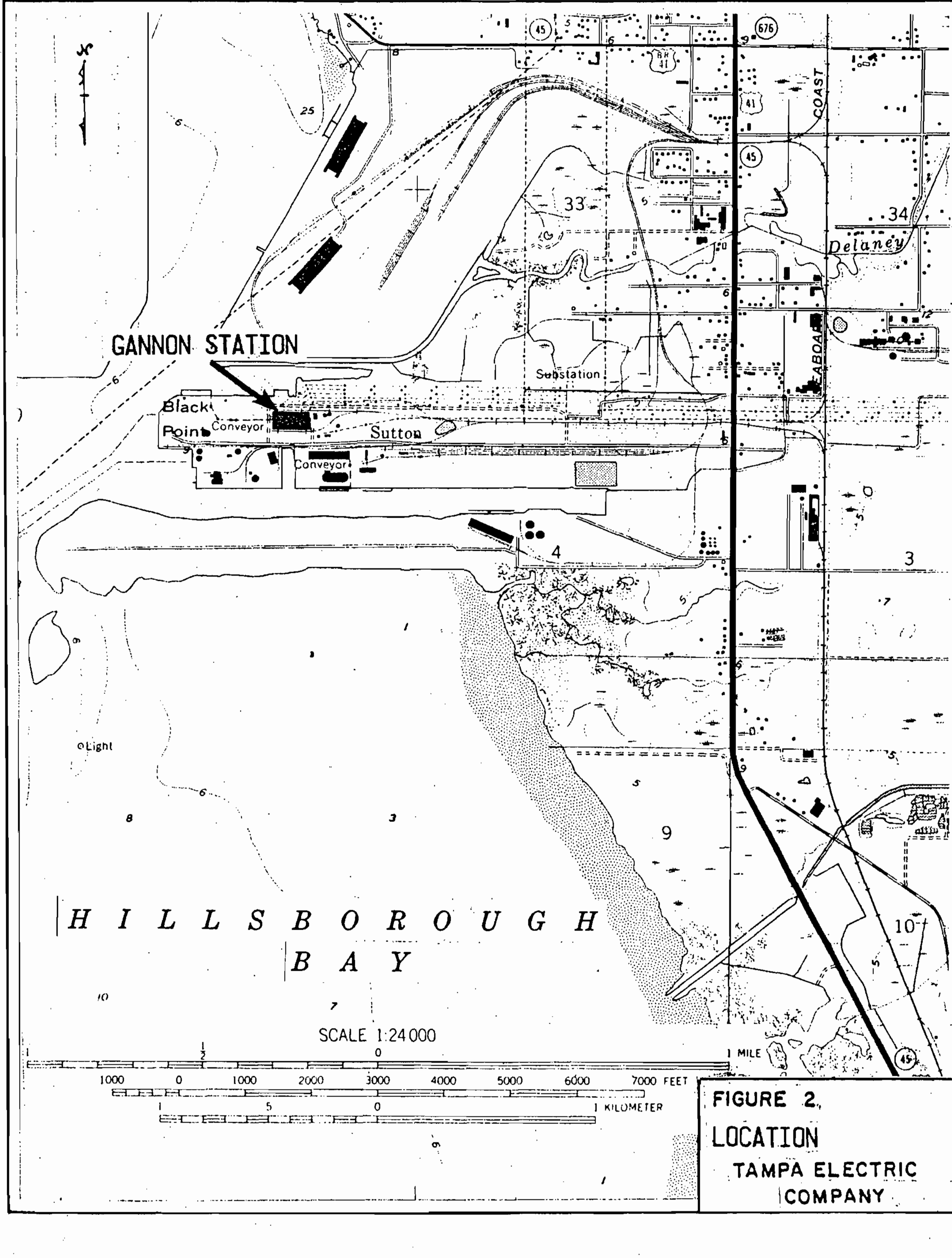


FIGURE 2.
LOCATION
TAMPA ELECTRIC COMPANY

BEST AVAILABLE COPY

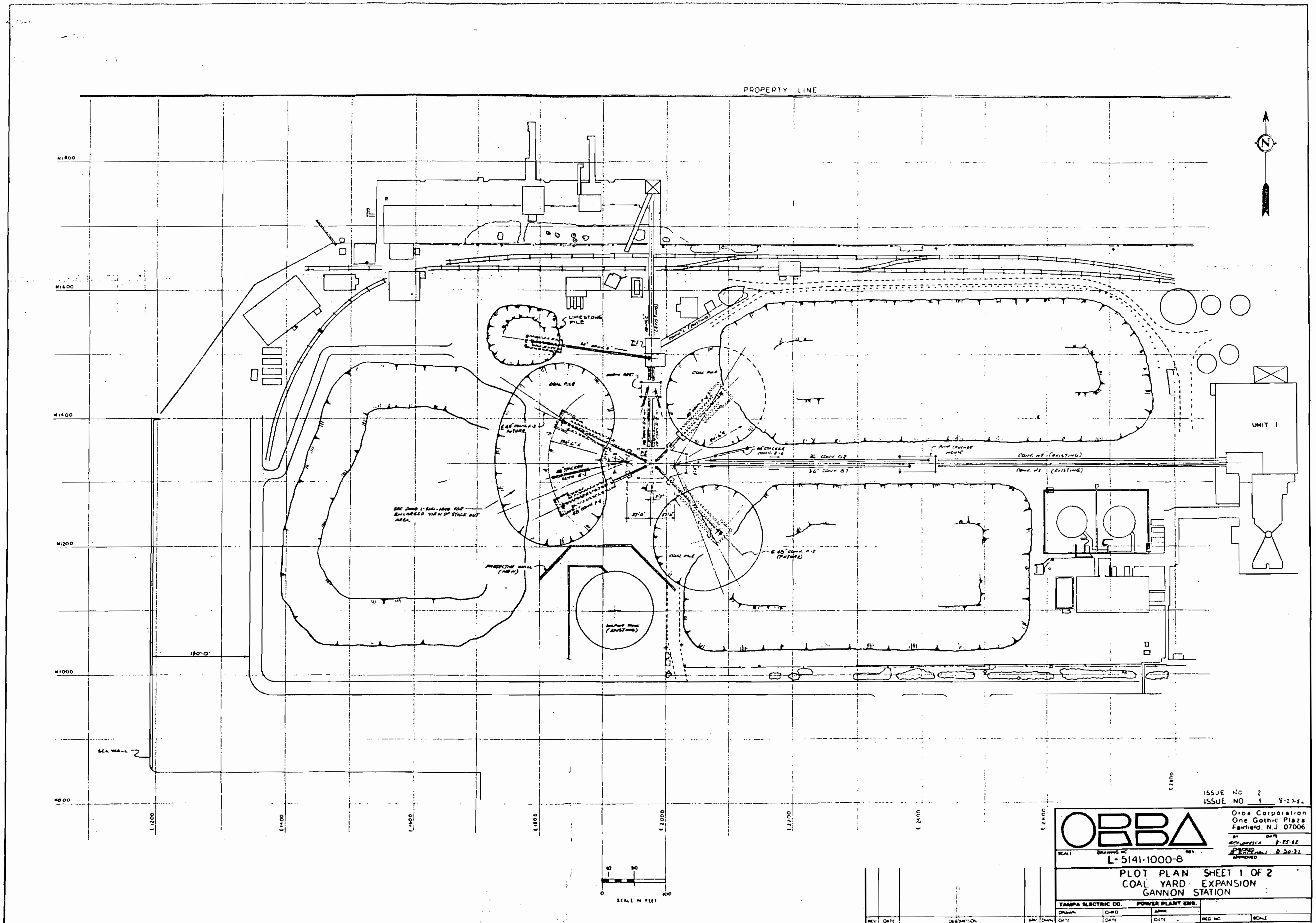


Figure 3

TYPE D ROTO-CLONE

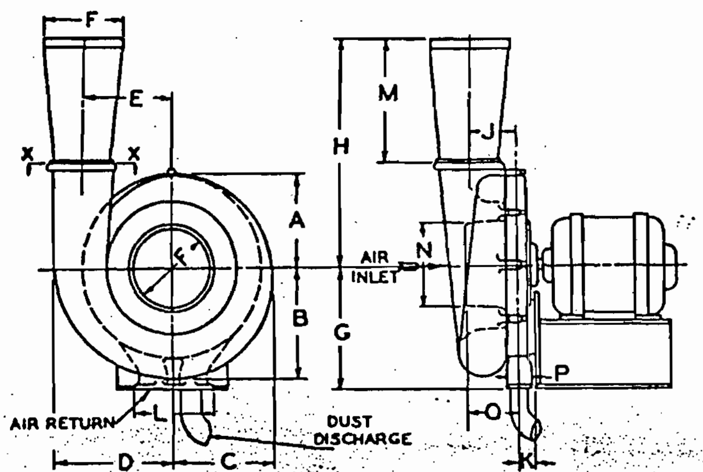


FIG. 1 — Roto-Clone, Direct Driven
Sizes 3 thru 12

Proposed Size

**ROTO-CLONE DIMENSIONS IN INCHES
DIRECT DRIVEN AND BELT DRIVEN**

Size	3	3 1/2	4	5	6	7	8	10	12	14	16	20	24
A	4 3/16	5 5/8	5 5/8	5 15/16	8 5/8	9 11/16	11 1/16	11 5/8	16 5/8	19 5/16	21 13/16	22 3/16	32 5/8
B	5 1/16	6 5/8	6 5/8	7 1/8	9 13/16	11 5/8	13	13 3/4	19 7/16	22 7/16	25 13/16	27 1/8	38 5/8
C	4 11/16	6 3/16	6 3/16	6 5/16	9 1/8	10 9/16	12 1/8	12 11/16	18 1/16	20 7/8	24 1/16	25 1/8	35 7/8
D	5 3/16	7	7	7 7/16	10 5/8	12 1/8	13 13/16	14 1/2	20 5/8	24	27 7/16	28 13/16	41
E	4 1/8	5 1/2	5 1/2	5 11/16	8 1/4	9 5/8	11	11 3/16	16 1/2	19 1/4	22	22 5/8	33
F	3	3 1/2	4	5	6	7	8	10	12	14	16	20	24
G	6 1/8	7 11/16	7 11/16	7 11/16	11 1/2	13 3/4	15 1/4	15 1/4	22 3/4	27	30 1/2	30 1/2	45
H	10 5/8	13	13	14	18 3/4	21 3/4	24 1/2	28	36 1/4	42	46 3/4	52 3/4	70 3/4
J	2 1/4	2 11/16	2 11/16	2 7/8	3 13/16	4 13/16	5 1/8	5 7/8	7 3/4	9 1/8	10 5/8	11 5/8	14 7/8
K	1 5/16	1 3/16	1 3/16	1 3/16	2	1 3/4	1 13/16	1 13/16	3 1/2	3 7/8	4 5/16	4 3/16	6 3/16
L	5	5 1/2	5 1/2	5 1/2	6 3/4	9 1/2	10	10	14	17 1/4	18 1/2	18 1/2	30
M	6 1/4	7	7	8	10	11 1/2	13	16	19	22	24	30	36 1/4
N	3 1/2	4	4 1/2	5 1/2	6 1/2	7 5/8	8 5/8	10 5/8	12 3/4	14 3/4	16 7/8	20 7/8	25
O	2 3/8	2 3/4	2 3/4	2 15/16	4	4 3/4	5 1/8	6 5/16	7 5/16	9 5/16	10 1/4	12 1/8	10 5/8
P	2	1 5/8	1 1/4	1 5/8	3 3/4	3 5/8	3 1/4	3 1/4	4 1/2	5 3/4	6	6	14 5/8

Figure 4

TAMPA ELECTRIC
A TECO ENERGY COMPANY

DER
OCT 11 1982
BAQM

RECEIVED
OCT 7 1982
H.C.E.P.C.

D.E.R.
OCT 7 1982
SOUTHWEST DISTRICT
TAMPA

September 30, 1982

TO WHOM IT MAY CONCERN:

Please be advised that John B. Ramil, Manager of Environmental Planning, is the authorized representative of Tampa Electric Company concerning matters with which this permit application deals.

Very truly yours,

Alex Kaiser

Alex Kaiser
Vice President
Energy Supply

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601 (813) 228-4111

State of Florida

Department of State

I certify from the records of this office that TAMPA ELECTRIC COMPANY, is a corporation organized under the laws of the State of Florida, filed on April 18, 1949.

The Charter Number for this corporation is 157782.

I further certify that said corporation has filed all annual reports and paid all annual report filing fees due this office through December 31, 1981, and its status is active.

Given under my hand and the
Great Seal of the State of Florida,
at Tallahassee, the Capital, this the
24th day of June, 1981.

George Firestone
Secretary of State

CER 101 Rev. 12-80

TAMPA ELECTRIC
A TECO ENERGY COMPANY

RECEIVED
OCT 7 1982
H.C.E.P.C.

D.E.R.
OCT 7 1982
SOUTHWEST DISTRICT
TAMPA

October 4, 1982

Mr. Roger P. Stewart
Hillsborough County Environmental
Protection Commission
1900 - 9th Avenue
Tampa, Fl 33605

Mr. William K. Hennessey
Florida Department of Environmental
Regulation
7601 Highway 301 North
Tampa, FL 33610

DER
OCT 11 1982
BAQM

Re: Modification to Air Construction Permits,
Gannon Coal Yard
Tampa Electric Company

Gentlemen:

Enclosed please find an original and four (4) copies of Modification to Permit Application for the F.J. Gannon Coal Yard Facility.

Also, enclosed please find a Certificate of Good Standing and an authorization letter for the applicant. The application, together with a check for $50.00 to the Hillsborough County Board of County Commissioners and a check for $500.00 to the Florida Department of Environmental Regulation, are included with Mr. Stewart's copy.

The application has been designated to be for a modification to existing construction permits for Gannon Units 1 through 4. Permit modifications to accommodate the coal yard construction are requested.

If you have any questions, please call.

Sincerely,

John B. Ramil

John B. Ramil, P.E.
Manager
Environmental Planning

JRB:sb

cc: Mr. Dan Williams

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601 (813) 228-4111

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

JACOB D. VARN
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

October 23, 1980

Joe Griffiths
Air Engineering Department
Hillsborough County Environmental
Protection Commission
1900 9th Avenue
Tampa, Florida 33605

Dear Joe:

The following information is provided in response to the concern you raised in your letter of September 17, 1980, regarding the reconversion of Gannon Units 1-4.

1. On the subject of weekly versus daily fuel analysis, we are accepting TECO's revised sulfur variability statistics which indicate that, if 2.4 lb/MMBTU is met on a weekly average, the 24-hour average will not exceed 2.58 lb/MMBTU. We are also asking for annual verification of these statistics. Since emissions at the rate of 2.58 lb/MMBTU result in modeled violations of the 24-hour ambient standard at loads above about 80% of plant capacity, we are requiring a pre-daily fuel analysis whenever peak load is forcast to exceed this level. At these higher loads, the implied 24-hour average emission limit is roughly:

   3.37 - (load factor), #/MMBTU

   where the load factor varies from 0.79 to 1. According to TECO's studies, the 3-hour average emission rate will not vary significantly from the 24-hour average rate.

2. We are satisfied that fuel analysis will provide an acceptable means of demonstrating compliance with the emission limits and emissions cap. This is not to say we are opposed to continuous monitoring, however, If you feel strongly about this issue, we suggest you bring it up again at the hearing.

3. The purpose of the 10.6 ton/hour cap is to ensure that no increase in total allowable SO_2 emissions takes place. Since compliance with the current allowable emission limit is demonstrated on a weekly basis, we believe that compliance with the cap should also be demonstrated on a weekly basis.

If you would like to discuss these or any other items further, please call.

Sincerely,

Steve Smallwood

Steve Smallwood, P.E.
Chief, Bureau of Air Quality Management

SS:caa

cc: Dan Williams
Clair Fancy
Larry George
Walt Starnes
Mary Clark

Check Sheet

Company Name: Tampa Electric Company
Permit Number: AC29-061276
PSD Number:
Permit Engineer:

Application:

- ☑ Initial Application
  - ☐ Incompleteness Letters
  - ☐ Responses
  - ☑ Waiver of Department Action
  - ☐ Department Response
  - ☐ Other

Cross References:

- ☐
- ☐
- ☐

Intent:

- ☑ Intent to Issue
- ☑ Notice of Intent to Issue
- ☑ Technical Evaluation
- ☑ BACT or LAER Determination
- ☑ Unsigned Permit
- Correspondence with:
  - ☐ EPA
  - ☐ Park Services
  - ☐ Other
- ☑ Proof of Publication
  - ☐ Petitions - (Related to extensions, hearings, etc.)
  - ☐ Waiver of Department Action
  - ☐ Other

Final

Determination:

- ☑ Final Determination
- ☑ Signed Permit
- ☐ BACT or LAER Determination
  - ☐ Other

Post Permit Correspondence:

- ☐ Extensions/Amendments/Modifications
- ☐ Other

TAMPA ELECTRIC
A TECO ENERGY COMPANY

File Tampa has this -

RECEIVED
SEP 25 1995
Bureau of
Air Regulation

September 21, 1995

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

Re: Tampa Electric Company
Gannon Station-Unit 4
Pet Coke Test Burn

Dear Mr. Arif:

On January 23, 1995, Tampa Electric Company (TEC) requested approval from the Southwest District of the Florida Department of Environmental Protection (FDEP) to perform a petroleum test burn at the Gannon Station Unit 4. Subsequently, this request was routed to your office for review and processing. Based upon our telephone conversation, TEC offers the following responses:

FDEP Comment: **It appears the tables provided to demonstrate the estimated maximum actual emission rates used the incorrect % sulfur numbers.**

TEC Response: *FDEP is correct that the sulfur numbers used in the tables were the lbs. SO_2/MMBTU. These emissions calculations should be based upon % sulfur (dry weight basis). The correct table (Enclosure 1) for Gannon Unit 4 is enclosed.*

FDEP Comment: **FDEP requested copies of Gannon Units 1-4 construction permits.**

TEC Response: *Please find enclosed copies of the requested construction permits.*

FDEP Comment: **Provide one (1) year historical as-received % sulfur.**

TEC Response: *Enclosure 3 shows weekly results for % sulfur (dry basis) for the calender year of 1994.*

FDEP Comment: **FDEP requested the location for our CEM measurements for Unit 4.**

TEC Response: *CEM measurements are taken in the stacks.*

FDEP Comment: **Provide location map of Gannon Station in relation to the City of Tampa downtown.**

TEC Response: *Please see Enclosure 4.*

Also, please find enclosed (Enclosure 5) TEC's test plan detailing Gannon Unit 4's test burn protocols along with supporting documentation for the Department's use.

TEC believes that this additional information satisfactorily addresses the Department's questions and requests the approval of this test burn in an expeditious manner.

If you have any questions, please feel free to call me at (813) 228-4839. Thank you for your assistance.

Sincerely,

Janice K. Taylor
Senior Engineer
Environmental Planning

EP\gm\JKT721

Enclosures

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 17, 1984

Mr. A. Spencer Autry, Manager
Environmental Planning
Tampa Electric Company
Tampa, Florida 33601

Dear Mr. Autry:

We are in receipt of your request for a modification of the contruction permit, AC 29-61276. The modification is a deletion of the H/J transfer point venting and associated cyclone dust separator. A modification is granted subject to the following condition:

Visible emissions around the tripper room building shall not be greater than 5 percent opacity at any time.

This letter must be attached to your permit, AC 29-61276, and shall become a part of this permit.

Sincerely,

Terry Cole
Victoria J. Tschinkel
Secretary

VJT/ks

cc: Dan Williams
Iwan Choronenko

and other appropriate methods ~~as approved~~ after approval by the Department

Other appropriate methods may be used to maintain this opacity after approval by the Department

Permit File

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

March 27, 1984

John B. Ramil, Manager
Environmental Planning
Tampa Electric Company
Tampa, Florida 33601

Re: Requested Modifications to Air Construction Permit:
AC 29-61276

Dear Mr. Ramil:

Your request to modify the subject permit to eliminate the requirement for a cyclone at the H/J conveyor transfer point has been reviewed.

The information submitted is incomplete. Your statement that the transfer point is completely enclosed within the tripper room may make installation of a scrubber on the transfer point inappropriate, but the projected reduction in control efficiency from 95% to 70% suggests that an alternate control strategy is indicated for the tripper room itself.

The bureau will consider approval of an alternate control strategy but your proposal, as submitted, is unacceptable.

Sincerely,

Steve Smallwood
for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management

CHF/BT/s

cc: B. Thomas
D. Williams
I. Choronenko

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

April 14, 1983

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. John B. Ramil
Manager, Environmental Planning
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601

Dear Mr. Ramil:

Enclosed is Permit Number AC 29-61276, dated April 12, 1983 to Tampa Electric Company issued pursuant to Section 403, Florida Statutes.

Acceptance of the permit constitutes notice and agreement that the Department will periodically review this permit for compliance, including site inspections where applicable, and may initiate enforcement actions for violation of the conditions and requirements thereof.

Sincerely,

John P. Svec P.E.
for
C. H. Fancy, P.E.
Deputy Bureau Chief
Bureau of Air Quality
Management

CHF/bjm

Enclosure

cc: Mr. Lynn F. Robinson, P.E., Tampa Electric Company
Mr. Dan Williams, DER Southwest District
Mr. Iwan Choronenko, Hillsborough County Environmental Protection Commission

Final Determination

Tampa Electric Company

Gannon Coal Yard

Permit Number
AC 29-61276

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

April 12, 1983

Response to Public Comment

AC 29-61276
Tampa Electric Company
Gannon Coal Yard

The company's construction permit application for modification of the existing Gannon coal yard in Hillsborough County, Florida has been reviewed by FDER. Public Notice of the Department's Intent to Issue was published in the Tampa Tribune on March 12, 1983. Copies of the preliminary determination and application were available for public inspection at DER's Southwest District Office in Tampa and the Bureau of Air Quality Management in Tallahassee.

There were no comments from the public as a result of the public notice period.

The final action of the department will be to issue the permit as noticed in the public review process.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE: **Tampa Electric Co.**
P. O. Box 111
Tampa, Florida
33601

Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984
County: Hillsborough
Latitude/Longitude: 27° 54' 25" N/ 82° 25' 21" W
Project: **Gannon Station Coal Handling and Storage Facility Modification**

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the coal yard modification of Gannon which owns six fossil units located on Port Sutton Road, Tampa, Florida.

Construction shall be in accordance with the attached permit application and additional informtion except as otherwise noted in the attached Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources. DER Form 17-1.122(16), received on October 7, 1982.

2. DER's incompleteness letter to TECO, dated November 5, 1982.

3. TECO's response to DER, received on November 22, 1982.

4. Hillsborough County's comments received on January 13, 1983.

5. DER district's comments received on January 24, 1983.

6. TECO's additional information received on February 23, 1983.

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

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. Nor 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 does not constitute 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, ani al, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, 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.

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

GENERAL CONDITIONS:

6. The permittee shall at all times 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.

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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

c. Sampling or monitoring 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 notify and provide the department with the following information:

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

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

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

GENERAL CONDITIONS:

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 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 arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

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 17-4.12 and 17-30.30, 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 is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

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

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain 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), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

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 date(s) 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 submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. Construction shall be in accordance with the attached permit application and additional information except as otherwise noted in the following conditions.

2. Reasonable precautions to prevent fugitive particulate emissions at the site, such as coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed soils or coal, shall be taken by the permittee.

3. The hours of operation may be up to 24 hours per day, 7 days per week, 52 weeks per year or 8,760 hours per year.

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

SPECIFIC CONDITIONS:

4. Visible emissions caused by fugitive or unconfined particulate from coal handling systems and storage areas shall not be greater than 5 percent opacity at 90% of design capacity demonstrated in accordance with DER Method 9 (Rule 17-2.700(6)(a)9, FAC).

5. Visible emissions from each cyclone shall not be greater than 5 percent opacity and 0.03 grains/dscf. The cyclone sources shall be subject to compliance tests for mass emission rate by DER Method 5 (Rule 17-2.700(6)(a)5, FAC).

6. Wet sprays shall be installed at new transfer points of the coal handling system.

7. Dead storage coal pile shall not be used on day to day activities. Its use shall be restricted to those times when normal deliveries cannot supply boiler requirements.

8. Prior to 90 days before the expiration of this permit, a complete application for an operating permit shall be submitted to DER Southwest District Office. Full operation of the source may then be conducted in compliance with the terms of this permit until its expiration or until receipt of an operating permit.

Issued this 12 day of April, 1983

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Victoria J. Tschinkel

VICTORIA J. TSCHINKEL, Secretary

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices
And/Or To Other Than The Addressee

To: ______ Loctn.: ______
To: ______ Loctn.: ______
To: ______ Loctn.: ______
From: ______ Date: ______

Reply Optional [ ] Reply Required [ ] Info. Only [ ]
Date Due: ______ Date Due: ______

TO: Victoria J. Tschinkel

FROM: for Clair Fancy John Svec

DATE: April 13, 1983

SUBJ: Approval of Attached Air Construction Permit

Attached for your approval and signature is one Air Construction Permit for which the applicant is Tampa Electric Company. The proposed project is for modification of the Gannon Station coal yard in Tampa, Hillsborough County, Florida.

The waiver date, after which the permit would be issued by default, is April 15, 1983.

The Bureau recommends your approval and signature.

CF/pa

Attachment

RECEIVED
APR 13 1983
Office of the Secretary

TAMPA ELECTRIC
A TECO ENERGY COMPANY

March 18, 1983

DER
MAR 23 1983
BAQM

Mr. Clair Fancy, P.E.
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301

Dear Mr. Fancy:

Please find attached a copy of the "Notice of Proposed Agency Action" as published in the Tampa Tribune on Saturday, March 12, 1983.

If you have any questions, please call.

Sincerely,

John B. Ramil

John B. Ramil, P.E.
Manager
Environmental Planning

JBR:tb

cc: Roger P. Stewart (w/att)
Dan Williams (w/att)
L. F. Robinson, P. E.

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601 (813) 228-4111

RECEIVED

MAR 18 1983

ENVIRONMENTAL PLANNING

THE TAMPA TRIBUNE

Published Daily
Tampa, Hillsborough County, Florida

State of Florida }
County of Hillsborough } ss.

Before the undersigned authority personally appeared G. T. Gleason, who on oath says that he is Controller of The Tampa Tribune, a daily newspaper published at Tampa in Hillsborough County, Florida; that the attached copy of advertisement being a .... LEGAL NOTICE ....

in the matter of Notice that the Department of Environmental Regulation gives notice of its intent to issue a permit to Tampa Electric Company to modify the existing coal storage facility to supply Units 1 through 4 after conversion from oil to coal at the Gannon Power Station.

was published in said newspaper in the issues of March 12, 1983 --------------------------------

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.

G. T. Gleason

Sworn to and subscribed before me, this ...16th.. *day of* March ..., *A.D. 19* 83

[signature]

Notary Public, State of Florida at Large
My Commission Expires Jan. 25, 1986

(SEAL)

NOTARY PUBLIC STATE OF FLORIDA

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to issue a permit to Tampa Electric Company to modify the existing coal storage facility to supply Units 1 through 4 after conversion from oil to coal at the Gannon Power Station in Tampa, Hillsborough County, Florida. A determination of Best Available Control Technology (BACT) was not required.

A person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

The application, technical evalulation and department intent 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 the following locations:

DER Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

DER Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Hillsborough County Environmental Protection Commission
1900 9th Avenue
Tampa, Florida 33605

Comments on this action shall be submitted in writing to Bill Thomas of Tallahassee office within thirty (30) days of this notice.

M2586 March 12, 1983

No. 0157988

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL

(See Reverse)

SENT TO John B. Ramil				
STREET AND NO.				
P.O., STATE AND ZIP CODE				
POSTAGE				$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE			¢
	OPTIONAL SERVICES	SPECIAL DELIVERY		¢
		RESTRICTED DELIVERY		¢
		RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	¢
			SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
			SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
			SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES				$
POSTMARK OR DATE ~~3/10/83~~ 3/11/83				

PS Form 3800, Apr. 1976

PS Form 3811, Jan. 1978

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

● SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
   - [x] Show to whom and date delivered. .... ¢
   - [ ] Show to whom, date and address of delivery. .... ¢
   - [ ] RESTRICTED DELIVERY Show to whom and date delivered. .... ¢
   - [ ] RESTRICTED DELIVERY. Show to whom, date, and address of delivery. $

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
   Mr. John B. Ramil, P.E.
   TECO, P.O. Box 111
   Tampa, FL 33601

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0157988	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE ☐ Addressee ☐ Authorized agent

4. DATE OF DELIVERY MAR 15 1983 POSTMARK

DOWNTOWN STA. TAMPA MAR 15 1983

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

☆GPO : 1979-300-459

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

DEPARTMENT OF ENVIRONMENTAL REGULATION
STATE OF FLORIDA

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

March 10, 1983

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. John B. Ramil, P.E.
Manager, Environmental Planning
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601

Dear Mr. Ramil:

Attached is one copy of the Technical Evaluation and Preliminary Determination, and proposed permit for the Gannon Station coal storage facility modification.

The Preliminary Determination and proposed permit constitute a proposed action of the department and is subject to administrative hearing under the provisions of Chapter 120, Florida Statutes, if requested within fourteen days from receipt of this letter. Any petition for hearing must comply with the requirements of Florida Administrative Code Rule 28-5.201 and be filed with the Office of General Counsel, Florida Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to file a request for hearing within fourteen days shall constitute a waiver of your right to a hearing. Filing is deemed complete upon receipt by the Office of General Counsel.

Please submit, in writing, any comments which you wish to have considered concerning the department's proposed action to Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

for Bill Thomas

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa
Attachment
cc: Mr. Lynn F. Robinson, P.E.
Mr. Dan Williams, DER Southwest District
Mr. Iwan Choronenko, Hillsborough County Environmental Protection Commission

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to issue a permit to Tampa Electric Company to modify the existing coal storage facility to supply Units 1 through 4 after conversion from oil to coal at the Gannon Power Station in Tampa, Hillsborough County, Florida. A determination of Best Available Control Technology (BACT) was not required.

A person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

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2600 Blair Stone Road
Tallahassee, Florida 32301

DER Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Hillsborough County Environmental Protection Commission
1900 9th Avenue
Tampa, Florida 33605

Comments on this action shall be submitted in writing to Bill Thomas of Tallahassee office within thirty (30) days of this notice.

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

Technical Evaluation

and

Preliminary Determination

(AC 29-61276)

Contents

I. APPLICANT AND SOURCE LOCATION

A. Applicant

Tampa Electric Company (TECO)
P. O. Box 111
Tampa, Florida 33601

B. Location

The proposed modification will occur at Tampa Electric Company's Gannon station in Hillsborough County. The plant is located on Port Sutton Road in Tampa, Florida. The UTM coordinates of the plant are: Zone 360.0 km East and 3087.5 km North.

II. PROJECT DESCRIPTION

The existing Gannon power station has six units, presently only Units 5 and 6 are being served by the existing coal yard. TECO proposed that the existing coal yard be modified to also supply Gannon Units 1, 2, 3 and 4.

The modification is required to allow for efficient stockpiling and reclaiming of the various sulfur content coals, this will provide the flexibility necessary for blending the coals to achieve the required sulfur content and heating values. A limestone stockpile is also proposed to allow for fluxing of the boilers.

The existing coal yard has 80,000 tons live and active storage capacity and 150,000 tons dead storage capacity. Its throughput rate is 1,270,000 tons per year. The proposed coal yard will have 80,000 tons live and active storage capacity and 300,000 tons dead storage capacity. Its throughput will be 2,400,000 tons per year.

The underground reclaim system will be used for all live storage reclaim by gravity feed. The attendant reduction in particulate emissions by elimination of the present pile traffic generated by bulldozer reclaim accounts for the small increase in emissions resulting from the expansion.

III. EMISSIONS AND CONTROLS

As proposed by TECO, the modification of the coal yard would result in an increase in fugitive dust emissions from the coal handling system and storage areas.

The belts conveying material will be enclosed by a hood cover. Underground reclaim systems will be used for coal stack out. Wet spray dust suppression at the new transfer points will provide additional control, especially during dry periods.

Coal pile management will be improved by: (1) direct throughput (10%) to the bunkers, (2) the ability to stack out above the underground reclaim system, thus eliminating bulldozer activity during unloading to the live storage coalpile, and (3) by reclaiming from storage through an increased number of reclaim areas.

The particulate emissions from the existing and proposed coal yards as submitted by TECO are as follows:

System	Point Sources		Stockpiles		Total	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Existing	4.74	1.15	36.81	155.02	41.55	156.17
Proposed	6.24	2.02	37.50	158.06	43.74	160.08
Increase	1.50	0.87	~~0.09~~ 0.69	3.04	2.19	3.91

Ok

Traffic dependent factors in the equations for coal pile emissions were modified downward based on consideration of the coal pile management plan proposed by TECO (Attachment 6). The management plan is therefore viewed on the same basis as control equipment in determination of potential emissions and limiting increases to less than significant levels (Table 500-2, 17-2.500, FAC).

IV. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Rule 17-2, Florida Administrative Code (FAC), because it constitutes a modification to a major facility as defined in Rule 17-2.100(~~102~~).

The modification to the coal yard is within the particulate nonattainment area in Hillsborough County. The particulate emission increase will be less than 25 tons per year, the applicable significant emission rate listed in Table 500-2. Therefore, the modification is not subject to the Preconstruction Review Requirements 17-2.510(4).

The proposed and existing coal handling systems are subject to the RACT rule, Section 17-2.650(2)(c)11, which limits visible emissions to 5%. This section also limits vented emissions to 0.03 grains/dscf.

V. CONCLUSIONS

Based on the technical evaluation of the application and the additional information submitted by TECO, the Department has made a preliminary determination that compliance with Florida's air pollution regulations will be achieved, provided certain general and specific conditions are met as set forth in the attached draft permit (AC 29-61276).

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE: **Tampa Electric Co.**
P. O. Box 111
Tampa, Florida
33601

Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984
County: Hillsborough
Latitude/Longitude: 27° 54' 25" N/ 82° 25' 21" W
Project: Gannon Station Coal Handling and Storage Facility Modification

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the coal yard modification of Gannon which owns six fossil units located on Port Sutton Road, Tampa, Florida.

Construction shall be in accordance with the attached permit application and additional informtion except as otherwise noted in the attached Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources. DER Form 17-1.122(16), received on October 7, 1982.
2. DER's incompleteness letter to TECO, dated November 5, 1982.
3. TECO's response to DER, received on November 22, 1982.
4. Hillsborough County's comments received on January 13, 1983.
5. DER district's comments received on January 24, 1983.
6. TECO's additional information received on February 23, 1983.

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

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. Nor 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 does not constitute 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, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, 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.

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

GENERAL CONDITIONS:

6. The permittee shall at all times 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.

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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

c. Sampling or monitoring 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 notify and provide the department with the following information:

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

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

GENERAL CONDITIONS:

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 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 arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

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 17-4.12 and 17-30.30, 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 is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

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

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain 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), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

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 date(s) 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 submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. Construction shall be in accordance with the attached permit application and additional information except as otherwise noted in the following conditions.

2. Reasonable precautions to prevent fugitive particulate emissions at the site, such as coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed soils or coal, shall be taken by the permittee.

3. The hours of operation may be up to 24 hours per day, 7 days per week, 52 weeks per year or 8,760 hours per year.

PERMITTEE: Tampa Electric Company

I. D. Number:
Permit Number: AC 29-61276
Date of Issue:
Expiration Date: December 31, 1984

SPECIFIC CONDITIONS:

4. Visible emissions caused by fugitive or unconfined particulate from coal handling systems and storage areas shall not be greater than 5 percent opacity at 90% of design capacity demonstrated in accordance with DER Method 9 (Rule 17-2.700(6)(a)9, FAC).

5. Visible emissions from each cyclone shall not be greater than 5 percent opacity and 0.03 grains/dscf. The cyclone sources shall be subject to compliance tests for mass emission rate by DER Method 5 (Rule 17-2.700(6)(a)5, FAC).

6. Wet sprays shall be installed at new transfer points of the coal handling system.

7. Dead storage coal pile shall not be used on day to day activities. Its use shall be restricted to those times when normal deliveries cannot supply boiler requirements.

8. Prior to 90 days before the expiration of this permit, a complete application for an operating permit shall be submitted to DER Southwest District Office. Full operation of the source may then be conducted in compliance with the terms of this permit until its expiration or until receipt of an operating permit.

Beef this up w/ requirement for water sprays when opacity 5%

Issued this ___ day of________, 1983

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

____
VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

No. 0157984

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL

(See Reverse)

SENT TO John B. Ramil				
STREET AND NO.				
P.O., STATE AND ZIP CODE				
POSTAGE				$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE			¢
	OPTIONAL SERVICES	SPECIAL DELIVERY		¢
		RESTRICTED DELIVERY		¢
		RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	¢
			SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
			SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
			SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES				$
POSTMARK OR DATE 3/7/83				

PS Form 3800, Apr. 1976

PS Form 3811, Jan. 1979 • RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
   - [X] Show to whom and date delivered. .... ¢
   - [ ] Show to whom, date and address of delivery. ..... ¢
   - [ ] RESTRICTED DELIVERY Show to whom and date delivered. .... ¢
   - [ ] RESTRICTED DELIVERY. Show to whom, date, and address of delivery. $____

   (CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
   Mr. John B. Ramil
   P. O. Box 111
   Tampa, FL 33601

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0157984	

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE ☐ Addressee ☐ Authorized agent

4. DATE OF DELIVERY — POSTMARK MAR 11 1983

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: — CLERK'S INITIALS

☆GPO : 1979-300-459

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

March 7, 1983

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. John B. Ramil, P.E.
Manager, Environmental Planning
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601

Dear Mr. Ramil:

Per my telephone conversation this morning with Lynn Robinson, I am attaching a copy of the Public Notice for the Gannon Station coal storage facility modification.

Before final action can be taken on your proposed permit, you are required by Florida Administrative Code Rule 17-1.62(3) to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Hillsborough County on Friday, March 11, 1983. The department must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice will be grounds for denial of the permit.

The Technical Evaluation and Preliminary Determination for this proposed permit will be mailed to you in a few days. If you have any further questions or comments, please contact me at (904)488-1344.

Sincerely,

W A Thomas

William A. Thomas, P.E.
Bureau of Air Quality
Management

WAT/pa

Attachment

cc: Mr. Lynn F. Robinson, P.E.
Mr. Dan Williams, DER Southwest District
Mr. Iwan Choronenko, Hillsborough County Environmental Protection Commission

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to issue a permit to Tampa Electric Company to modify the existing coal storage facility to supply Units 1 through 4 after conversion from oil to coal at the Gannon Power Station in Tampa, Hillsborough County, Florida. A determination of Best Available Control Technology (BACT) was not required.

A person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

The application, technical evaluation and department intent 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 the following locations:

DER Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

DER Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Hillsborough County Environmental Protection Commission
1900 9th Avenue
Tampa, Florida 33605

Comments on this action shall be submitted in writing to Bill Thomas of Tallahassee office within thirty (30) days of this notice.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices And/Or To Other Than The Addressee		
To:	Loctn.:	
To:	Loctn.:	
To:	Loctn.:	
From:	Date:	
Reply Optional [ ]	Reply Required [ ]	Info. Only [ ]
Date Due:	Date Due:	

DER
JAN 24 1983
BAQM

TO: Bill Thomas, DER, Tallahassee

THROUGH: Bill Thomas, DER, Tampa WT

FROM: Jim Estler JWE

DATE: January 13, 1983

SUBJECT: Comments Requested on the Proposed Coal Storage Facility - TECO Gannon Plant

The existing coal storage facility used by Units 5&6 apparently has never been permitted by DER.

Existing emission (information from 11-22-82 letter)

point sources	6.28 lbs/hr.	1.91 TPY
stockpiles	8.66 lbs/hr.	37.95 TPY
total	14.95 lbs/hr.	39.86 TPY

Based on the above the existing source may be subject to Section 17-2.650(2)(c)11.b., F.A.C., which limits visible emissions to 5%. This section also limits vented emissions to 0.03 grains/dscf. There is an exemption for each source under 1 TPY and the question arises whether the 19 activities (other than the stockpile) are considered individual sources. If so, these existing sources would be considered exempt.

In regards to the existing and proposed stockpiles, Section 17-2.650(2)(b)5., F.A.C., which covers the exemptions for particulate RACT states, "Any source of unconfined particulate matter from open stockpiling of material, vehicular traffic and other emission from roads and plant grounds, or construction activities". The coal and limestone stockpiles are therefore exempt from particulate RACT and would be subject to Section 17-2.610(3), F.A.C. which covers unconfined emissions of particulate matter.

The question arises whether the existing operation meets the requirements of Section 17-2.650(2)(c)11.b., F.A.C. No noticeable changes in control techniques are noted between the existing operation and the proposed except the addition of the cyclone separators added to the existing bunker feed.

Questions:

1. Do the controls imposed (existing and proposed) meet the 5% opacity limitation since the control efficiencies are low (i.e: 40 to 70% for covering the conveyors and 70% enclosing conveyor transfer stations).

TECO should be required to run V.E.'s on the existing operation to determine whether the 5% opacity can be met. This should be done with HCEPC and/or DER witnessing and after a period of dry weather during a windy day.

2. How are existing transfer House No. 1, proposed transfer House No. 2 and new fines crusher building vented. Do all three structures meet the 5% opacity and if vented the 0.03 grains/dscf?

3. Are there provisions for a water spray system at the stockpiles (coal & limestone)?

4. How is the dead storage conditioned?

5. How many cyclone separators will there be? Information in Section III H of the application must be submitted. Can the cyclones separators meet the 0.03 grains/dscf? Need manufacture's guarantee.

6. Need a large drawing of the facility, which includes all structures, buildings, and cyclones.

Since the incremental increase in particulate emmission due to the proposed modification is less than 25 TPY (ie. 21.45 TPY) the modification would not trigger PDS or major source permitting associated with the non-attainment area. The same question that arose early regarding whether the 21 various activities (other than stockpiles) are considered a single source or 21 sources will govern what rule these proposed modifications would be subject to (particulate RACT or unconfined emissions).

Based on the information received today, we do not feel that reasonable assurance has been provided to the Department that emission limitations would not be violated. We suggest the information sighted above be requested from the applicant (copies should be provided to this office & HCEPC).

Let me know if I can be of further assistance.

JE/scm
cc: HCEPC

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

DER
FEB 24 1983
BAQM

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AC 29-67216

Applicant's Name: Tampa Electric Company

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver is made freely and voluntarily by the applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 15 day of April 1983.

The undersigned is authorized to make this waiver on behalf of the applicant.

John B. Ramil
Signature

John B. Ramil, Manager
Environmental Planning
Please Type Name of Signee

February 23, 1983
Date

Diana R. Hofer
Sworn to and subscribed
before me this 23 day
of February 1983.

NOTARY PUBLIC STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES NOV. 14 1985
BONDED THRU GENERAL INS. UNDERWRITERS

DER Form 17-1.201(8)
Effective November 30, 1982

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions unless a shorter period of time for agency action is provided by law. The 90-day or shorter time period shall be tolled by the initiation of a proceeding under Section 120.57 and shall resume 10 days after the recommended order is submitted to the agency and the parties. Any application for a license not approved or denied within the 90-day period or shorter time period, within 15 days after conclusion of a public hearing held on the application, or within 45 days after the recommended order is submitted to the agency and the parties, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as prerequisite to licensure, the license shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to Section 120.57.

Section 403.0876, Florida Statutes

Permits; processing. ---Within 30 days after receipt of an application for a permit under this chapter, the department shall review the application and shall request submittal of all additional information the department is permitted by law to require. If the applicant believes any departmental request for additional information is not authorized by law or departmental rule, the applicant may request a hearing pursuant to s. 120.57. Within 30 days after receipt of such additional information, the department shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the department for such additional information is not authorized by law or departmental rule, the department, at the aplicant's request, shall proceed to process the permit application. Permits shall be approved or denied within 90 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the permit application.

DER
FEB 14 1983
BAQM

WAIVER OF 90 DAY TIME LIMIT

UNDER SECTION 120.60(2), FLORIDA STATUTES

License (Permit, Certification) Application No. AC 29-67216
Applicant's Name: Tampa Electric Company

The undersigned has read Section 120.60(2), Florida Statutes, and fully understands the Applicant's rights under that section.

With regard to the above referenced license (permit, certification) application, the Applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Section 120.60(2), Florida Statutes, waives the right under Section 120.60(2), Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Section 120.60(2), Florida Statutes. Said waiver is made freely and voluntarily by the Applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 13th day of March 1983.

The undersigned is authorized to make this waiver on behalf of the applicant.

John B. Ramil
Signature

John B. Ramil
Manager, Environmental Planning
Name of Signee

February 9, 1983
Date

Sworn to and subscribed before me this 9 day of February 1983.

Diana R. Hofer
NOTARY PUBLIC STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES NOV 14 1985
BONDED THRU GENERAL INS. UNDERWRITERS

D.E.R.
FEB 9 1983
SOUTHWEST
TAMPA

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions. Any application for a license not approved or denied within the 90-day period or within 15 days after conclusion of a public hearing held on the application, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as a prerequisite to licensure, [2](the license) shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to s. 120.57.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

February 23, 1983

DER
FEB 24 1983
BAQM

Mr. Clair Fancy
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Dear Mr. Fancy:

As a result of our meeting and discussions on February 18, 1983, please find attached the following supplemental information (Attachment 1):

(A) A description of the proposed conveyor enclosures and underground reclaim system.

(B) Particulate control options for the Gannon coal yard.

(C) Coal Pile management to be employed.

(D) Coal Moisture Content Information

Tampa Electric proposes that a dust suppression spray system be installed at the new transfer points at the coal yard. This would provide added dust control under abnormally dry periods and assure that emissions will be minimized.

An emission analysis using a 95% efficient dust suppression system and DER's recommended stockpile maintenance equation is attached (Supplement #2).

Also enclosed please find an Executed Permit Review Time Waiver form extending the waiver period to April 15, 1983. It is our understanding that this time period will allow the DER 15 days to complete the evaluation of our application and allow 30 days for the publication of a public notice.

I would like to take this opportunity to thank you and your staff for meeting with us and discussing the permit application. This has helped tremendously in resolving questions on our application.

I trust this additional information submitted will expedite the permit. If you have any questions, please call me at (813) 228-4838.

Sincerely,

John B. Ramil

John B. Ramil, P.E.
Manager
Environmental Planning

JBR:tb

(A) Conveyor Enclosure and Underground Reclaim System Description

The proposed system will include enclosures for the new conveyor system, specifically, the belt carrying material will be enclosed by a hood cover. The hood cover will terminate at the head chute which is enclosed. The chute is designed so as to control the material flow, reducing free fall and directing the material onto the next receiving conveyor. A representative chute design will include scrapers, dust curtains, and rubber sealings. Skirt-boards on the receiving conveyor are enclosed on the sides and top. The coal that exits is enclosed via a hood cover system that runs between the feed and discharge points. Please see Figures 1 and 2 (Exhibit 1).

The underground reclaim system, as employed in the new design, will permit the stack-out boom conveyor to deposit material directly over the underground reclaim system thus maintaining a surcharge of coal over the reclaim hoppers. This material will then be withdrawn by vibrating feeders which are housed in an enclosed underground concrete structure. The discharge from the vibrating feeders will be to a collecting belt via an enclosed transfer chute transporting material from the enclosed tunnel to a hood cover portion of the conveyor which runs above ground. The above described system thus provides for direct feed from the stacking out system to live storage. See Figure 3 (Exhibit 2).

The existing inbound unloading system which is via barge and unit trains, when combined with the new designs, will permit the plant to optimize feed control directly to the bunkers and/or to live coal storage above the underground reclaim system. This will reduce the present operation mode of having to go to outside dead storage and reclaiming solely by dozer equipment.

It is estimated that the amount of direct through-put that will result when combining the existing and new design is approximately 10% of yearly burn rate. That is, approximately 240,000 tons of inbound coal will be conveyed directly to the bunker, by-passing outside live storage.

(B) Emission Controls

Recognizing that various controls can be provided on any given system, a key factor is the selection of specific equipment depending upon the coal characteristics and more specifically the moisture content of the as-received coal. Given the historical data base that exists at the Gannon Station, the moisture content over the last three to five years clearly demonstrates the moisture content to be about 8% (train) and 11% (barge).

The proposed system will include enclosures for transfer points and the conveyors will be enclosed by a hood. These enclosures would produce an adequate containment for coal movement.

Wet spray dust suppression at the new transfers would provide additional control, especially during abnormally dry periods. It should be recognized that the benefits under this situation is that coal will be mixed with additional moisture, not only at the transfer point but throughout its journey to either the bunkers or the stock piles.

Baghouse dust collectors is another option for dust control at Gannon Coal Yard. Recognizing the high moisture content of the as-received coal, the use of baghouse dust collectors would be inappropriate, basically because the method for collecting dust through a bag filter and removing same by pulsing the bags is unlikely to occur, as fine coal high in moisture will tend to plug the bags.

(C) Pile Management

The total system, when modified with the new design, will provide the means for improved pile management . Pile management improvements which will result are: a) direct through-put to the bunkers from incoming sources (barge & unit train), b) ability to stack out above the underground reclaim system would not require any dozer activity during unloading to the live storage coalpile (See Figure 3), and c) under the new design, reclaiming from storage is enhanced by the increased number reclaim areas. This is compared to the present reclaiming mode requiring continuous reclaiming by dozer to the existing hopper.

(D) Moisture Content

The following table presents the yearly average moisture content on an "as bunkered" basis for the F.J. Gannon Station. These averages are compiled and submitted annually to the U.S. Department of Energy, Energy Information Administration.

Year	Average Moisture Content (%)
1982	9.5
1981	8.2
1980	8.0
1979	7.6
1978	7.9
1977	7.9
1976	8.2
1975	8.9

The average moisture content for the past eight years equals 8.3%.

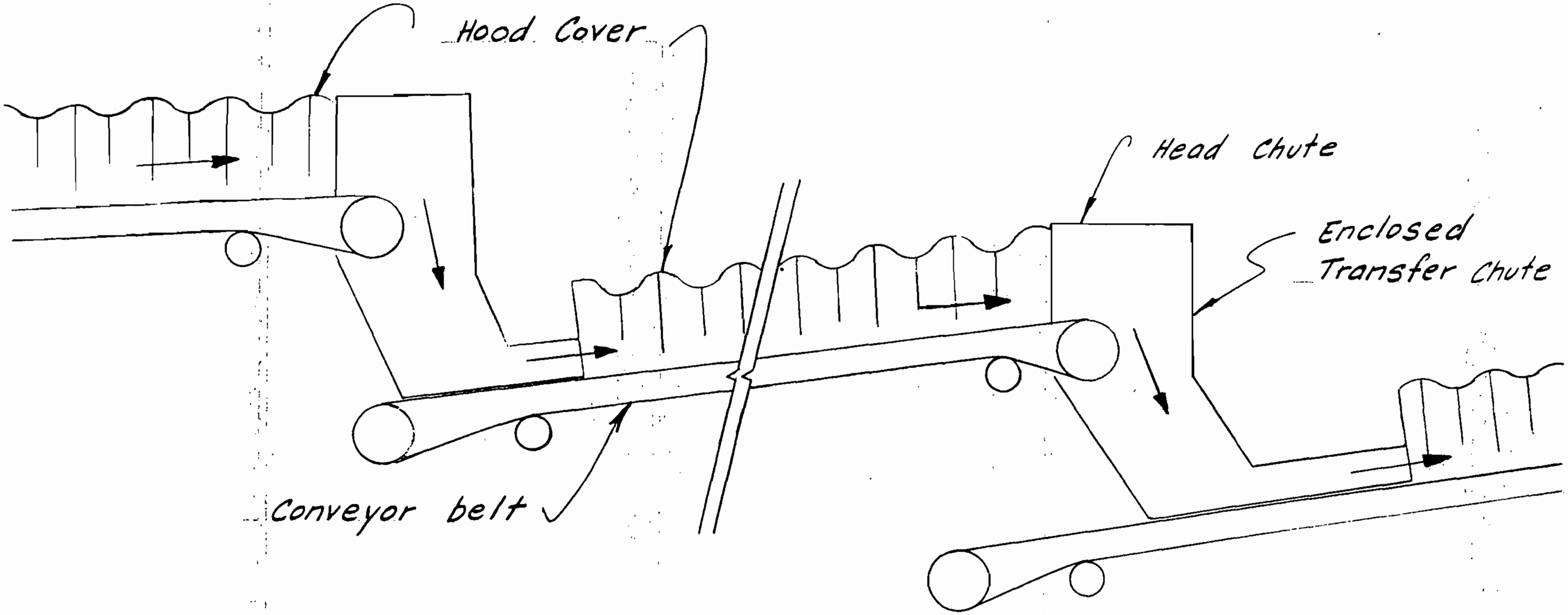

FIGURE 1 - Typical Belt to Belt Transfer

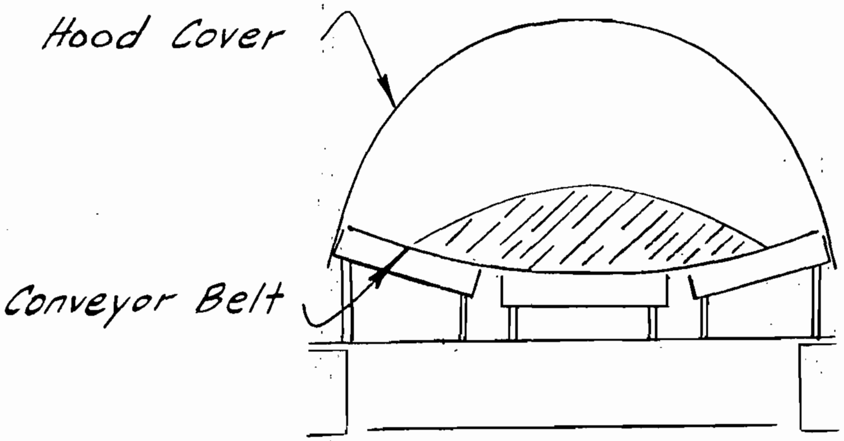

FIGURE 2 - Typical Conveyor Section

EXHIBIT 1

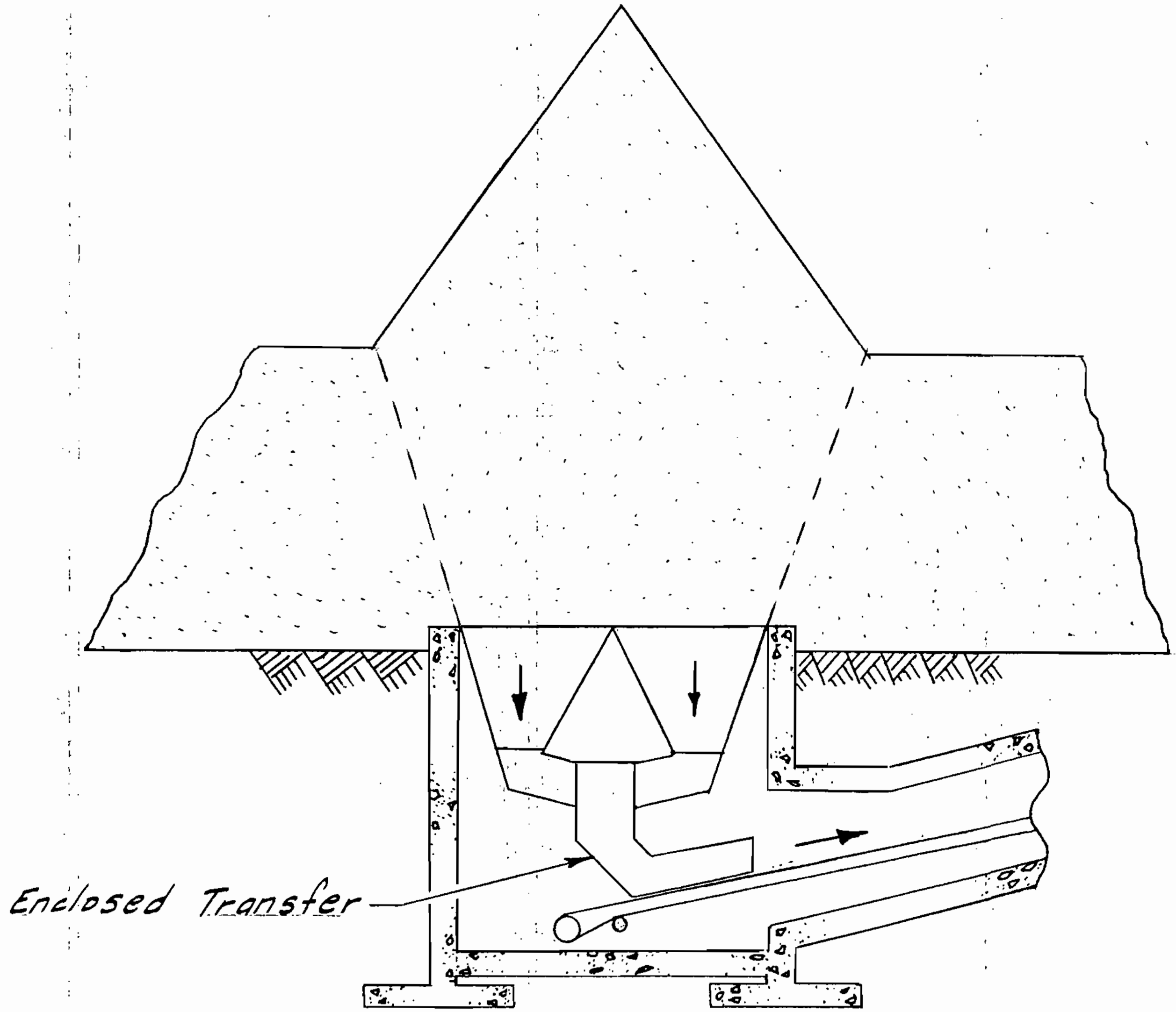

FIGURE 3 : Section - Underground Reclaim System

EXHIBIT 2

SUPPLEMENT #2

EMISSION ANALYSIS

of

COAL HANDLING MODIFICATIONS

AT THE GANNON COAL YARD

prepared for

TAMPA ELECTRIC COMPANY

by

George Noble, P.E.

NOBLE & ASSOCIATES

INTRODUCTION

1. Stockpile Maintenance

At the request of the DER a stock pile maintenance equation is to be used. This equation requires the use of an activity factor (K). The literature offers very little guidance on how this factor is to be determined. However, since the purpose of the emission analysis is to determine the incremental increase in emissions (existing vs. proposed), the actual values of K are less important than the ratio of:

$$\frac{\text{K existing}}{\text{K proposed}}$$

The following pages offer a rationale for determining this ratio.

The DER further requested that improvement in stockpile management should be discussed and evaluated. This specific improvement is in fact directly expressed by the ratio of activity factors above.

2. Wet Spray on New Transfer Points

Tampa Electric Company will install a wet spray suppression system at the new transfer points, that is, at transfer houses T1 and T2. The effect of this revision is also noted.

(1) STOCKPILE MAINTENANCE

The equation for stock pile maintenance contains a dozer activity factor which essentially translates to the activity resulting from a dozer transferring material to and from dead storage. In comparing the existing system and the movement of coal from dead storage against the upgraded design that has been recommended for the Gannon Station, several improvements can be readily identified which in essense improve the overall pile management efficiency. Thus it can be shown that the particulate emissions from stock pile maintenance are reduced even though the throughput has been increased from 1.27 to 2.4 million tons per year.

The K factor has been estimated based on the following:

a) The existing reclaim system has a single hopper for reclaiming coal from dead storage which by virtue of its location and position does not have the ability to receive coal in the form of live storage. The proposed system has four hoppers, each with above ground live storage, therefore the need for access and movement by dozer from dead storage to the reclaim system is substantially reduced. Based on this discussion, the efficiency of the new reclaim system is four times greater than the old system.

b) In the existing operation, there is only enough capacity to unload one barge containing a maximum of 32,000 tons. Upon subsequent train arrival significant dozer activity is required to move the barge coal to dead storage to allow room for the incoming rail coal. Under the proposed system, there is capacity for unloading one barge, plus two trains. This additional capacity ensures a minimum of dozer activity since the expanded live storage capacity is available for direct reclaim. In summary, under the existing system, replenishing of live storage requires dozer usage. Under the proposed system, replenishing live storage is accomplished during barge or train unloading..

(c) In the existing system there is no provision for bypassing the storage area. In the new system, the storage area can be bypassed thus reducing wind entrainment emissions. A conservative allowance has been made for at least 10% bypass (240,000 tons/yr.). In practice the bypass tonnage may exceed 10%, thus further reducing the overall stockpile emissions.

Conclusion

The activity factor describing dozer activity for the proposed system should be 0.25 compared to an activity factor of 1.0 for the existing system. Taking the existing system as unity, we will apply a conservative activity factor for the proposed system of K = 0.5.

EVALUATION OF STOCKPILE MAINTENANCE EMISSIONS

The emission factor is given by

$$E_f = 0.1\,K\left(\frac{s}{1.5}\right)\left(\frac{d}{235}\right)$$

Where	E_f	=	Emission Factor (lbs/ton throughput)
	K	=	Activity Factor
	s	=	Silt content (%)
	d	=	Number of dry days per year (days)

For existing system	K	=	1.0
For proposed system	K	=	0.5
For both systems	s	=	5%
	d	=	258 for Tampa

Emission Factor

Existing System

$$E_f = 0.1\,(1.0)\frac{(5)(258)}{(1.5)(235)}$$

$$= 0.1\,(1.0)(3.34)(1.098)$$

$$E_f = 0.367 \text{ lbs/ton}$$

Proposed system

$$E_f = 0.1\,(0.5)(3.34)(1.098)$$

$$E_f = 0.184 \text{ lbs/ton}$$

Efficiency - Since the incoming coal has a high moisture content, which conditions the pile against wind entrainment, an efficiency of 50% has been assigned to the stockpile emissions.

(2) WET SPRAYS ON NEW TRANSFER POINTS

In previous calculations, the emission control efficiency of transfer at new transfer points was assessed at 70% on the basis of transfer enclosures plus the conditioning of wet coal. With the introduction of wet sprays at the new transfer points, the efficiency of transfer increases to 95%.

PARTICULATE EMISSIONS.

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls Type	Controls Efficiency (%)	Controlled Emissions (tons/year)
1	Grab bucket from Barge	0.02 (Spillage)	110h	30	3300	0.0330	Grab bucket	--	0.0330
2	Bucket to Hopper	0.178	110h	2	220	0.0196	Windshield	25[1]	0.0147
3	Hopper to Feeder	0.178	9h	2	18	0.0016		--	0.0016
4	Feeder to Conveyor B	0.178	9h	15	135	0.012	Enclosure	50[2]	0.006
5	Conveyor B to Conveyor C	0.178	9h	10	90	0.080	Enclosure	50	0.040
6	Conveyor C to Conveyor D	0.178	9h	26	234	0.021	Enclosure	70[3]	0.006
7	Rail car to hopper	1.092	92h	17	1564	0.854	Enclosure (open-ended)	40[4]	0.512
8	Hopper to Feeder	1.092	20h	2	40	0.022	Enclosure	50	0.011
9	Feeder to Convyr.L	1.092	20h	1	10	0.005	Enclosure	50	0.003
10	Conveyor L to Conveyor D	1.092	20h	28	560	0.306	Enclosure	70	0.092
11	Conveyor D to Radial Stacker E	1.27	17h	24	408	0.259		--	0.259
									0.979

PARTICULATE EMISSIONS

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) $(x10^{-6})$	Height of Drop (feet)	Emission Factor (lbs/ton) $(x10^{-6})$	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
							Type	Efficiency (%)	
2	Stacker E to stockpile	1.27	17h	27.5 (avg.fall)	46.7	0.029	Free fall	--	0.029
3	Stockpile Live	1.12	63,700	--	63,700	35.67	Conditioned[5]	50	17.84
	Dead	0.15	894,000	--	894,000	67.05	Condit/Cmpct[6]	70	20.11
4	Underground reclaim to F_1/F_2	1.27	17h	7	11.9	0.008	Underground	85[7]	0.0012
5	F_1/F_2 to G_1/G_2	1.27	17h	5	8.5	0.005	Enclosure	70	0.0015
6	G_1/G_2 to Crusher	1.27	17h	20	50	0.032	"	70	0.0096
7	Crusher to H_1/H_2	1.27	17h	6	15.3	0.009	"	70	0.0027
8	H_1/H_2 to J_1/J_2	1.27	17h	13	221	0.140	"	70	0.042
9	J_1/J_2 to Bunker	1.27	17h	27	459	0.291	"	70	0.087
10	Vehicular entrainment	9,125 mi	0.124 lbs/ vehicle mi	--	--	0.566	--	--	0.566
11	Stockpile maintenance	1.27		--	0.367	233.00	Conditioned	50	116.50
									156.171

Noble & Associates

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls Type	Controls Efficiency (%)	Controll Emission (tons/yea
1	Grab bucket from Barge	0.09 (Spillage)	110h	30	3300	0.148	Grab bucket	--	0.148
2	Bucket to Hopper	0.9	110h	2	220	0.099	Windshield	25[1]	0.074
3	Hopper to Feeder	0.9	9h	2	18	0.008		--	0.008
4	Feeder to Conveyor B	0.9	9h	15	135	0.061	Enclosure	50[2]	0.030
5	Conveyor B to Conveyor C	0.9	9h	10	90	0.041	"	50	0.020
6	Conveyor C to D_1/D_2	0.9	9h	25	225	0.101	Wetsprays	95	0.005
7	Rail car to hopper	1.5	92h	17	1564	1.173	Enclosure (open-ended)	40[4]	0.704
8	Hopper to Feeder	1.5	20h	2	40	0.030	Enclosure	50	0.015
9	Feeder to Convyr. L	1.5	20h	1	10	0.0075	"	50	0.004
0	Conveyor L to D_1/D_2	1.5	20h	30	600	0.450	"	95	0.023
1	D_1/D_2 to M_1/M_2	2.160	20h	17	340	0.367	"	95	0.018
2	M_1/M_2 to E_1/E_2	2.16	20h	8	160	0.173	"	95	0.009
									1.058

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Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) (x10^{-6})	Height of Drop (feet)	Emission Factor* (lbs/ton) (x10^{-6})	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
						Type	Efficiency (%)	
E_1/E_2 to Stockpile	2.16	20h	31.5 (avg. fall)	630	0.680	--	--	0.680
Coal Stockpile								
Live	1.860	38,500	--	38,500	35.81	Conditioned[5]	50	17.90
Dead	0.3	894,000	--	894,000	134.10	Cond/Compact[6]	70	40.23
Limestone Live	0.057	390	--	390	0.01	--	--	0.01
Reclaim to $F_1/F_2/F_3/F_4$	2.16	17h	16	272	0.294	Enclosure	85[7]	0.044
$F_1/F_2/F_3/F_4$ to G_1/G_2	2.16	17h	24	408	0.441	Wetsprays	95	0.022
G_1/G_2 to Crusher	2.4	17h	20	340	0.408	Enclosure	70	0.122
Crusher to H_1/H_2	2.4	17h	6	102	0.122	"	70	0.037
H_1/H_2 to J_1/J_2	2.4	17h	13	221	0.265	"	95[8]	0.013
J_1/J_2 to Bunker	2.4	17h	27	459	0.551	"	95	0.027
D_1/D_2 to G_1/G_2 By-passes storage	0.240	17h	56.5	960	0.115	Wetsprays	95	0.006
Vehicular entrainment	9,125 mi	0.124 lbs/vehicle mi	---	---	0.566	---	---	0.566
Stockpile maintenace	2.16		---	0.184	198.72	Conditioned	50	99.36
								160.075

SUMMARY

The new totals are summarized in the following table:

Controlled Emissions
(tons/year)

System	Point Sources	Stockpiles	Total
Existing	1.15	155.02	156.17
Proposed	2.02	158.06	160.08
Increment	0.87	3.04	3.91

CONCLUSION

The incremental increase in particulate emission due to the proposed modification

= 3.91 tons/year

MAXIMUM HOURLY RATES

These can be obtained by first computing the tons of emission per tons of total throughput.

i.e. $\dfrac{\text{tons of emission per year}}{\text{tons of throughput per year}}$

The maximum throughput rate for each delivery system is 1500 tons per hour. Theoretically both barge and rail car systems could be delivering the coal to the stockpile simultaneously i.e. stockpile feed = 3000 tons per hour. This will occur rarely.

The reclaim system is rated at 1600 tons per hour. In practice the average will be less, but this figure is the maximum.

$$\text{Maximum hourly rate of Emission} = \left(\frac{\text{tons emission}}{\text{tons throughput}}\right) \times \left(\frac{\text{tons throughput}}{\text{hour}}\right)$$

The emissions from the stockpile take place 365 days a year, 24 hours a day, consequently the maximum hourly rate is arrived at as follows:

$$\text{Maximum hourly rate of Emission} = \left(\frac{\text{tons}}{\text{hour}}\right) = \frac{\text{Annual emission rate}}{365 \times 24} = \left(\frac{\text{tons}}{\text{hour}}\right)$$

The following tables identify the maximum hourly rates of emission in pounds per hour for the existing and the proposed system.

Particulate Emissions Maximum Hourly Rate Existing System

	Particulate Emission Source	Throughput (Million Tons)	Controlled Emissions (tons/year)	Controlled Emissions (tons/ton) (x 10^{-9})	Maximum Throughput rate (tons/hour)	Maximum Hourly Emission (lbs./hour)
1.	Grab bucket from barge	0.02 (Spillage)	0.033	1650.00	150	0.495
2.	Bucket to Hopper	0.178	0.0147	82.58	1500	0.248
3.	Hopper to Feeder	0.178	0.0016	8.99	1500	0.027
4.	Feeder to Conveyor B	0.178	0.006	33.71	1500	0.101
5.	Conveyor B to Conveyor C	0.178	0.040	224.72	1500	0.674
6.	Conveyor C to Conveyor D	0.178	0.006	33.71	1500	0.101
7.	Rail car to Hopper	1.092	0.512	468.89	1500	1.409
8.	Hopper to Feeder	1.092	0.011	10.07	1500	0.030
9.	Feeder to Conveyor L	1.092	0.003	2.75	1500	0.008
10.	Conveyor L to Conveyor D	1.092	0.092	84.25	1500	0.253
11.	Conveyor D to Radial Stacker E	1.27	0.259	203.94	1500	0.612
12.	Stacker E to Stockpile	1.27	0.029	22.83	1500	0.068
13.	Stockpile Live	1.12	17.84	---	---	4.073
	Dead	0.15	20.11	---	---	4.591
14.	Underground reclaim to F_1/F_2	1.27	0.0012	0.94	1000	0.002
15.	F_1/F_2 to G_1/G_2	1.27	0.0015	1.18	1000	0.002
16.	G_1/G_2 to Crusher	1.27	0.0096	7.56	1000	0.015
17.	Crusher to H_1/H_2	1.27	0.0027	2.13	1000	0.004
18.	H_1/H_2 to J_1/J_2	1.27	0.042	33.07	1000	0.066
19.	J_1/J_2 to Bunker	1.27	0.087	6.85	1000	0.013
20.	Vehicular entrainment	9,125 miles	0.566	---	730 hours/yr.	1.551
21.	Stockpile Maintenance	1.27	116.5	---	---	26.6

41.55

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Particulate Emission Source	Throughput (Million Tons)	Controlled Emissions (tons/year)	Controlled Emissions (tons/ton) (x 10^{-9})	Maximum Throughput rate (tons/hour)	Maximum Hourly Emission (lbs./hour)
Grab bucket from Barge	0.09 (Spillage)	0.148	1644.41	150	0.491
Bucket to Hopper	0.9	0.076	82.21	1500	0.249
Hopper to Feeder	0.9	0.008	8.87	1500	0.027
Feeder to Conveyor B	0.9	0.030	33.34	1500	0.100
Conveyor B to Conveyor C	0.9	0.020	22.23	1500	0.067
Conveyor C to D_1/D_2	0.9	0.030	33.34	1500	0.100
Rail car to Hopper	1.5	0.704	469.35	1500	1.408
Hopper to Feeder	1.5	0.015	10.00	1500	0.030
Feeder to Conveyor L	1.5	0.004	2.67	1500	0.008
Conveyor L to D_1/D_2	1.5	0.135	90.00	1500	0.270
D_1/D_2 to M_1/M_2	2.16	0.110	50.92	3000	0.306
M_1/M_2 to E_1/E_2	2.16	0.052	24.07	3000	0.144
E_1/E_2 to Stockpile	2.16	0.680	314.81	3000	1.889
					5.08

	Particulate Emission Source		Throughput (Million Tons)	Controlled Emissions (tons/year)	Controlled Emissions (tons/ton) (x 10^{-9})	Maximum Throughput rate (tons/hour)	Maximum Hourly Emission (lbs./hour)
14.	Coal Stockpile	Live	1.860	17.90	---	---	4.087
		Dead	0.3	40.23	---	---	9.185
15.	Limestone	Live	0.057	0.01	---	---	0.002
16.	Reclaim to $F_1/F_2/F_3/F_4$		2.16	0.044	20.37	1600	0.065
17.	$F_1/F_2/F_3/F_4$ to G_1/G_2		2.16	0.132	61.11	1600	0.195
18.	G_1/G_2 to Crusher		2.4	0.122	50.83	1600	0.163
19.	Crusher to H_1/H_2		2.4	0.037	15.42	1600	0.049
20.	H_1/H_2 to J_1/J_2		2.4	0.013	5.42	1600	0.017
21.	J_1/J_2 to Bunker		2.4	0.027	11.25	1600	0.036
22.	D_1/D_2 to G_1/G_2 by-passes storage		0.240	0.035	145.84	160	0.023
23.	Vehicular entrainment		9,125 miles	0.566	---	730 hours/yr.	1.551
24.	Stockpile Maintenance		2.16	99.36	---	---	22.68
							43.74

NOBLE & ASSOCIATES

SUMMARY

These maximum hourly rates are summarized in the following table:

Maximum Hourly Rates
Controlled Emissions
(lbs/hour)

System	Point Sources	Stockpiles	Total
Existing	4.74	36.81	41.55
Proposed	6.24	37.50	43.74
Increment	1.50	0.69	2.19

CONCLUSION

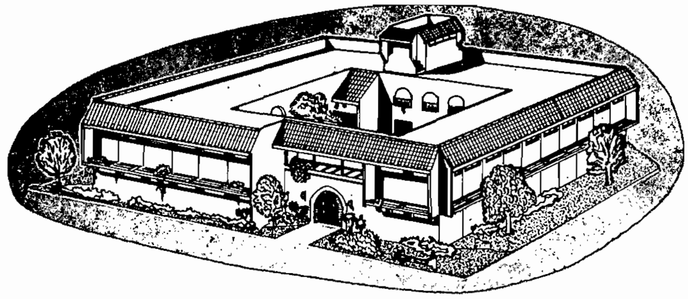
The incremental maximum hourly rate increase in particulate emission due to the proposed modification

= <u>2.19 pounds per hour</u>

REFERENCES FOR EFFICIENCIES

1. Allowance for spillage.
2. Fifty percent for duct losses at entry and exit.
3. Enclosed transfers.
4. Generally 50%, but 40% allows for end losses.
5. Allowance for conditioning due to high moisture content.
6. Allowance for compaction.
7. Allowance for reclaim under surcharged conditions. (Coal stored directly over reclaim hopper.)
8. Cyclone separators.

HILLSBOROUGH COUNTY
ENVIRONMENTAL PROTECTION
COMMISSION



ROGER P. STEWART
DIRECTOR

1900 - 9th AVE
TAMPA, FLORIDA 33605

TELEPHONE (813) 272-5960

January 13, 1983

DER
JAN 17 1983
BAQM

Mr. Bob King, Engineer
Florida Department of Environmental Regulation
2100 Blair Stone Road
Tallahassee, Florida 32301

RE: TECO Air Permit Modification Application to Gannon's Coal Yard

Dear Mr. King:

Your request for information, led to a visit to TECO's Gannon Station on January 6, 1983 by Mr. Anthony Jones and myself. The following report is my account of my observations of the coal yard and conversations with Mr. Jim Nail and Mr. Patrick Ho. There was no coal moving activity during this visit.

Coal is received by barge and by rail car. Coal is unloaded from the barge with two clamshell buckets into bins. The east bin is enclosed on all but one side (windshield). The clamshell bucket is within this enclosure when the coal is released from the bucket. The bin on the west side is not enclosed. The coal can be dropped from this bucket, passing about 10 feet through open air. From the hoppers,coal is conveyed onto the conveyor belt running along side the dock. At the east end of the conveyer coal is transferred to a south bound conveyor which goes to a transfer house "T1" which also receives coal from the rail car bin.

Rail cars enter a building to unload coal. This building is open on the east and west side. A large device suspended inside this building is fastened to the rail car in order to vibrate it, assisting the dropping of coal from the bottom of the rail car. The coal posses through a grating into a large underground hopper bin. An underground conveyor transfers coal from here to the transfer house "T1".

Limestone pebble is to be brought to the plant by truck and then stored at the proposed limestone pile. Limestone would be conveyed from a hopper at this pile to the transfer house "T1". From here it will be conveyed to transfer house "T2".

The transfer house "T2" transfers coal received from "T1" onto stacker conveyors for loadout onto coal piles. Coal is bulldozed into underground receiving hoppers for conveyence to transfer house "T2". Both coal and limestone pass from "T2" by conveyor to the fine crusher house, onto another conveyor and into the power plant bunkers. The coal bunkers utilize cyclones which remove and prevent methane gas buildup.

East transfer and the crushing building have a collecting vat to collect the fine material which earlier adhered to the conveyor belt and drops it through a chute to the ground below. I did not see any brushes to clean the returning belt.

It was said that the coal usually has a high moisture content when received due to the shipment passing through inclement weather in route, and thus results in a minimum of emissions (dust). Most of the coal they received is unwashed. Washing coal is done whenever it is contaminated with a significant quantity of dirt. This usually occurs when they mine a narrow coal vein. The coal was said to be conditioned by shaping and compaction. This conditioning is done to minimize fire hazard from the methane gas evolving from the coal piles. There have never been any coal fire at TECO's plants.

All conveyor belts have top and side enclosures. I did not observe any brushes for cleaning the returning conveyor belts. Transfer points are controlled only with enclosures. Free-fall of the coal occurs when it is dropped from the west side clamshell bucket into the hopper and later when the stocker drops it onto the coal pile. Loading operations of the coal and limestone into hoppers from their respective piles occurs with a bulldozer pushing material above the underground hopper, not with a front-end loader. The coal pile is not watersprayed. Its high moisture content presently causes boiler operational problems.

There was almost no evidence of a dust problem. This could be due to an earlier rainstorm, good housekeeping or lack of dust problems at this time.

My concerns are as follows:

1. Presently the coal has a high moisture content. Apparently this moisture is not desirable. What if efforts occur to eliminate this moisture or the coal does not pass through inclement weather - will there be significant emissions with present controls?

2. Why doesn't the west hopper have a "windshield" like the east hopper? Should it have?

3. Are emissions from the underside of the conveyor significant to require cleaning of the returning conveyor belt.

4. Are there more emissions from transfer points when dry coal is transferred with present controls.

5. Will the limestone be crushed? To what size? Will it be stored within the power plant bunker? What controls are used?

6. Should the road to the limestone pile be paved and kept clean?

7. Is limestone pebble friable?

8. Will additional controls produce significant benefit to justify their cost?

Sincerely,

Frank Shindle

Frank Shindle
Environmental Engineer
Hillsborough County Environmental
Protection Commission

FS:dr
cc: Dan Williams

TAMPA ELECTRIC
A TECO ENERGY COMPANY

Bob Kirk

November 22, 1982

Mr. C. H. Fancy, P.E.
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301

DER
NOV 29 1982
BAQM

RE: Modification to Air Construction Permits
AC 29-67216
Gannon Coal Yard - Tampa Electric Company

Dear Mr. Fancy:

In response to your letter dated November 5, 1982, please find the answers listed below:

1) The maximum hourly fugitive emissions have been evaluated and are presented in the attached Supplement to the Emission Analysis.

It should be noted that the maximum hourly emissions from area sources were obtained by directly converting the annual estimates to an hourly estimate. This procedure is not recommended by EPA, but EPA does recognize that this is a reasonable approach since short term emission factors have not yet been developed. (See EPA letter attached to your letter dated November 5, 1982).

2) The emission formula stated in your letter:

$$E = \frac{0.0018 \left(\frac{S}{5}\right)\left(\frac{U}{5}\right)\left(\frac{h}{5}\right)}{\left(\frac{M}{5}\right)^{2} \left(\frac{y}{6}\right)^{1/3}}$$

refers to batch load-in's and load-out's. This equation is appropriate for processes such as barge or train unloading but not for continuous operations such as stacker/reclaimer or conveyor activities.

The Emission Analysis has been revised to include the above formula for process numbers 1, 2 and 7. The revised computations are presented in the attached Supplement to the Emission Analysis. These computations show an additional increment of 1.05 tons/year.

3) The area source emission formula.

$$E = 0.05\left(\frac{S}{1.5}\right)\left(\frac{d}{235}\right)\left(\frac{f}{15}\right)\left(\frac{D}{90}\right)$$

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601 (813) 228-4111

was obtained from:
"Particulate Emission Factors Applicable to the Iron and Steel Industry", September 1979, EPA 450/4-79-028, page 48, table 13, source category #6. (See attached table 13).

4) Please see Attachment "A" for coal and limestone information.

5) The cyclones have not yet been purchased so a manufacture's guarantee is not available. The cyclone specifications do, however, require a removal efficiency of 95% for particle sizes greater than 15 microns. (See Attachment "B").

6) The time in the live and active, (L & A) storage area is dependent on the L & A storage capacity and the throughput rate to this area. Since the capacity for L & A storage is the same for both existing and proposed systems, and the proposed system has a higher L & A throughput rate, then it would be expected that the time in L & A storage be less for the proposed system than the existing systems.

   In the case of Gannon Coal Yard the time in live and active storage is 15.7 days for the proposed system and 26 days for the existing system. (See pages 8 & 9, Emission Analysis Report)

We trust that this additional information will be adequate to complete the application, and that the processing efforts will resume so as to expedite the permit.

Sincerely,

John B. Ramil

John B. Ramil, P.E.
Manager
Environmental Planning

JBR:tb

cc: Roger P. Stewart (w/enc.)
Dan Williams (w/enc.)
L. F. Robinson, P.E.

ATTACHMENT A

COAL & LIMESTONE CHARACTERISTICS

COAL

(A) Originating Area: It is expected that the two prime suppliers of coal to Gannon Station will be Gatliff Coal and Pyramid Mining of East and West Kentucky respectively.

(B) Type of coal - bituminous

(C) Silt content - the average silt content of the coal before entering the fine crushers has been estimated to be 5%. Previous analyses by Midwest Research Institute have shown this value to be representative of coal storage piles in a wide range of geographic locations.*

(D) Moisture Content

Source	Contract Specification	Plant Analysis (As received)
E. Kentucky	10% Max.	8.12%
W. Kentucky	12% Max. 10% Monthly Avg.	11.96%

LIMESTONE

(A) Originating Source - no supplier has yet been chosen to provide the limestone but the originating area is expected to be the State of Florida.

(B) Type of limestone - washed pebble limestone.

(C) Silt content - due to the washed nature of the limestone, it is not expected that more than 0.1% of the material will be silt. Contract specifications call for only 1% passing a number 8 mesh.

(D) Moisture content - since no limestone has yet been purchased, it is not known what the actual moisture content will be, this value has been estimated to be between 12% & 13%.

*Particulate Emission Factors Applicable to the Iron and Steel Industry, page 51, table 15, 3a. EPA 450/4-79-028.

ATTACHMENT B

Specified Dust Removal Efficiency

Dust removal efficiency shall be as follows:

Particle size (Microns)	Efficiency
1	10%
2	20%
4	40%
6	56%
8	70%
10	82%
15 and above	95%

TABLE 13. FUGITIVE DUST EMISSION FACTORS EXPERIMENTALLY DETERMINED BY MRI

Source category	Measure of extent	Emission factor[a/] (lb/unit of source extent)	Correction Parameters
1. Unpaved roads	Vehicle-Miles Traveled	$5.9 \left(\frac{s}{12}\right)\left(\frac{S}{30}\right)\left(\frac{W}{3}\right)^{0.7}\left(\frac{w}{4}\right)^{0.5}\left(\frac{d}{365}\right)$	s = Material Silt Content (%)
2. Paved Roads	Vehicle-Miles Traveled	$0.09\ I \left(\frac{4}{N}\right)\left(\frac{s}{10}\right)\left(\frac{L}{1,000}\right)\left(\frac{W}{3}\right)^{0.7}$	S = Average Vehicle Speed (mph) W = Vehicle Weight (tons)
3. Batch Load-In (e.g., front-end loader, railcar dump)	Tons of material Loaded In	$0.0018 \dfrac{\left(\frac{s}{5}\right)\left(\frac{U}{5}\right)\left(\frac{h}{10}\right)}{\left(\frac{M}{2}\right)^{2}\left(\frac{Y}{6}\right)}$	L = Surface Dust Loading on Traveled Portion of Road (lb/mile)
4. Continuous Load-In (e.g., stacker, transfer station)	Tons of Material Loaded In	$0.0018 \dfrac{\left(\frac{s}{5}\right)\left(\frac{U}{5}\right)\left(\frac{h}{10}\right)}{\left(\frac{M}{2}\right)^{2}}$	U = Mean Wind Speed (mph) M - Material Surface Moisture Content (%)
5. Active Storage Pile Maintenance and Traffic	Tons of Material Put Through Storage	$0.10\ K \frac{s}{1.5}\left(\frac{d}{235}\right)$	Y = Dumping Device Capacity (yd^3) K = Activity Correction[b/]
6. Active Storage Pile Wind Erosion	Tons of Material Put Through Storage	$0.05 \left(\frac{s}{1.5}\right)\left(\frac{d}{235}\right)\left(\frac{f}{15}\right)\left(\frac{D}{90}\right)$	d = Number of Dry Days Per Year
7. Batch Load-Out	Tons of Material Loaded Out	$0.0018 \dfrac{\left(\frac{s}{5}\right)\left(\frac{U}{5}\right)\left(\frac{h}{10}\right)}{\left(\frac{M}{2}\right)^{2}\left(\frac{Y}{6}\right)}$	f = Percentage of Time Wind Speed Exceeds 12 mph at 1 ft above the ground D = Duration of Material Storage (days)
8. Wind Erosion of Exposed Areas	Acre-Years of Exposed Land	$3,400 \dfrac{\left(\frac{e}{50}\right)\left(\frac{s}{15}\right)\left(\frac{f}{25}\right)}{\left(\frac{P-E}{50}\right)^{2}}$	e = Surface Erodibility (tons/acre/year) P-E = Thornthwaite's Precipitation-Evaporation Index N = Number of Traveled Lanes I = Industrial Road Augmentation Factor[c/] w = Average Number of Wheels on Vehicle Mix h = Drop Height (ft)

a/ Represents particulate smaller than 30 μm in diameter based on particle density of 2.5 g/cm^3.

b/ Equals 1.0 for front-end loader maintaining pile tidiness and 50 round trips per truck per day in the storage area.

c/ * Equals 7.0 for trucks coming from unpaved to paved roads and releasing dust from underbody of vehicle;
* Equals 3.5 when 20% of the vehicles are forced to travel temporarily with one set of wheels on an unpaved road berm while passing on narrow roads;
* Equals 1.0 for traffic entirely on paved surfaces.

Noble & Associates

SUPPLEMENT

EMISSION ANALYSIS

of

COAL HANDLING MODIFICATIONS
AT THE GANNON COAL YARD

prepared for

TAMPA ELECTRIC COMPANY

by

George Noble, P.E.
NOBLE & ASSOCIATES

November 17, 1982

INTRODUCTION

This supplement contains information concerning the following:

1. Batch Operations

   Derivation of batch load-out and load-in particulate emission factors based on an unpublished equation provided by the Florida DER.

2. Maximum Hourly Rates

   Derivation of the maximum hourly rates of particulate emission and a comparison of hourly emissions (Existing vs. Proposed Systems).

1. Batch Operations

Based on information provided by the Florida DER, batch load-in/load-out is given by:

$$E = \frac{0.0018\ (\frac{s}{5})\ (\frac{U}{5})\ (\frac{h}{5})}{(\frac{M}{5})^2\ (\frac{Y}{6})^{0.34}}$$

$$E = \frac{0.0018\ (\frac{5}{5})\ (\frac{8.7}{5})\ (\frac{h}{5})}{(\frac{M}{5})^2\ (\frac{Y}{6})^{0.34}}$$

$$E = \frac{0.0018\ (1)\ (1.74)\ h\ (25)}{M^2\ Y^{0.34}\ (5)\ (0.54)}$$

$$E = \frac{0.029\ h}{M^2\ Y^{0.34}} \text{ lbs/ton}$$

where h = height of drop (ft)
M = Moisture content (%)
Y = Bucket capacity (yd^3)

For unit train coal:

$$E = \frac{0.029\ h}{8.12^2\ Y^{0.34}}$$

$$= 0.00044\ (\frac{h}{Y^{0.34}})$$

Conservatively $Y = 100\ yd^3$ for unit train

$$E = \frac{0.00044\ h}{100^{0.34}}$$

$$E = \frac{0.00044\ h}{4.786}$$

$$E = 0.000092 \quad lbs/ton$$

For barge coal:

$$E = \frac{0.029\ h}{11.96^2\ Y^{0.34}}$$

$$E = 0.0002 \quad \left(\frac{h}{Y^{0.34}}\right)$$

Conservatively $Y = 7\ yd^3$ for grab bucket

$$E = \frac{0.0002\ h}{7^{0.34}}$$

$$E = \frac{0.0002\ h}{1.9379}$$

$$E = 0.00011\ h \quad lbs/ton$$

Using these emission factors, the Existing and Proposed System Emissions are shown in the following tables.

PARTICULATE EMISSIONS

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
							Type	Efficiency (%)	
1	Grab bucket from Barge	0.02 (Spillage)	110h	30	3300	0.0330	Grab bucket	--	0.0330
2	Bucket to Hopper	0.178	110h	2	220	0.0196	Windshield	25[1]	0.0147
3	Hopper to Feeder	0.178	9h	2	18	0.0016		--	0.0016
4	Feeder to Conveyor B	0.178	9h	15	135	0.012	Enclosure	50[2]	0.006
5	Conveyor B to Conveyor C	0.178	9h	10	90	0.080	Enclosure	50	0.040
6	Conveyor C to Conveyor D	0.178	9h	26	234	0.021	Enclosure	70[3]	0.006
7	Rail car to hopper	1.092	92h	17	1564	0.854	Enclosure (open-ended)	40[4]	0.512
8	Hopper to Feeder	1.092	20h	2	40	0.022	Enclosure	50	0.011
9	Feeder to Convyr. L	1.092	20h	1	10	0.005	Enclosure	50	0.003
10	Conveyor L to Conveyor D	1.092	20h	28	560	0.306	Enclosure	70	0.092
11	Conveyor D to Radial Stacker E	1.27	17h	24	408	0.259		--	0.259
									0.979

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls: Type	Controls: Efficiency (%)	Controlled Emissions (tons/year)
12	Stacker E to stockpile	1.27	17h	27.5 (avg.fall)	46.7	0.029	Free fall	--	0.029
13	Stockpile Live	1.12	63,700	--	63,700	35.67	Conditioned[5]	50	17.84
	Dead	0.15	894,000	--	894,000	67.05	Condit/Cmpct[6]	70	20.11
14	Underground reclaim to F_1/F_2	1.27	17h	7	11.9	0.008	Underground	85[7]	0.0012
15	F_1/F_2 to G_1/G_2	1.27	17h	5	8.5	0.005	Enclosure	70	0.0015
16	G_1/G_2 to Crusher	1.27	17h	20	50	0.032	"	70	0.0096
17	Crusher to H_1/H_2	1.27	17h	6	15.3	0.009	"	70	0.0027
18	H_1/H_2 to J_1/J_2	1.27	17h	13	221	0.140	"	70	0.042
19	J_1/J_2 to Bunker	1.27	17h	27	459	0.291	"	70	0.087
20	Vehicular entrainment	9,125	0.124 lbs/ vehicle mi.	--	--	0.566	--	--	0.566
21	Dozer activity	1,220	0.31 lbs per mile	--	--	0.189	--	--	0.189
									39.86

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls		Controlled Emissions (tons/year)
							Type	Efficiency (%)	
1	Grab bucket from Barge	0.09 (Spillage)	110h	30	3300	0.148	Grab bucket	--	0.148
2	Bucket to Hopper	0.9	110h	2	220	0.099	Windshield	25[1]	0.074
3	Hopper to Feeder	0.9	9h	2	18	0.008		--	0.008
4	Feeder to Conveyor B	0.9	9h	15	135	0.061	Enclosure	50[2]	0.030
5	Conveyor B to Conveyor C	0.9	9h	10	90	0.041	"	50	0.020
6	Conveyor C to D_1/D_2	0.9	9h	25	225	0.101	"	70[3]	0.030
7	Rail car to hopper	1.5	92h	17	1564	1.173	Enclosure (open-ended)	40[4]	0.704
8	Hopper to Feeder	1.5	20h	2	40	0.030	Enclosure	50	0.015
9	Feeder to Convyr.L	1.5	20h	1	10	0.0075	"	50	0.004
10	Conveyor L to D_1/D_2	1.5	20h	30	600	0.450	"	70	0.135
11	D_1/D_2 to M_1/M_2	2.160	20h	17	340	0.367	"	70	0.110
12	M_1/M_2 to E_1/E_2	2.16	20h	8	160	0.173	"	70	0.052
									1.330

PARTICULATE EMISSIONS

	Particulate Emission Source	Throughput (Million Tons)	Emission Factor (lbs/ton) ($x10^{-6}$)	Height of Drop (feet)	Emission Factor (lbs/ton) ($x10^{-6}$)	Uncontrolled Emissions (tons/year)	Controls Type	Controls Efficiency (%)	Controlled Emissions (tons/year)
13	E_1/E_2 to Stockpile	2.16	20h	31.5 (avg. fall)	630	0.680	--	--	0.680
14	Coal Stockpile								
	Live	1.860	38,500	--	38,500	35.81	Conditioned[5]	50	17.90
	Dead	0.3	894,000	--	894,000	134.10	Cond/Compact[6]	70	40.23
15	Limestone Live	0.057	390	--	390	0.01	--	--	0.01
16	Reclaim to $F_1/F_2/F_3/F_4$	2.16	17h	16	272	0.294	Enclosure	85[7]	0.044
17	$F_1/F_2/F_3/F_4$ to G_1/G_2	2.16	17h	24	408	0.441	"	70	0.132
18	G_1/G_2 to Crusher	2.4	17h	20	340	0.408	"	70	0.122
19	Crusher to H_1/H_2	2.4	17h	6	102	0.122	"	70	0.037
20	H_1/H_2 to J_1/J_2	2.4	17h	13	221	0.265	"	95[8]	0.013
21	J_1/J_2 to Bunker	2.4	17h	27	459	0.551	"	95	0.027
22	D_1/D_2 to G_1/G_2 By-passes storage	0.240	17h	56.5	960	0.115	"	70	0.035
23	Vehicular entrainment	9,125	0.124 lbs/vehicle mi.	---	---	0.566	---	---	0.566
24	Dozer activity	1,220	0.31 lbs/mi.	---	---	0.189	---	---	0.189
									61.31

The new totals are summarized in the following table:

System	Controlled Emissions (tons/year) Point Sources	Stockpiles	Total
Existing	1.91	37.95	39.86
Proposed	3.17	58.14	61.31
Increment	1.26	20.19	21.45

Conclusion

The incremental increase in particulate emission due to the proposed modification

= 21.45 tons/year

2. Maximum Hourly Rates

These can be obtained by first computing the tons of emission per tons of total throughput.

i.e. $\dfrac{\text{tons of emission per year}}{\text{tons of throughput per year}}$

The maximum throughput rate for each delivery system is 1500 tons per hour. Theoretically both barge and rail car systems could be delivering the coal to the stockpile simultaneously i.e. stockpile feed = 3000 tons per hour. This will occur rarely.

The reclaim system is rated at 1600 tons per hour. In practice the average will be less, but this figure is the maximum.

$$\text{Maximum hourly rate of Emission} = \left(\frac{\text{tons emission}}{\text{tons throughput}}\right) \times \left(\frac{\text{tons throughput}}{\text{hour}}\right)$$

The emissions from the stockpile take place 365 days a year, 24 hours a day, consequently the maximum hourly rate is arrived at as follows:

$$\text{Maximum hourly rate of Emission} = \left(\frac{\text{tons}}{\text{hour}}\right) = \frac{\text{Annual emission rate}}{365 \times 24} = \left(\frac{\text{tons}}{\text{hour}}\right)$$

The following tables identify the maximum hourly rates of emission in pounds per hour for the existing and the proposed system.

	Particulate Emission Source	Throughput (Million Tons)	Controlled Emissions (tons/year)	Controlled Emissions (tons/ton) (x 10^{-9})	Maximum Throughput rate (tons/hour)	Maximum Hourly Emission (lbs./hour)
1.	Grab bucket from barge	0.02 (Spillage)	0.033	1650.00	150	0.495
2.	Bucket to Hopper	0.178	0.0147	82.58	1500	0.248
3.	Hopper to Feeder	0.178	0.0016	8.99	1500	0.027
4.	Feeder to Conveyor B	0.178	0.006	33.71	1500	0.101
5.	Conveyor B to Conveyor C	0.178	0.040	224.72	1500	0.674
6.	Conveyor C to Conveyor D	0.178	0.006	33.71	1500	0.101
7.	Rail car to Hopper	1.092	0.512	468.89	1500	1.409
8.	Hopper to Feeder	1.092	0.011	10.07	1500	0.030
9.	Feeder to Conveyor L	1.092	0.003	2.75	1500	0.008
10.	Conveyor L to Conveyor D	1.092	0.092	84.25	1500	0.253
11.	Conveyor D to Radial Stacker E	1.27	0.259	203.94	1500	0.612
12.	Stacker E to Stockpile	1.27	0.029	22.83	1500	0.068
13.	Stockpile Live	1.12	17.84	---	---	4.073
	Dead	0.15	20.11	---	---	4.591
14.	Underground reclaim to F_1/F_2	1.27	0.0012	0.94	1000	0.002
15.	F_1/F_2 to G_1/G_2	1.27	0.0015	1.18	1000	0.002
16.	G_1/G_2 to Crusher	1.27	0.0096	7.56	1000	0.015
17.	Crusher to H_1/H_2	1.27	0.0027	2.13	1000	0.004
18.	H_1/H_2 to J_1/J_2	1.27	0.042	33.07	1000	0.066
19.	J_1/J_2 to Bunker	1.27	0.087	6.85	1000	0.013
20.	Vehicular entrainment	9,125 miles	0.566	---	730 hours/yr.	1.551
21.	Dozer activity	1,220 miles	0.189	---	622 hours/yr.	0.608
						14.95

	Particulate Emission Source	Throughput (Million Tons)	Controlled Emissions (tons/year)	Controlled Emissions (tons/ton) (x 10^{-9})	Maximum Throughput rate (tons/hour)	Maximum Hourly Emission (lbs./hour)
1.	Grab bucket from Barge	0.09 (Spillage)	0.148	1644.41	150	0.491
2.	Bucket to Hopper	0.9	0.076	82.21	1500	0.249
3.	Hopper to Feeder	0.9	0.008	8.87	1500	0.027
4.	Feeder to Conveyor B	0.9	0.030	33.34	1500	0.100
5.	Conveyor B to Conveyor C	0.9	0.020	22.23	1500	0.067
6.	Conveyor C to D_1/D_2	0.9	0.030	33.34	1500	0.100
7.	Rail car to Hopper	1.5	0.704	469.35	1500	1.408
8.	Hopper to Feeder	1.5	0.015	10.00	1500	0.030
9.	Feeder to Conveyor L	1.5	0.004	2.67	1500	0.008
10.	Conveyor L to D_1/D_2	1.5	0.135	90.00	1500	0.270
11.	D_1/D_2 to M_1/M_2	2.16	0.110	50.92	3000	0.306
12.	M_1/M_2 to E_1/E_2	2.16	0.052	24.07	3000	0.144
13.	E_1/E_2 to Stockpile	2.16	0.680	314.81	3000	1.889
						5.08

	Particulate Emission Source		Throughput (Million Tons)	Controlled Emissions (tons/year)	Controlled Emissions (tons/ton) (x 10^{-9})	Maximum Throughput rate (tons/hour)	Maximum Hourly Emission (lbs./hour)
14.	Coal Stockpile	Live	1.860	17.90	---	---	4.087
		Dead	o.3	40.23	---	---	9.185
15.	Limestone	Live	0.057	0.01	---	---	0.002
16.	Reclaim to $F_1/F_2/F_3/F_4$		2.16	0.044	20.37	1600	0.065
17.	$F_1/F_2/F_3/F_4$ to G_1/G_2		2.16	0.132	61.11	1600	0.195
18.	G_1/G_2 to Crusher		2.4	0.122	50.83	1600	0.163
19.	Crusher to H_1/H_2		2.4	0.037	15.42	1600	0.049
20.	H_1/H_2 to J_1/J_2		2.4	0.013	5.42	1600	0.017
21.	J_1/J_2 to Bunker		2.4	0.027	11.25	1600	0.036
22.	D_1/D_2 to G_1/G_2 by-passes storage		0.240	0.035	145.84	160	0.023
23.	Vehicular entrainment		9,125 miles	0.566	---	730 hours/yr.	1.551
24.	Dozer activity		1,220 miles	0.189	---	622 hours/yr.	0.608
							21.06

These maximum hourly rates we summarized in the following table:

System	Point Sources	Stockpiles	Total
	Maximum Hourly Rates Controlled Emissions (lbs/hour)		
Existing	6.28	8.66	14.95
Proposed	7.78	13.27	21.06
Increment	1.50	4.61	6.11

Conclusion

The incremental maximum hourly rate increase in particulate emission due to the proposed modification

= 6.11 pounds per hour

No. 0157761

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL

(See Reverse)

SENT TO	John B. Ramil
STREET AND NO.	P. O. Box 111
P.O., STATE AND ZIP CODE	Tampa, FL 33601
POSTAGE	$
CERTIFIED FEE	¢
SPECIAL DELIVERY	¢
RESTRICTED DELIVERY	¢
OPTIONAL SERVICES — RETURN RECEIPT SERVICE: SHOW TO WHOM AND DATE DELIVERED	¢
SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
CONSULT POSTMASTER FOR FEES	
TOTAL POSTAGE AND FEES	$
POSTMARK OR DATE	11/5/82

PS Form 3800, Apr. 1976

PS Form 3811, Jan. 1979 — RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

● SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
   - [x] Show to whom and date delivered............ ¢
   - [ ] Show to whom, date and address of delivery.... ¢
   - [ ] RESTRICTED DELIVERY
     Show to whom and date delivered............ ¢
   - [ ] RESTRICTED DELIVERY.
     Show to whom, date, and address of delivery.$____

   (CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
   Mr. John B. Ramil, P.E.
   P. O. Box 111
   Tampa, FL 33601

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0157761	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE ☐ Addressee ☐ Authorized agent

4. DATE OF DELIVERY — POSTMARK: TAMPA, FL NOV 8 1982

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: — CLERK'S INITIALS

☆GPO : 1979-300-459

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 5, 1982

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

John B. Ramil, P.E.
Manager
Environmental Planning
Tampa Electric Company
P. O. Box 111
Tampa, Florida 33601

Dear Mr. Ramil:

RE: Modification to Air Construction Permit
AC 29-67216, TECO's Gannon Coal Yard

The Department has received your application on October 7, 1982, for a permit of the modification at the Gannon coal yard in Tampa, Florida. Based on the initial review of your proposal, it has been determined that additional information is needed before we can process the application. The information required to complete the application is listed below.

1. The maximum fugitive emissions in lbs/hr from each point, and area source should be evaluated and addressed.

2. The following up-dated emission formula should be used for point source emissions' calculations.

$$E = \frac{0.0018\left(\frac{s}{5}\right)\left(\frac{u}{5}\right)\left(\frac{h}{5}\right)}{\left(\frac{M}{5}\right)^{2}\left(\frac{Y}{6}\right)^{1/3}}$$

The formula on page 5 of your Emission Analysis Report is no longer approved for emissions calculation by EPA and the Department and has been replaced by the above formula (see attached copy). Document where the area source emission formula used on page 7 of your Emission Analysis Report was obtained and provide a copy of this section for our files.

Mr. John B. Ramil, P.E.
Page Two
November 5, 1982

4. Submit coal analysis reports or contract specifications for all different source coals that will be used at the site. The reports shall include orginating areas, coal type, silt content (% less than #200 mesh), and moisture content. Also provide similar reports for the moisture content and silt content of the limestone.

5. Manufacturer's guarantee on the cyclones' 95% removal efficiency is required to document control efficiency. Please submit the guarantee.

6. Explain why two different numbers of days used for coal live and active storage: 15.7 days for proposed system and 26 days for existing system (on page 10, Emission Analysis Report).

When all the required information is received, we will resume processing your application. If you have any questions on the data requested, please contact Bill Thomas or Bob King at (904)488-1344.

Sincerely,

C. H. Fancy, P. E.
Deputy Bureau Chief
BAQM

BK/ks
cc: Roger P. Stewart, Hillsborough County Environmental Protection Commission
Dan Williams, Southwest District

BEST AVAILABLE COPY

Rodi 3-25-81

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

COPY: ALL STAFF
ALL STATE
ALL LOCAL
Kent [illegible]
Lew [illegible]
Roger [illegible]
Bruce [illegible]

FEB 13 1981

RECEIVED
MAR 6 1981
DEPT. OF ENVIRONMENTAL REGULATION

Mr. Joseph A. Curreri, Assistant Manager
Diffusion Impact Studies Section
Environmental Research & Technology, Inc.
696 Virginia Road
Concord, Massachusetts 01742

Dear Mr. Curreri:

This letter is in response to your letter of January 9, 1981, to Mr. Darryl Tyler regarding fugitive particulate emission factors applicable to coal handling operations.

In the EPA publication Particulate Emission Factors Applicable to the Iron and Steel Industry, EPA-450/4-79-028, September 1979, the empirical formulas listed on page 48, Table 13, provide the latest guidance available to estimate annual fugitive dust emissions, and these are the factors we currently recommend. The three steel industry references listed in your letter all represent the same basic work and equations. One additional change has been made to the Batch Load-in equation (Source Category 3 in the above cited Table) since publication. This equation is now:

$$\text{Emission} = 0.0018 \frac{\left(\frac{s}{5}\right)\left(\frac{u}{5}\right)\left(\frac{h}{5}\right)}{\left(\frac{M}{5}\right)^2 \left(\frac{Y}{6}\right)^{1/3}} \text{ lb/tons of material loaded}$$

where the parameter symbols are unchanged from those listed in the reference.

These equations were derived from tests of different source categories such as sand and gravel, and iron and steel industries. The test data were generally taken during short term studies under varying conditions (meteorological, storage pile size, storage pile configuration, aggregate size, etc.) and correlated to the conditions in such a manner as to allow the application of annual conditions to estimate annual fugitive emissions, which is the proper use of the equations. We do not at this time have specific short term emission factors for these operations.

The first four equations in Table 13 (for Unpaved Roads, Paved Roads, Batch Load-in and Continuous Load-in) and Equation 7 (for Batch Load-out) could be employed in a strict mathematical sense for short term fugitive emissions by using short term conditions (24 hour average wind speed, actual moisture content, etc.) which would represent the specific site and period in question. However, it has not been determined that emission estimates so derived would indeed be representative of a short term (24 hour) period. Therefore, we can neither endorse nor preclude their use for short term applications.

Equations 5, 6 and 8 for Active Storage Pile Maintenance and Traffic, Active Storage Pile Wind Erosion, and Wind Erosion of Exposed Areas are also useful as indicated only for estimating annual fugitive dust emissions from the formula input data needed. Equation 8 can be better adapted to a specific site situation by substituting actual moisture content (2.8-11; 4.8 avg. for coal) for the term $(\frac{P-E}{50})^2$. However, once annual emissions are estimated, we cannot state with any confidence how this should be best modified to a short term (24 hour) estimate. Since, however, the levels are presumed to be emitted primarily on "dry" days, it is likely that typical day emissions would be on the order of $\frac{\text{annual emissions}}{\text{number of dry days}}$. If one absolutely had to make an approximation, this would likely be a reasonable approach, although we cannot endorse it.

As I am sure you are aware, the "state of the art" of fugitive dust emission factors is such that resulting estimates from their use are, at best, consistent and reasonable approximations. EPA continues to devote resources to better quantification of emissions from these important sources. Several studies are now underway to extend the data base and to provide better information on the particle size characteristics of such emissions. In addition, our office has recently initiated action to bring AP-42 up to date to reflect the latest data equations and factors now available and to include work being concluded for surface mining operations and roadway activities over the next four to six months. Our plan is to publish the results of the studies being concluded during this time in Supplement 13 of AP-42, about August 1981. We have incorporated into the scope for this update effort a discussion of the use of the equations for short term applications.

In summary, the fugitive emission empirical formulas currently available are not recommended for estimation of short term (24 hour) emissions. Weighing factors and adjustments of the long term formulas have not been developed to convert the emission estimates to short term periods. Until this limitation in current technology is rectified, however, we recognize that short term analyses may be required. Therefore we concur that a reasonable approach would be case by case evaluations using the long term empirical formulas cited above to estimate short term emissions (for modeling). Since Maine is now implementing the Prevention of Significant Deterioration (PSD) program, all decisions regarding what constitutes Best Available Control Technology (BACT) and the degree of monitoring necessary is left to them. However, due to the mentioned limitations in estimating short term emissions, Maine may well choose to exercise its authority under PSD to require postconstruction monitoring.

//

I trust that this discussion is responsive to your needs. If you wish to discuss the problem further, do not hesitate to contact us again.

Sincerely yours,

Richard G. Rhoads
Director
Monitoring and Data Analysis Division

cc: A&HMD Director, Regions I-X
B. Green
B. Steigerwald
M. Trutna
E. Tuerk
D. Tyler
P. Wyckoff

bcc: Ray Smith (OANR)
D.C. Drehmel (IERL)

BEST AVAILABLE COPY

TAMPA ELECTRIC
A TECO ENERGY COMPANY

DATE SEPTEMBER 30 1982 VOUCHER NO. 9 -4517

631

CHECK NUMBER 1-90096

PAY

$500.00xx

TO THE ORDER OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

$500.00xx

C. H. Hardee

THE EXCHANGE BANK AND TRUST CO.
OF FLORIDA
TAMPA, FLORIDA

[redacted]

ONLY ONE SIGNATURE REQUIRED ON CHECKS OF $2500.00 OR LESS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

№ 33627

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Tampa Electric Company Date October 11, 1982

Address P.O. Box 111 Tampa, Florida 33601 Dollars $ 500.00

Applicant Name & Address Same as above.

Source of Revenue

Revenue Code 0101 Application Number AC 29-61276

By Patricia G. Adams

AC 29-61276

DER

OCT 11 1982

BAQM

D.E.R.

OCT 27 1982

SOUTHWEST DISTRICT
TAMPA

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Tampa Electric Company COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Gannon Station Coal Storage Facility Modification

SOURCE LOCATION: Street Port Sutton Road City Tampa

UTM: East 360,000 North 3,087,500

Latitude 27 ° 54 ' 25 "N Longitude 82 ° 25 ' 21 "W

APPLICANT NAME AND TITLE: Tampa Electric Company

APPLICANT ADDRESS: P.O. Box 111, Tampa, FL 33601 Attn: Environmental Planning

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Tampa Electric Company

I certify that the statements made in this application for a Modification to existing permits permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: John B. Ramil

John B. Ramil, P.E., Manager, Environmental Planning
Name and Title (Please Type)

Date: 10-6-82 Telephone No. (813) 228-4111

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: Lynn F. Robinson

Lynn F. Robinson, P.E.
Name (Please Type)

(Affix Seal)

Tampa Electric Company
Company Name (Please Type)

P. O. Box 111, Tampa, FL 33601
Mailing Address (Please Type)

Florida Registration No. 20786 Date: 10/6/82 Telephone No. (813) 228-4111

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Modification to Gannon coal handling system to serve reconverted Units 1 through 4.

See Attachment A for additional information

B. Schedule of project covered in this application (Construction Permit Application Only) See detailed schedule, Attch. B

Start of Construction March 1983 Completion of Construction June 1984

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Conveyor and transfer point enclosures: $239,550

Cyclone Dust Collectors: $71,865

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Units 1-4 reconversion permits:	Issued	Expires
DER Permit AC29-41943	8/7/81	3/15/87
DER Permit AC29-41942	8/7/81	3/15/86
DER Permit AC29-41941	8/7/81	1/15/85
DER Permit AC29-41940	8/7/81	2/15/84

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes __X__ No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

if seasonal, describe:

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
   a. If yes, has "offset" been applied? No
   b. If yes, has "Lowest Achievable Emission Rate" been applied? No*
   c. If yes, list non-attainment pollutants.
      Particulate
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

* See attachment "Emission Analysis of Coal Handling Modifications at the Gannon Coal Yard" and Attachment C

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Modification to Gannon coal handling system to serve reconverted Units 1 through 4.

See Attachment A for additional information

B. Schedule of project covered in this application (Construction Permit Application Only) See detailed schedule, Attch. B

Start of Construction March 1983 Completion of Construction June 1984

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Conveyor and transfer point enclosures: $239,550

Cyclone Dust Collectors: $71,865

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates. Units 1-4 reconversion permits:

	Issued	Expires
DER Permit AC29-41943	8/7/81	3/15/87
DER Permit AC29-41942	8/7/81	3/15/86
DER Permit AC29-41941	8/7/81	1/15/85
DER Permit AC29-41940	8/7/81	2/15/84

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24; days/wk 7; wks/yr 52; if power plant, hrs/yr ____;

if seasonal, describe: ____

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
   a. If yes, has "offset" been applied? No
   b. If yes, has "Lowest Achievable Emission Rate" been applied? No*
   c. If yes, list non-attainment pollutants.
      Particulate
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

* See attachment "Emission Analysis of Coal Handling Modifications at the Gannon Coal Yard" and Attachment C

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: Not Applicable

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) Not Applicable

1. Total Process Input Rate (lbs/hr): ______

2. Product Weight (lbs/hr): ______

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Particulate	Not Applicable	59.81*	See Attachment D	Not Applicable	Not Applicable	279.20	Fig. 1

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Enclosed Transfers	Particulate	70%	Not Applicable	See Attached Emission Analysis
Enclosed Conveyor	Particulate	40-50%	Not Applicable	
Cyclones	Particulate	95%	1 and above	

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard

[4]Emission, if source operated without control (See Section V, Item 3)

[5]If Applicable

* Existing Emissions - 39.41 Tons/year
Proposed Emissions - 59.81 Tons/year
Incremental Emission - 20.40 Tons/year
See Emissions Analysis.

E. Fuels Not Applicable

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Not Applicable Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal. Not Applicable

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack): Not Applicable

Stack Height: ______ ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

E. Fuels Not Applicable

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Not Applicable Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal. Not Applicable

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack): Not Applicable

Stack Height: ______ ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

Gas Flow Rate: ______________ ACFM ______________ DSCFM* Velocity ______________ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation.

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. See Emission Analysis

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). See Emission Analysis

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). See Figure 4

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). See Emission Analysis

6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. See Figure 1

7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). See Figure 2

8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. See Figure 3

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

Not Applicable

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

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Not Applicable

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power — KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:
2. Efficiency*:
3. Capital Cost:
4. Life:
5. Operating Cost:
6. Energy:
7. Maintenance Cost:
8. Manufacturer:
9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

Not Applicable

A. Company Monitored Data

1. ________ no sites ________ TSP ________ ( ) SO^2* ________ Wind spd/dir

Period of monitoring ___/___/___ to ___/___/___
month day year month day year

Other data recorded ____________________

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. ____ Year(s) of data from ___/___/___ to ___/___/___
month day year month day year

2. Surface data obtained from (location) ____________________

3. Upper air (mixing height) data obtained from (location) ____________________

4. Stability wind rose (STAR) data obtained from (location) ____________________

C. Computer Models Used

1. ____________________ Modified? If yes, attach description.

2. ____________________ Modified? If yes, attach description.

3. ____________________ Modified? If yes, attach description.

4. ____________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^2	________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

SECTION VII — PREVENTION OF SIGNIFICANT DETERIORATION

Not Applicable

A. Company Monitored Data

1. ________ no sites ________ TSP ________ ( ) SO^2* ________ Wind spd/dir

Period of monitoring ___/___/___ to ___/___/___
month day year month day year

Other data recorded ________________________________

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. ____ Year(s) of data from ___/___/___ to ___/___/___
month day year month day year

2. Surface data obtained from (location) ________________________________

3. Upper air (mixing height) data obtained from (location) ________________________________

4. Stability wind rose (STAR) data obtained from (location) ________________________________

C. Computer Models Used

1. ________________________________ Modified? If yes, attach description.

2. ________________________________ Modified? If yes, attach description.

3. ________________________________ Modified? If yes, attach description.

4. ________________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^2	________ grams/sec

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F. Attach all other information supportive to the PSD review.

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G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

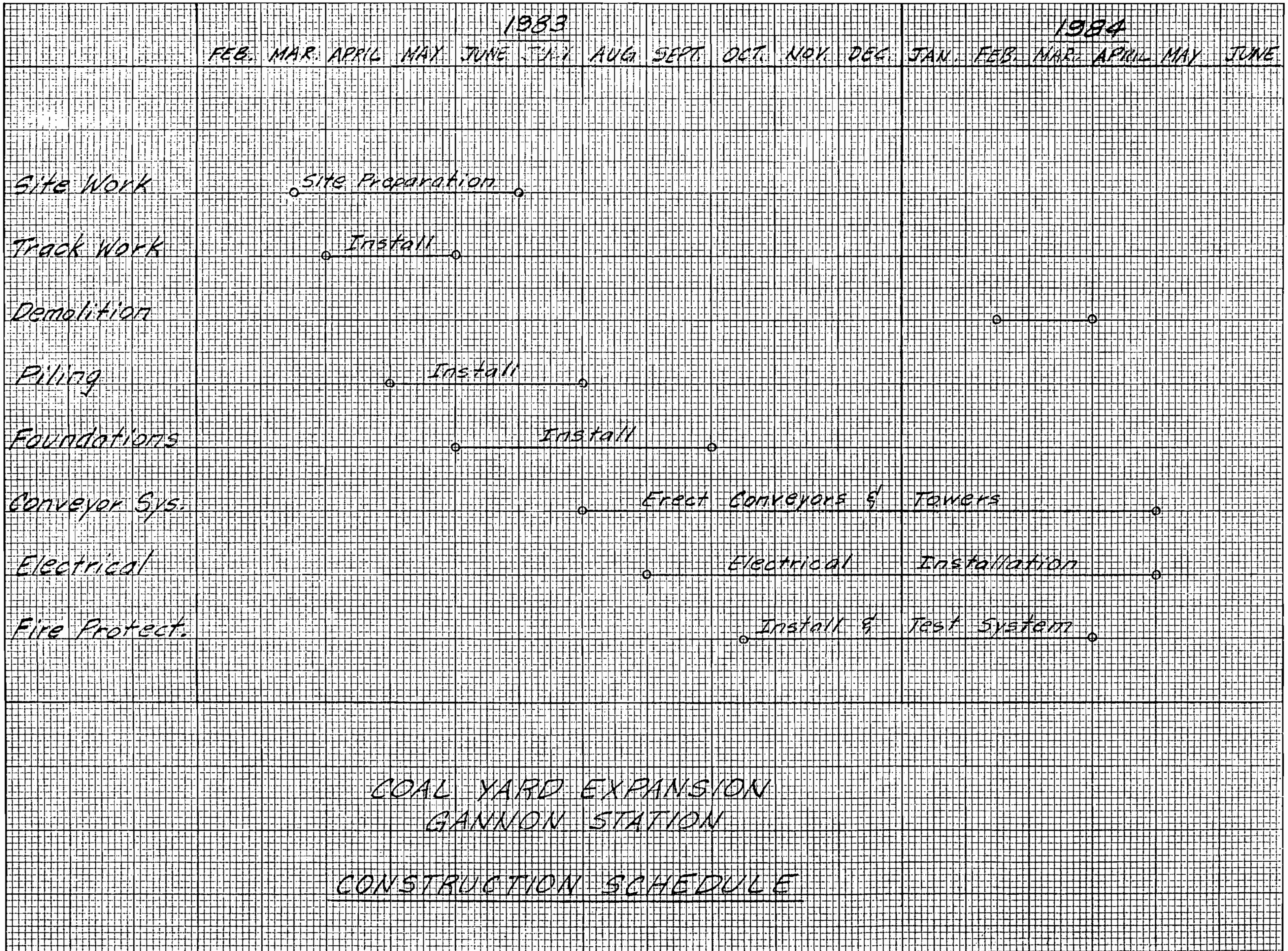
ATTACHMENT A

Section II.A.

The source is a coal storage facility that supplies the F.J. Gannon Power Plant. Presently only Units 5 and 6 are being served by the coal yard. It is proposed that the source be modified to also supply Gannon Units 1, 2, 3, and 4 after reconversion from oil to coal.

The modification is required to allow for efficient stockpiling and reclaiming of the various sulfur content coals, this will provide the flexibility necessary for blending the coals to achieve the required sulfur content and heating values. A limestone stockpile is also proposed to allow for fluxing of the boilers.

Enclosed conveyors, enclosed transfer points and cyclone dust collectors will be utilized to control emissions.



Attachment B

ATTACHMENT C

Section II G b

The modifications to the coal yard are not expected to produce a "Significant Net Emission Increase" in particulates. Thus, pursuant to Florida Administrative Code 17-2.510(2)(d)4a, Preconstruction Review Requirements, including "Lowest Achievable Emission Rate", are not applicable.

ATTACHMENT D

Section III C

Per Section 17-2.650(2)(C)11 b

- Visible emissions: 5% except 10% when material is being discharged into hold of ship.

- Vented emissions: 0.03 gr/dscf
  (eg: cyclones)

BEST AVAILABLE COPY

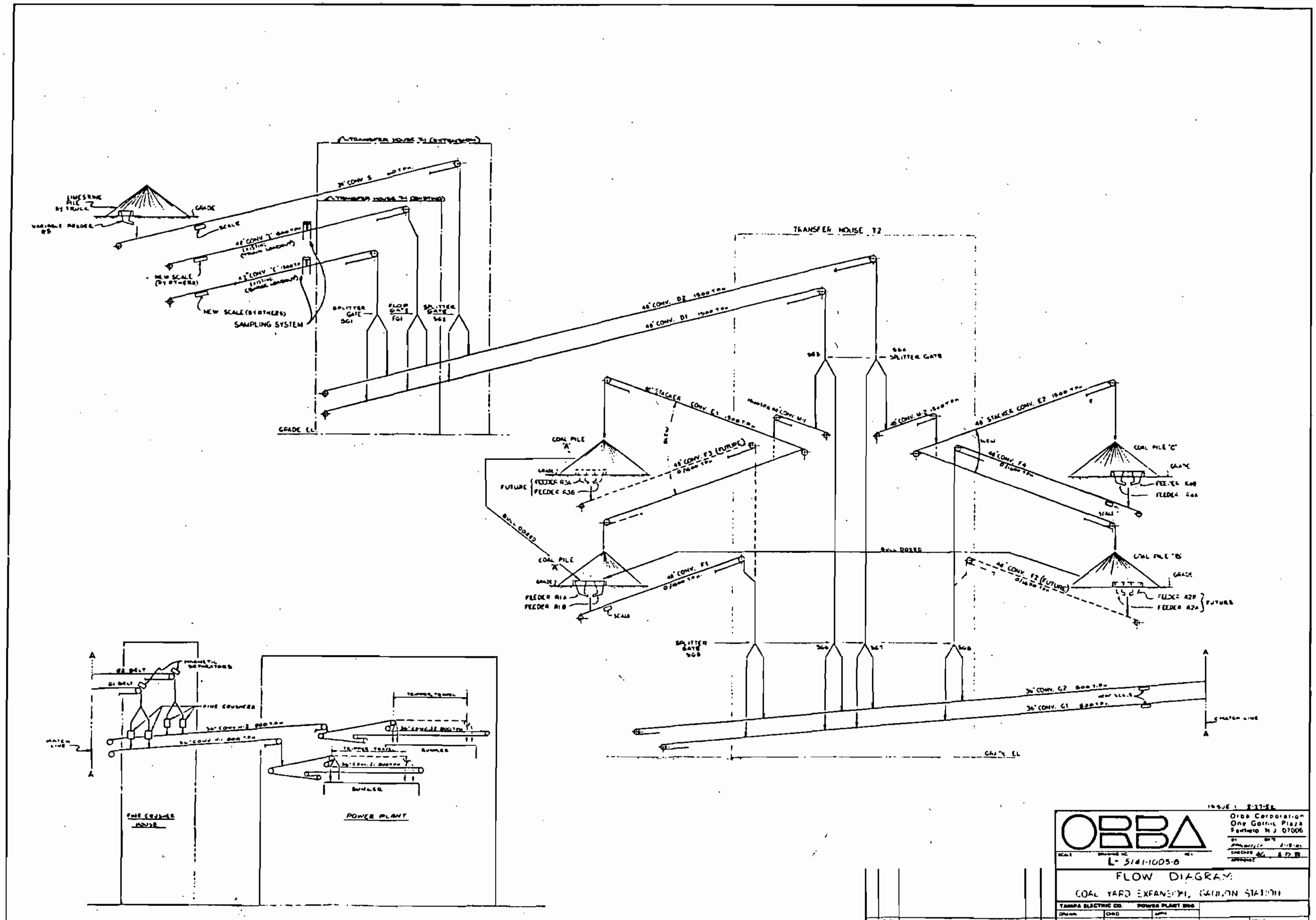


Figure 1

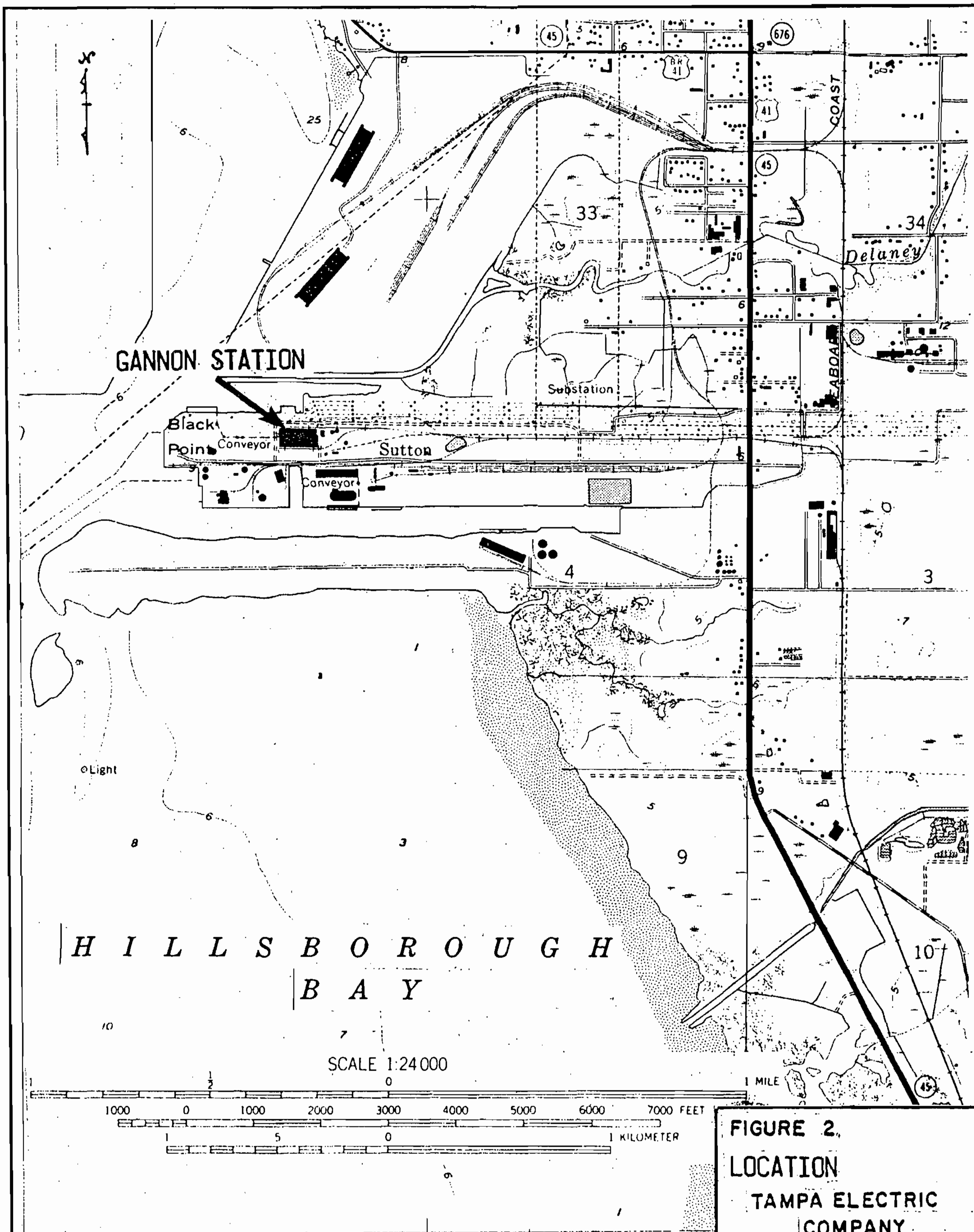


FIGURE 2.
LOCATION
TAMPA ELECTRIC
COMPANY

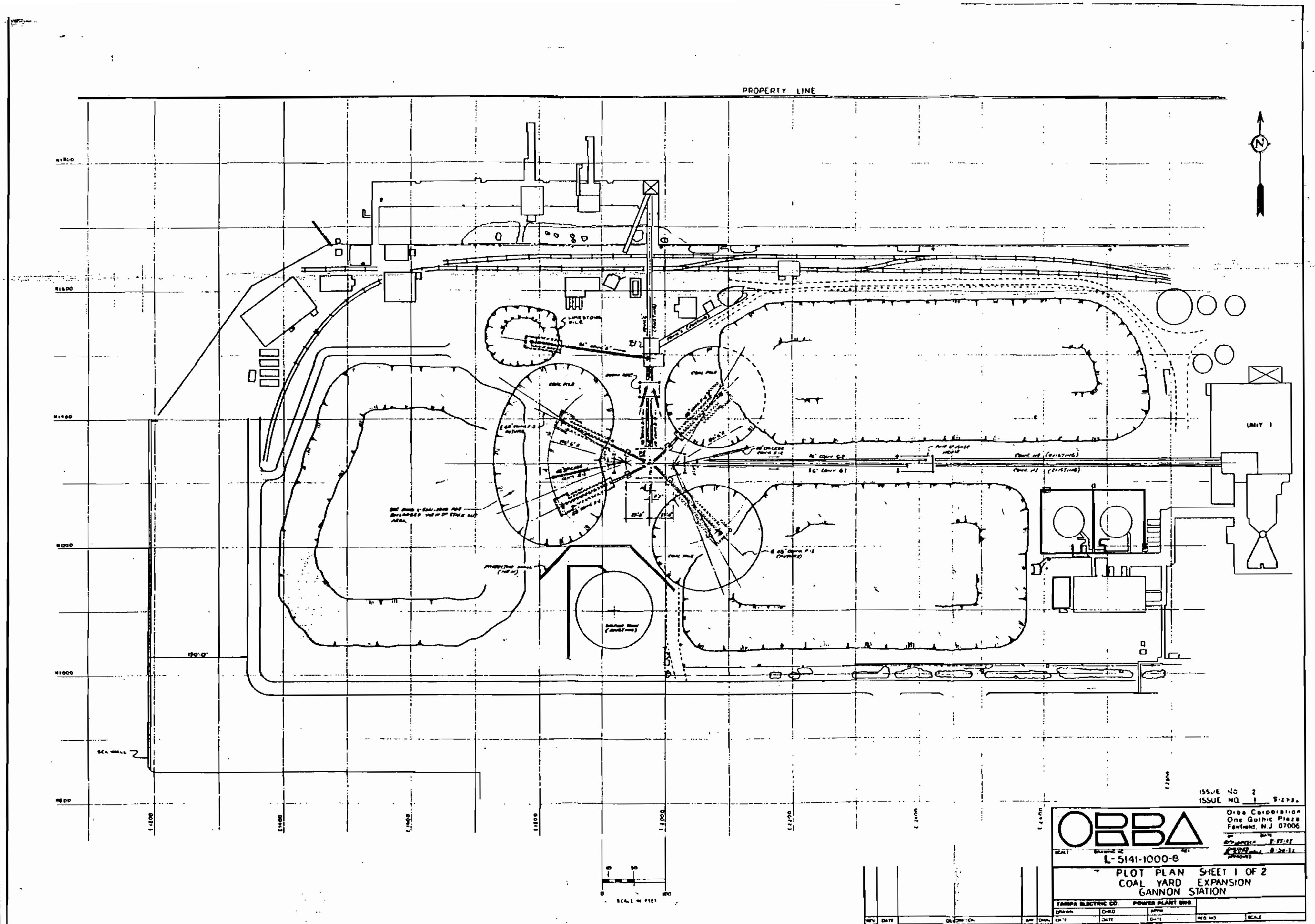

PROPERTY LINE
LIMESTONE PILE
COAL PILE
UNIT 1
ISSUE NO 2
ISSUE NO 1
Orba Corporation
One Gothic Plaza
Fairfield, N.J 07006
L-5141-1000-8
PLOT PLAN SHEET 1 OF 2
COAL YARD EXPANSION
GANNON STATION
TAMPA ELECTRIC CO.
POWER PLANT ENG.

Figure 3

TYPE D ROTO-CLONE

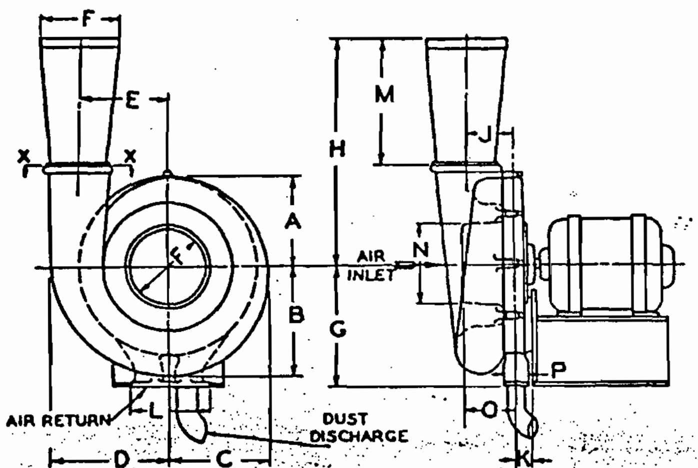


FIG. 1 — Roto-Clone, Direct Driven
Sizes 3 thru 12

Proposed Size

ROTO-CLONE DIMENSIONS IN INCHES
DIRECT DRIVEN AND BELT DRIVEN

Size	3	3 1/2	4	5	6	7	8	10	12	14	16	20	24
A	4 5/16	5 5/8	5 5/8	5 13/16	8 3/8	9 11/16	11 1/16	11 3/8	16 3/8	19 1/16	21 13/16	22 9/16	32 5/8
B	5 1/16	6 5/8	6 5/8	7 1/8	9 13/16	11 3/8	13	13 3/8	19 7/16	22 7/16	25 13/16	27 1/4	38 5/8
C	4 11/16	6 3/16	6 3/16	6 5/16	9 1/8	10 9/16	12 1/8	12 11/16	18 1/16	20 7/8	24 1/16	25 1/8	35 7/8
D	5 5/16	7	7	7 7/16	10 3/8	12 1/8	13 13/16	14 1/2	20 3/8	24	27 7/16	28 13/16	41
E	4 1/8	5 1/2	5 1/2	5 11/16	8 1/4	9 5/8	11	11 3/16	16 1/2	19 1/4	22	22 3/8	33
F	3	3 1/2	4	5	6	7	8	10	12	14	16	20	24
G	6 1/8	7 11/16	7 11/16	7 11/16	11 1/2	13 3/4	15 1/4	15 1/4	22 3/4	27	30 1/2	30 1/2	45
H	10 5/8	13	13	14	18 3/4	21 3/4	24 1/2	28	36 1/4	42	46 3/4	52 3/4	70 3/4
J	2 1/4	2 11/16	2 11/16	2 7/8	3 13/16	4 13/16	5 1/8	5 7/8	7 3/4	9 1/8	10 1/8	11 3/8	14 7/8
K	1 3/16	1 3/16	1 3/16	1 3/16	2	1 3/4	1 15/16	1 15/16	3 1/2	3 7/8	4 5/16	4 5/16	6 5/16
L	5	5 1/2	5 1/2	5 1/2	6 3/4	9 1/2	10	10	14	17 1/4	18 1/2	18 1/2	30
M	6 1/4	7	7	8	10	11 1/2	13	16	19	22	24	30	36 1/4
N	3 1/2	4	4 1/2	5 1/2	6 1/2	7 5/8	8 5/8	10 5/8	12 3/8	14 3/4	16 7/8	20 7/8	25
O	2 3/8	2 3/8	2 3/8	2 15/16	4	4 1/4	5 1/8	6 5/16	7 9/16	9 1/16	10 1/4	12 1/8	10 5/8
P	2	1 3/4	1 3/4	1 3/4	3 3/4	3 5/8	3 1/4	3 1/4	4 1/2	5 3/4	6	6	14 3/4

Figure 4

EVALUATION OF ALTERNATIVE STRATEGIES FOR THE RECONVERSION OF THE GANNON STEAM PLANT TO BURN COAL

Prepared by

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PEDCo Environmental, Inc.
1006 N. Bowen Road
Arlington, Texas 76012

Contract No. 68-02-2535
Task Order No. 19
PN 3280-S

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Air and Hazardous Materials Division
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Archie Lee, Project Officer

September 1980

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

The Francis J. Gannon Steam Plant of Tampa Electric Company (TECO) currently has six units with a total generating capacity of 1315 MW. Units 1-4 are oil-fired units with rated capacities of 115, 125, 175, and 210 MW respectively. Units 5 and 6 are coal-fired boilers with rated generating capacities of 265 and 425 MW respectively. The average coal analysis for 1979 was 12,174 Btu/lb, 1.3 percent sulfur, 10.1 percent ash, and 7.6 percent moisture. The average oil analysis was 150,083 Btu/gal with 0.95 percent sulfur.

Electrostatic precipitators (ESPs) control particulate emissions. Units 1 and 2 have ESPs with design efficiencies of 90 percent each. ESPs on Units 3 and 4 have design efficiencies of 93 and 95.5 percent. Based on coal with 3.2 percent sulfur, Units 5 and 6 have design efficiencies of 99.78 percent. Sulfur dioxide (SO_2) emissions are presently not controlled by any flue gas cleansing system.

For 1979, total particulate emissions were 890 tons for all six boilers. This is 0.056 lb/million Btu for the yearly average. The allowable particulate emissions are 0.1 lb/million Btu. Total SO_2 emissions were 38,500 tons for 1979. This is equivalent to 2.42 lb SO_2/ million Btu. Current SO_2 regulations are 1.1 lb/million Btu for Units 1-4. Units 5 and 6 have maximum allowable rates of 2.4 lb/million Btu.

Tampa Electric Company plans to reconvert Boilers 1-4 from oil burning back to coal because of the increasing price of crude oil. TECO's plans include burning low sulfur coal and using an emission bubble cap to meet SO_2 limitations. Add-on ESPs will be installed on Units 1-4 to aid in particulate emissions.

Using low sulfur coal (1.2 percent sulfur), TECO calculates the expected emissions to be 1.73 lb SO_2/million Btu. This is slightly higher than the current limit, so TECO is requesting an overall emission cap of 10.6 ton/hr to limit SO_2 emission levels. However, with the decrease in sulfur content of the coal, the efficiency of the various ESPs also declines as a result of

increased flyash resistivity. Additional collection area is required to maintain the requisite level of collection efficiency. TECO will install additional ESPs on Units 1-4, the first being completed by mid-1983. Their retrofit plan calls for one ESP to be installed every year for four years.

The other option open to TECO is to burn high sulfur coal (3.78 percent sulfur). High sulfur coal raises the efficiency of the ESPs on Units 5 and 6 to approximately 99.9 percent. The ESPs on Units 1-4 will have an operating efficiency of approximately 90 percent. Burning high sulfur coal causes SO_2 to be emitted at higher levels than currently allowed. At present, there is no system at the plant to control the high SO_2 levels. If the switch to high sulfur coal is made, a flue gas desulfurization (FGD) system will have to be installed. This option is extremely costly because of the lack of available space and the difficulty in retrofit. With high sulfur coal, expected emissions are 6.84 lb SO_2/million Btu. An FGD system with a 77.6 percent efficiency will lower the emission rate to 1.53 lb SO_2/ million Btu. The estimated operating efficiency of a lime or limestone FGD is 85 percent or better. This lowers possible SO_2 emission levels to 1.03 lb SO_2/ million Btu or lower.

A lime or a limestone system are the most feasible FGD systems for Gannon. The major drawback, however, is the large required land area required which Gannon does not have. The lime FGD requires less room than the limestone system, but it still requires 1.3 acres for the necessary equipment. Following TECO's installation schedule, PEDCo projects lime FGD capital cost at around \$310 million, using the present ESPs for particulate control. If a Venturi scrubber is installed, the costs are near \$360 million. These costs amount to \$590/kW, \$685/kW with the venturi. Limestone FGD costs are slightly higher, running near \$320 million with ESPs and \$360 million with a venturi. These capital costs amount to \$610/kW, \$686/kW with the venturi. Annual costs for the lime FGD are \$96 million/year (46 mill/kWh) with ESPs or \$114 million/ year (55 mill/kWh) with a venturi. Annual costs for a limestone FGD are \$99 million (48 mill/kWh) with existing ESPs or \$114 million (55 mill/kWh) with a venturi.

TECO prefers to use low sulfur coal in conjunction with an emission cap. This enables TECO to help reduce overall costs in switching from high priced crude oil to low cost coal. Annual savings for low sulfur coal in comparison with oil are estimated to be $8.7 million. Annual costs for FGD and high sulfur coal are estimated to be $53.7 million higher than for oil. The following table is a present worth comparison of incremental capital and annual costs relative to burning oil for the two principal TECO options:

- Convert units to low-sulfur coal, using ESPs.
- Convert units to high-sulfur coal, using FGD-ESPs.

For the low-sulfur option, capital costs are incurred to convert the units to coal and to install an ESP. For annual costs, the fuel cost differential is negative, but there are two incremental annual costs. First there is the annual cost associated with the ESP. Secondly, there are annual costs associated with the boiler conversion and with the increased O&M requirements for a coal-fired boiler. These costs have been estimated to be 25 percent of the boiler conversion costs. For the high-sulfur coal option, the cost increments fall into the same categories. In addition, there are capital and annual components for the FGD systems.

? Florida has drafted a regulation to limit emissions from the Gannon coal-fired units to 2.4 lb SO_2 per million Btu heat input for each unit on a weekly average. Furthermore, combined emissions from all six boilers are not to exceed 10.6 ton SO_2/h on a weekly basis. ? TECO is to verify compliance by submitting weekly station generation data and weekly composite fuel quality analysis data. Compliance with 3-hour and 24-hour ambient standards is to be insured by load limiting in conjunction with daily fuel quality; details are to be specified in the station operating permit(s). This new regulation has not been promulgated, pending a public hearing in mid-October, 1980. The intent of the proposed regulation is to allow TECO to demonstrate continuing compliance to the satisfaction of the state agency at reasonable cost. The alternative to the use of routine coal analyses would be to require the installation and operation of a continuous emissions monitoring (CEM) system. CEM

We have visited two utilities that use CEM systems extensively and we have discussed the relative problems associated with demonstration of compliance by coal analysis and by the use of CEM equipment. The following conclusions are based on our visits to these plants and on data supplied to us by the Tennessee Valley Authority (TVA).

OVERALL COST COMPARISONS RELATIVE TO PRESENT OIL-FIRING.

	Low-sulfur coal		High-sulfur Coal		
			Lime FGD	Limestone FGD	
	TECO	PEDCo	PEDCo	TECO	PEDCo
Capital Costs ($\$ \times 10^6$)					
Boiler conversion costs	36.4	36.4	99.0	99.0	99.0
Capital FGD and ESP costs (1980)	0.0	0.0	205.4	118.4	212.2
Capital ESP costs (1980)	31.0	40.3	0.0	0.0	0.0
TOTAL	67.4	76.7	304.4	217.4	311.2
Annual Costs ($\$ \times 10^6$)					
Annual fuel costs (1980)	--	(28.5)	(36.96)		(36.96)
Annual FGD and ESP costs (1980)	--	0.0	65.9		68.3
Annual ESP costs (1980)	--	10.7	0.0		0.0
Annual fuel conversion costs	--	9.1	24.8		24.8
TOTAL	--	(8.7)	53.74		56.14

Any system of data collection and reporting that is agreed upon between the utility and the state must report data in a form that is usable to the state and which gives strong evidence that agreed emission limits are being met so that ambient standards will not be violated. The reporting system must be simple enough that the state will not be burdened with a mountain of data to sort through; yet the utility must be able to maintain backup data for a reasonable period of time to defend any challenge that the plant may not be in compliance. By the same token, the utility needs to protect itself from a cumbersome data reduction task. TVA visually integrates 15-minute SO_2 emission averages from strip chart data; this procedure seems too expensive and cumbersome for TECO to have to adopt.

Although an underlying relationship necessarily exists between the sulfur content of coal and the SO_2 emissions from burning the coal, we were unable to correlate TVA's coal analysis data with corresponding CEM data. This may be partly because in our correlation we have not incorporated the variable lag time between loading the bunker and burning the coal. However, some question exists that the two data sets are equivalent for demonstration of compliance with emissions regulations. Whether Florida decides to require coal analysis data or CEM data to demonstrate compliance, the utility must insure that the selected method accurately reflects true SO_2 emissions.

TVA analyzes each coal sample two or three days after the coal is put into the bunker. In most cases the coal is burned about a day before the analysis is completed. Thus the analysis is of little more than historical interest and cannot be used for essentially real-time control. On the other hand CEM data are available only minutes after the coal is burned, and it is conceivable that a system could be developed to divert clean coal into a boiler quickly to bring indicated high SO_2 emissions into line with regulatory limits. However, if no such system is available to TECO, there may be little practical value in eliminating any lag time that coal analysis necessitates.

Because coal has inherent variability in quality, any strategy to comply with emissions regulations must incorporate a statistical analysis to comply with those regulations for a certain minimum percentage of the time. Any regulation that is promulgated should take this statistical variation into account and should permit a given limit to be exceeded only with limited frequency such as one day per month or three weeks per year or ten days per year. Penalties for exceeding the prescribed frequency should be indicated, and the system whereby TECO is to demonstrate continuing compliance should be described in detail.

SECTION 1

INTRODUCTION

This report summarizes the results of a study conducted by PEDCo Environmental, Inc. for the U. S. Environmental Protection Agency (EPA) under Contract No. 68-02-2535, Task No. 19, to provide technical assistance to the State of Florida Department of Environmental Regulation in regard to a petition by Tampa Electric Company (TECO) to revise the Florida State Implementation Plan to permit their Gannon power station to burn low-sulfur coal instead of oil.

TECO is seeking a regulation change from the Florida Department of Environmental Regulation so that the Gannon plant can be converted to low sulfur coal without the need for a flue gas desulfurization (FGD) system.

Our evaluation covers the subjects of low-sulfur coal conversion with electrostatic precipitator (ESP) installation, high-sulfur coal with FGD, and ESP installation, retrofit and coal conversion costs, and continuous emission monitor requirements.

SECTION 2

PLANT DESCRIPTION

The Francis J. Gannon Steam Plant, operated by Tampa Electric Company (TECO), is located four miles southeast of Tampa, Florida, on the East Shore of Hillsborough Bay. The plant has six wet bottom boilers. Boilers 1, 2, 3, and 4, originally coal fired, are Babcock and Wilcox cyclone fired boilers that now use low sulfur No. 6 fuel oil (0.95 percent sulfur average for 1979). Boilers 5 and 6 are Riley pulverized coal turbo-fired boilers with flyash reinjection, that use low sulfur coal (1.3 percent sulfur and 10.1 percent ash averages for 1979) as fuel. All six boilers have electrostatic precipitators (ESPs) to control particulate emissions.

The plant is presently considering plans to reconvert Boilers 1, 2, 3, and 4 from oil back to coal. The addition of add-on ESPs are included in these plans to help control particulate emissions. TECO plans to start the conversion of Boiler 4 by 1983. Following the completion of Boiler 4, Boilers 1, 3, and 2, will be converted in order, with one unit outage per year including six months for ESP tie-in.

The Gannon Plant has performed several studies of the feasibility to convert the oil-fired boilers to coal, including economic evaluations comparing the costs of oil-fired and coal-fired boilers. Comparisons between the costs of low sulfur coal and high sulfur coal have also been projected. These comparisons are being used in the consideration of the various emission control systems required. Low sulfur coal will not produce great amounts of SO_2 (1.73 lb/million Btu) and only add-on ESPs will be needed to control particulate emissions. If high sulfur coal is fired, a new FGD system will be needed to control excessive SO_2 emissions (6.84 lb/million Btu). Either a venturi scrubber or an ESP will be required for particulate control. Boiler design and operating data are listed in Table 2-1. Appendix A is TECO's May 1980 Power Plant Survey Form.

TABLE 2-1. POWER GENERATING UNIT DESIGN AND OPERATING DATA FOR F. J. GANNON PLANT.

Boiler data	Boiler number 1	2	3	4	5	6
Generating capacity	115	125	175	210	265	425
Hours of operation (1979)	5,278	6,416	5,448	5,369	6,630	6,554
Average capacity factor (1979)	48	48	44	42	59	65
Served by stack number	1	2	3	4(a),4(b)	5	6
Boiler manufacturer	B&W	B&W	B&W	B&W	Riley	Riley
Year placed in service	1957	1958	1960	1963	1965	1967
Max. oil consumption (bbl/h)	255	255	344	409	none	none
Max. coal consumption (ton/h)	49.7	49.7	64.9	71.3	93.4	151.4
Max. heat input (million/Btu/h)	1,257	1,257	1,579	1,876	2,284	3,790
Stack height (ft. above grade)	306	306	306	306	306	306
Flue gas rate - max. (acfm)	500,000	500,000	615,000	700,000	681,000	1,120,000
Flue gas temperature (°F)	309	309	266	286	288	292
Emission controls	ESP	ESP	ESP	ESP	ESP	ESP
Emission rates						
Particulates (lb/million Btu)	0.04	0.04	0.03	0.07	0.004	0.02
(lb/h) max.	50	50	48	131	10	76
SO_2 (lb/million Btu)	1.03	1.06	0.96	1.10	1.43	1.9
(lb/h) max.	1,295	1,332	1,535	2,064	3,267	7,330

SECTION 3

FUEL CHARACTERISTICS

The Gannon Plant originally used West Kentucky coal to fire the boilers. As this coal became unavailable, the plant switched to East Kentucky coal. The boilers require an ash content of at least five or six percent to coat the inside of the cyclone burners. Australian and African coal were tried, but difficulties proved them uneconomical.

Presently, the plant has a long-term contract for the import of Polish coal. TECO also owns Cal-Glo mines, which has an estimated 60 million tons in reserve at about 1.9 lb SO_2/million Btu. Low sulfur Polish coal leads to poor ESP performance, so a mixture of Polish and East or West Kentucky coal is used. TECO maintains a stockpile of West Kentucky coal in Louisiana which is readily available by barge.

For 1979, Boilers 5 and 6 used a mixture of coal with a net heating value of 12,174 Btu/lb. On the average, the coal has 10.1 percent ash, 1.3% sulfur, and a 7.6 percent moisture. The average equivalent SO_2 content of this coal was 2.1 lb SO_2 per million Btu. These boilers operate at approximately 88.8 percent efficiency each, with heat inputs of 2691 and 4361 million Btu/h respectively. Fuel sources and analyses for the Gannon boilers are shown in Table 3-1.

TABLE 3-1. FUEL SOURCES OF THE F. J. GANNON PLANT.

COAL (1979)

Quantity (1000 tons)	Source (coal districts)	Supplier
841	8	Cal-Glo Coal Inc.
127	8	Blue Gem Coal and Land Company
26	13	Mineral Land and Mining Company
22	8	Diversified Fuels
14	13	Brilliant Company
111	--	Coal Age (Foreign Supplier, Poland)

AVERAGE COAL ANALYSIS FOR 1979

Btu/lb	% Sulfur	% Ash	% Moisture
12,174	1.3	10.1	7.6

OIL (1979)

3,466,000 bbl	0.95% S	150,083 Btu/gal	Western Fuels (Tampa, Florida)

SECTION 4

EMISSIONS AND ALLOWABLE EMISSION RATES

Presently, the Gannon Plant is meeting the emission limitations set by law. Based on 1979 stack test results, particulate emissions for all six boilers did not exceed the 0.1 lb/million Btu limit. SO_2 emissions for Boilers No. 1 through 4 did not exceed the 1.1 lb/million Btu limit, and emissions from Boilers 5 and 6 are within the 2.4 lb SO_2/million Btu limit. Mass emission rates for each stack are found in Appendix A. In the future, TECO requests that a bubble limit for emission control be used. This would limit the overall plant emission rate to 10.6 ton/h. TECO predicts that the plant can limit the load on all six boilers and burn coal with an equivalent SO_2 content of less than 2.4 lb/million Btu to meet the proposed 10.6 ton/h regulation. Present and predicted emission rates for Units 1-6 are shown in Table 4-1. We have estimated that the existing ESPs on Units 1-4 would have a collection efficiency of 50 percent on low sulfur coal.

TABLE 4-1. PARTICULATE AND SULFUR DIOXIDE EMISSIONS FROM THE F. J. GANNON POWER PLANT.

Boiler no.	Actual collection efficiency ESP	Particulate Emissions: Actual rate lb/10^6 Btu	Particulate Emissions: Actual rate lb/h	Particulate Emissions: Allowable rate lb/10^6 Btu	Particulate Emissions: Allowable rate lb/h	Sulfur Dioxide Emissions: Actual rate lb/10^6 Btu	Sulfur Dioxide Emissions: Actual rate lb/h	Sulfur Dioxide Emissions: Allowable rate lb/10^6 Btu	Sulfur Dioxide Emissions: Allowable rate lb/h
1[a]	86.0	0.04	50	0.1	112	1.03	1,295	1.1	1,240
2[a]	91.0	0.04	50	0.1	112	1.06	1,332	1.1	1,240
3[a]	85.0	0.03	48	0.1	147	0.96	1,535	1.1	1,610
4[a]	80.0	0.07	131	0.1	161	1.10	2,064	1.1	1,770
5[b]	99.8	0.004	9	0.1	211	1.43	3,267	2.4	5,171
6[b]	99.8	0.02	76	0.1	342	1.90	7,330	2.4	8,582
1[c]	88.0	0.1	948	0.1	112	1.9	2,388	1.1	1,240
2[c]	88.0	0.1	725	0.1	112	1.9	2,388	1.1	1,240
3[c]	88.0	0.1	1,909	0.1	147	1.9	3,038	1.1	1,610
4[c]	88.0	0.1	2,986	0.1	161	1.9	3,564	1.1	1,770
5[c]	99.8	0.004	9	0.1	211	1.9	4,339	2.4	5,171
6[c]	99.8	0.02	76	0.1	342	1.9	7,202	2.4	8,582
1[d]	88.0	0.1	294	0.1	112	1.1	1,382	1.1	1,240
2[d]	88.0	0.1	121	0.1	112	1.1	1,382	1.1	1,240
3[d]	88.0	0.1	636	0.1	147	1.1	1,729	1.1	1,610
4[d]	88.0	0.1	1,279	0.1	161	1.1	2,063	1.1	1,770
5[d]	99.8	0.004	9	0.1	211	1.9	4,339	2.4	5,171
6[d]	99.8	0.02	76	0.1	342	1.9	7,202	2.4	8,582

[a]Present oil fired boiler.

[b]Present coal fired boiler.

[c]Predicted low sulfur coal fired.

[d]Predicted high sulfur coal fired with FGD.

SECTION 5

FEASIBILITY OF USING ELECTROSTATIC PRECIPITATORS AND LOW-SULFUR COAL

TECO has studied the feasibility of emissions control systems at Gannon using ESPs, FGD systems, venturi scrubbers, or a combination of these to control overall emissions. The current SO_2 emission regulations are 1.1 lb SO_2 per million Btu for Units 1 through 4, and 2.4 lb SO_2/million Btu for Units 5 and 6. TECO plans to use low sulfur coal (1.2 percent sulfur) to fire all six boilers. However, SO_2 emissions are expected to be 1.73 lb SO_2/million Btu. ESP's will be used to control particulate emissions. If high sulfur coal (3.78 percent sulfur) is used, the estimated uncontrolled emission rate is 6.84 lb SO_2/million Btu. Using a 77.6 percent efficient FGD system, emissions will be reduced to 1.53 lb SO_2/million Btu. To comply with current SO_2 regulations via low-sulfur coal, a coal with 0.62 percent sulfur must be used. TECO indicates that a source of such coal has been located in Utah, and that no problems are anticipated in its availability. This coal was not evaluated in this study because of its high cost. However, with low sulfur coal there would be a decrease in the SO_2 content of the resulting flue gas stream and a corresponding decrease in ESP collection efficiency, but even if high sulfur coal were used, the collection efficiency would be inadequate to meet current regulations. Therefore, an FGD system and particulate control system will have to be installed to control emission levels.

ESP SYSTEM

Electrostatic precipitators are used to remove particulates from flue gases. In ESP operation, a system of alternate parallel banks of ionizing wires and collection plates form a high voltage corona. This corona causes the gas molecules to form ions. The ionized gas molecules collide with and charge the dust particles in the flue gas stream. The charged particles migrate towards oppositely charged plates where they adhere and agglomerate.

The plates are periodically rapped to dislodge the dust particles which then fall into collecting hoppers.

A strong advantage of ESPs is their overall collection efficiency. The design efficiency can be better than 99 percent. However, the sulfur content of coal directly affects the efficiency of flyash removal. A coal with low sulfur content has a poor collection efficiency because of the increased electrical resistivity of the flyash particles. Therefore, with low sulfur coal, larger collection plates are required. Figures 5-1 and 5-2 illustrate the effects of sulfur content on fly ash resistivity and migration velocity. High sulfur coal lowers the resistivity of the flyash and increases the operating efficiency. The existing Gannon ESPs have an estimated 80 to 90 percent flyash collection efficiency. If the conversion is made to low sulfur coal, the efficiencies of the ESPs are expected to drop to less than 75 percent. New ESPs were added to Boilers 5 and 6 to increase design efficiency to 99.7 percent using 3.2 percent sulfur coal, but a switch to low sulfur coal will reduce the efficiency of these ESPs and necessitate the installation of a flue gas conditioning system to meet the particulate regulation of 0.1 lb per million Btu. TECO plans to install add-on precipitators on Gannon Units 1-4.

To compensate for the decline in ESP efficiency with the decline in the sulfur content of the coal, the physical size of an ESP must be increased. We have estimated that an additional ESP specific collection area (SCA) of 580 ft^2 will be required. Capital costs for installing new ESPs on Boilers 1 through 4, will be approximately $40.3 million. Annual operating costs will be approximately $10.7 million per year for all four units.

Low-Sulfur Coal Schedules

TECO has proposed to install ESPs on Boilers 1 through 4, bringing the first unit on line in mid-1983 and an additional unit each year thereafter. This closely corresponds to the PEDCo FGD schedule and is used interchangeably in this report. However, we feel that TECO could expedite the schedule and bring one ESP unit on line every six months after the first one to save additional oil and to avoid some inflation.

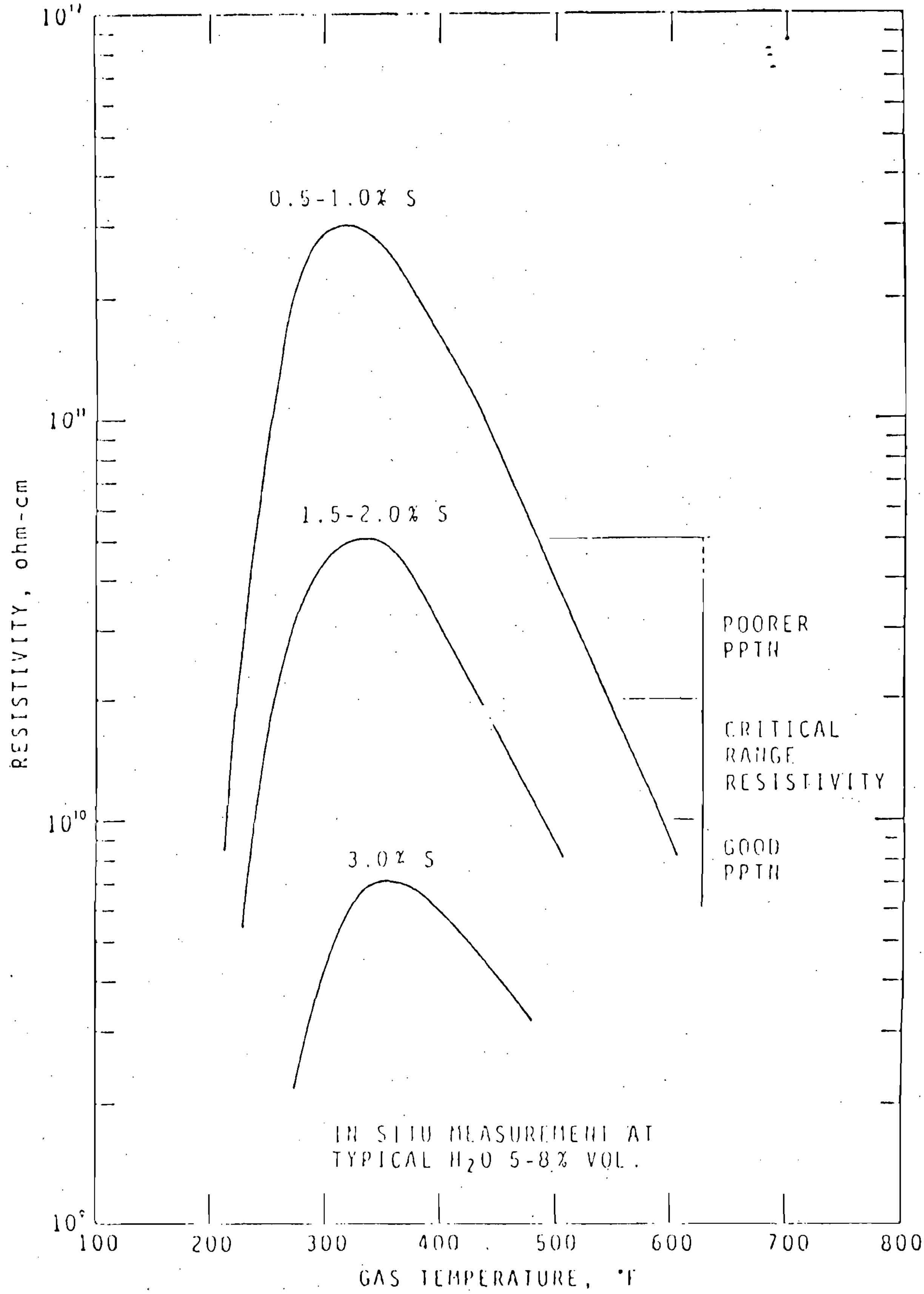

Figure 5-1. Effect of sulfur content and temperature on fly ash resistivity.

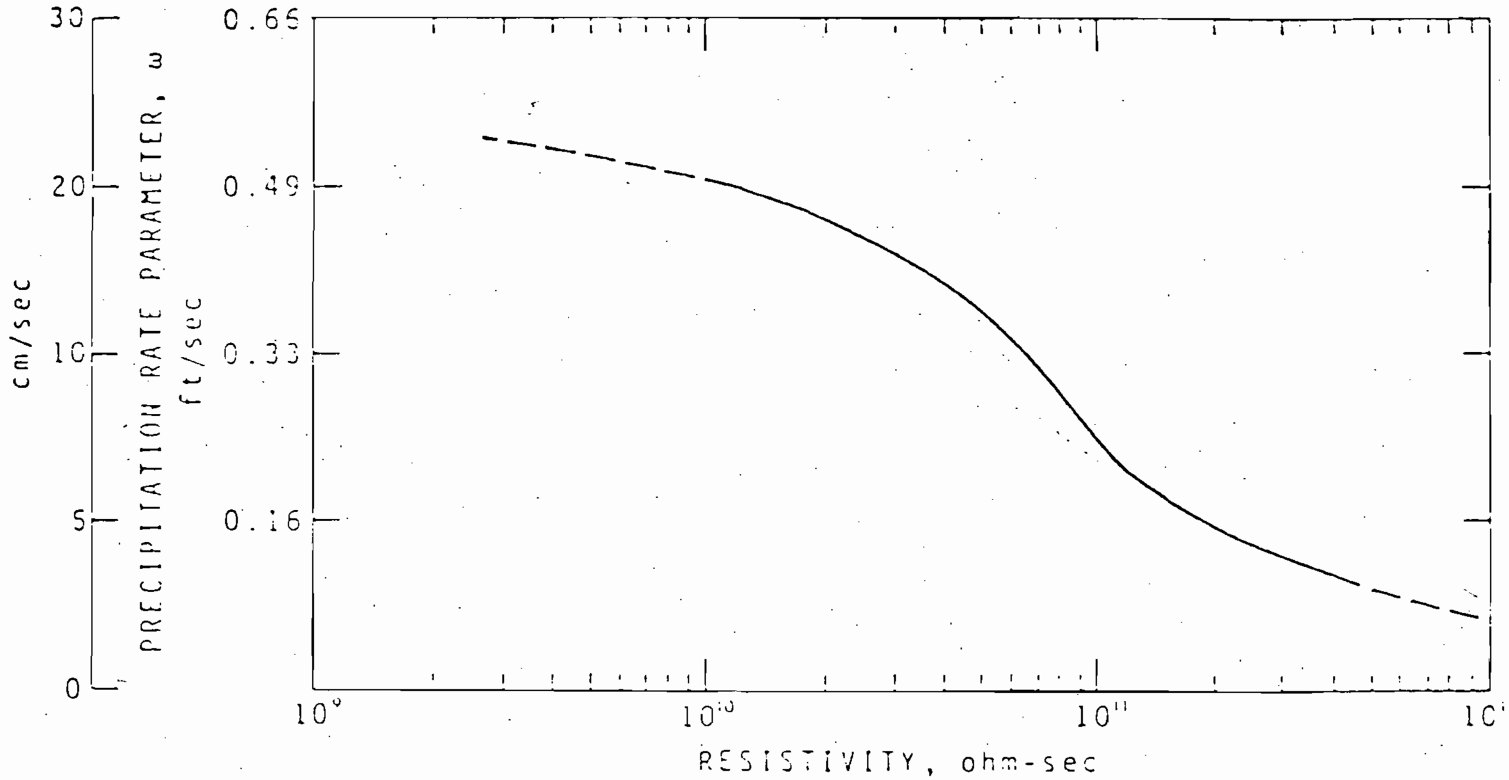

Figure 5-2. Effect of fly ash resistivity on migration velocity.

SECTION 6

FEASIBILITY OF FGD SYSTEMS AT GANNON

The option of using FGD systems at Gannon has been studied by both TECO and PEDCo. Cost estimates have been prepared for the installation of lime and limestone FGD systems in conjunction with new ESPs for the boilers. PEDCo has also estimated costs for the addition of venturi scrubbers to the FGD system in lieu of ESPs. A 77.6 percent efficient FGD system is required to control the SO_2 emissions. Lime and limestone FGD system each have an estimated operating efficiency of 85 percent.

Some of the physical parameters of the lime and limestone FGD systems include scrubber train modules sized in pairs to handle the flue gases from each boiler at its rated capacity with a third module as a spare. For Boiler No. 4, three operating modules and a spare are used. The lime or limestone feed will be 1.3 times stoichiometric requirements. The design SO_2 inlet concentration is 6.84 lb SO_2/million Btu using 3.78 percent sulfur coal. Feeders and conveyors are sized to handle 4.6 times the maximum lime or limestone required. In the absorber, the liquid to gas rate is 40 gallons/1000 standard cubic feet for lime, and 65 gallons/1000 standard cubic feet for limestone. Slurry concentration is 8 percent by weight for either lime or limestone. The flue gas pressure is atmosphere. The total pressure drop through the FGD system will be 15 inches H_2O for Boilers 1 through 4. The flue gas temperatures for the four boilers are: 309°F for Nos. 1 and 2, 266°F for No. 3, and 286°F for No. 4. The flue gas reheater will use low pressure steam for indirect heat exchange. Scrubbed gases at 125°F are reheated to a temperature of 175°F. The clarifiers are sized at 15 square feet of surface area per ton of dry solids removed per day.

PEDCo's estimated FGD costs are shown in Tables 6-1 through 6-4. Lime and limestone costs for FGD-ESP systems are shown in Table 6-1. Present worth capital investment is estimated to be $205 million or $391/kW. Annual costs

TABLE 6-1. COSTS OF FGD WITH ESP FOR GANNON BOILER NO. 1 THROUGH 4.

	Lime FGD				Limestone FGD			
	Capital cost		Annual cost		Capital cost		Annual cost	
Schedule	$\$x10^6$	\$/kW	$\$x10^6$	Mills/kWh	$\$x10^6$	\$/kW	$\$x10^6$	Mills/kWh
1980	205	391	66	32	212	404	68	33
PEDCo FGD schedule	251	479	79	38	260	495	82	40
TECO FGD schedule	310	590	96	46	320	610	99	48
1990	423	806	135	65	437	833	140	68

TABLE 6-2. COSTS OF FGD WITH VENTURI FOR GANNON BOILERS NO. 1 THROUGH 4.

	Lime FGD				Limestone FGD			
	Capital cost		Annual cost		Capital cost		Annual cost	
Basis	$\$x10^6$	\$/kW	$\$x10^6$	Mills/kWh	$\$x10^6$	\$/kW	$\$x10^6$	Mills/kWh
1980	238	454	77	37	239	455	78	38
PEDCo FGD schedule	292	556	93	45	292	556	94	45
TECO FGD schedule	360	685	114	55	360	686	114	55
1990	491	935	158	76	491	936	159	77

TABLE 6-3. COMPARISON OF FGD TOTAL CAPITAL INVESTMENT FOR GANNON BOILER NO. 1 THROUGH 4.

	Lime				Limestone				ESP	
	With ESP		With venturi		With ESP		With venturi			
Basis	$\$x10^6$	$/kW	$\$x10^6$	$/kW	$\$x10^6$	$/kW	$\$x10^6$	$/kW	$\$x10^6$	$/kW
1980	205	391	238	454	212	404	239	455		
PEDCo FGD schedule	251	479	292	556	260	495	292	556	49	94
TECO FGD schedule	310	590	360	685	320	610	360	686		
1990	423	806	491	935	437	833	491	936		

TABLE 6-4. COMPARISON OF FGD ANNUAL COSTS FOR GANNON BOILERS NO. 1 THROUGH 4.

	Lime				Limestone				ESP	
	With ESP		With venturi		With ESP		With venturi			
Basis	$\$x10^6$	$/kW	$\$x10^6$	$/kW	$\$x10^6$	$/kW	$\$x10^6$	$/kW	$\$x10^6$	$/kW
1980	66	32	77	37	68	33	78	38		
PEDCo FGD schedule	79	38	93	45	82	40	94	45	13	6
TECO FGD schedule	96	46	114	55	99	48	114	55		
1990	135	65	158	77	140	68	159	77		

are $66 million or 32 mills/kwh. These costs are very high as a result of extremely high flue gas volumes, spare modules, and the difficulty of retrofit. Using TECO's suggested installation schedule, capital investment increases to $310 million and annual costs are $96 million. Table 6-2 shows corresponding costs for FGD-venturi systems. Capital costs are about 15 percent higher than for the FGD-ESP systems. Annual costs are higher by about the same percentage.

Tables 6-3 and 6-4 present the same data in a slightly different format and also show the costs of installing an ESP to be used in conjunction with low sulfur coal by comparison. The capital investment for the ESP is only 15 to 20 percent of that for an FGD system, and the annual cost is about the same percentage.

FGD INSTALLATION REQUIREMENTS

For estimating purposes we have indicated that this FGD installation would be an extremely difficult retrofit. There is essentially no spare land in the vicinity of the Gannon Plant. Our computer program has indicated that area requirements for a limestone system are about 2.1 acres, and for a lime system, the required area would be about 1.3 acres (Table 6-5). In addition, an area of about two acres would be required for an emergency gypsum stock-out pile. There is no single open area at the plant where a two-acre FGD system can be built. One possibility is that the FGD system could be built on part of the area where the existing coal pile is located. Obviously, this is not very satisfactory because the area for stockpiling of coal is already insufficient. The coal displaced by the FGD system would have to be located at another site. One possibility might be to stockpile the coal at the Big Bend plant. The Big Bend plant is located only 15 miles from the Gannon plant, so there would not be a serious time delay if a supply of coal were needed. Another alternative is that a site closer to the plant could be leased by TECO for stockpiling the additional coal. We have not worked out any transportation costs for transfer of the coal from a selected site to the plant, nor have we considered any additional leasing costs if a site near the plant is used for stockpiling coal.

TABLE 6-5. AREA REQUIREMENTS OF FGD EXCLUDING VENTURI FOR GANNON BOILERS NO. 1 THROUGH 4.

	Lime (sq. ft.)	Limestone (sq. ft.)
Feed preparation		
Lime silos	1,600	0
Slakers	400	0
Storage pile	0	33,000
Grinding mills	0	200
Feed tanks	400	900
Total	2,400	34,100
Scrubbing		
Scrubbing trains	43,200	43,200
Fans and misc.	4,320	4,320
Total	47,520	47,520
Sludge handling and disposal		
Effluent tanks	100	100
Clarifiers	6,600	9,800
Vacuum filters and misc.	100	100
Total	6,800	10,000
Grand Total	56,720 (1.3 acres)	91,620 (2.1 acres)

LIME FGD SYSTEM DESCRIPTION

In a lime FGD process, lime slurry is prepared on-site for use in an absorber. Lime is slaked with water to form the slurry, using handling and conveying equipment, lime storage silos, slakers, and slurry storage tanks. The boiler flue gas initially enters an ESP or a venturi scrubber to remove particulates. Booster fans are used to overcome FGD system pressure drops. The flue gas enters the absorber at the base, and is cooled by quenching with water. The flue gas ascends and reacts with the lime slurry to form $CaSO_3$ and $CaSO_4$. The desulfurized gas passes through a demister and is then reheated before it is released to the atmosphere. The slurry passes from the absorber to a circulation tank where it is sparged with air and to precipitate $CaSO_4$ (gypsum). The liquid stream continues to a clarifier where the precipitate, any flyash, and unreacted lime settle out. The clean water from the clarifier is then returned to the circulation tank. The underflow from the clarifier is processed through a vacuum filter to recover gypsum which we have assumed to be salable at a price to offset the cost of removing it from the site. The estimated SO_2 removal efficiency for a lime system is 85 percent or better. A typical lime system is shown in Figure 6-1.

LIME FGD COSTS

PEDCo and TECO have both estimated FGD costs for the Gannon boilers. TECO has calculated that the actual conversion of Boilers No. 1-4 from oil to low-sulfur coal firing will cost approximately $36.4 million; their estimated cost for a new FGD system totals $118.4 million. The total cost of new precipitators will be $31.0 million. This brings the overall cost of the FGD-ESP system to $149.4 million. Adding the cost of the boiler conversions, TECO projects a grand total of $186.0 million to convert and modify Boilers 1-4. All of these costs have been adjusted by PEDCo to mid-1980 dollars. PEDCo's total estimated cost for a lime FGD system with a venturi scrubber is $360 million, not including coal conversion costs. With an ESP instead of a venturi, our cost is $310 million. Adding in TECO's coal conversion cost of $36.4 million, PEDCo estimates a grand total of $346.4 million. Annual costs for the lime FGD and venturi are estimated around $114 million; annual costs for the FGD-ESP system will be approximately $96 million per year. These

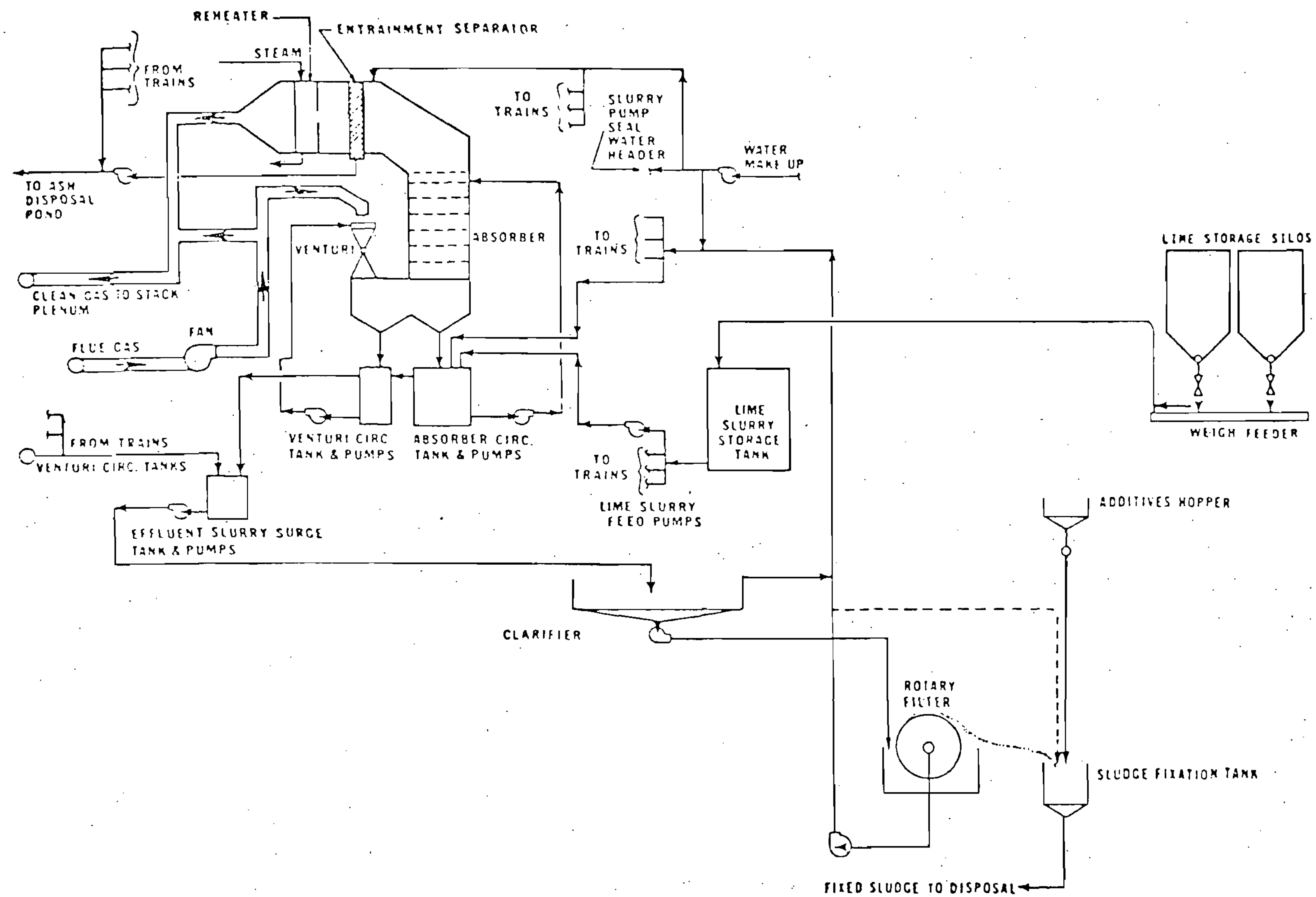

Figure 6-1. Lime slurry system.

PEDCo cost estimates do not include reconversion of the boilers so that they can fire coal.

LIME FGD ADVANTAGES AND DISADVANTAGES

In the lime FGD gypsum process, several storage areas are necessary. Lime storage silos are needed for a 12-day continuous supply of lime. Operating silos are needed which can hold an additional three-day supply of lime. Storage tanks, with 24-hour storage capacity, are needed to hold the prepared slurry, which includes a fresh supply and make-up slurry for the system. An effluent hold tank with a five-minute retention time is required to hold the spent liquor from the absorber, and a permanent site is required for storage of the gypsum.

Lime FGD system is usually at least 85 percent efficient at removing SO_2 from flue gases. Costs are also usually lower and space requirements are less than those for a limestone FGD system. However, a lime system still has large space constraints for the necessary equipment (such as the storage vessels and absorber). The absorber also requires expensive alloys to prevent corrosion of the system.

LIMESTONE FGD

The limestone FGD process is similar to that for lime. Limestone slurry is used as the SO_2 absorbant. Limestone is wet milled to produce a fine slurry in which 95 percent of the particles are smaller than 325 mesh. This process requires an open limestone storage area, handling and conveying equipment, limestone storage silos, wet ball mills, and a slurry storage tank. The SO_2 removal process is identical to the lime process. The flue gas passes through an ESP or a venturi scrubber to remove particulates and continues to the absorber where the SO_2 reacts with the slurry to form $CaSO_3$ and $CaSO_4$. The flue gas is reheated and released to the atmosphere. The slurry passes from the absorber to a circulation tank where it is sparged with air to oxidize $CaSO_3$ to $CaSO_4$ (gypsum) which is precipitated. The liquid stream continues to a clarifier where the precipitate, flyash, and unreacted lime, are settled out. The clean water from the clarifier is then returned to the circulation tank. The underflow from the clarifier is processed through a vacuum filter to recover gypsum which is assumed to be salable at a piece to offset the cost of removing it from the site. The estimated SO_2 removal efficiency for a limestone system is 85 percent or better. A typical limestone system is shown in Figure 6-2.

LIMESTONE FGD COSTS

The capital costs for a limestone FGD system are somewhat higher than for a lime FGD system. PEDCo projects the costs for the entire system (FGD plus venturi) to be $360 million, while the costs for an FGD-ESP system run approximately $320 million, which is three percent higher than for the lime system. Annual costs with a venturi are somewhat less for a limestone system at $114 million. With an ESP, limestone annual costs are estimated to be $99 million, which are three percent higher than for a lime FGD system.

LIMESTONE FGD ADVANTAGES AND DISADVANTAGES

A limestone FGD process requires a larger overall storage area than a lime system. An open storage area with a 30-day supply of limestone is required, as well as storage silos to hold a 12-day supply of limestone and operating silos to hold a three-day supply. Slurry storage tanks with a 24-hour storage capacity are needed for the fresh limestone slurry for the system. An effluent hold tank with a five-minute retention time, is required to hold the spent liquor from the absorber.

A limestone FGD system, like the lime process, is usually 85 percent efficient or better for SO_2 removal. If venturi scrubbers are used, the costs are somewhat lower than those of a lime FGD system. However, the limestone system requires somewhat more space than a lime system mainly because of additional equipment (such as the ball mills and the 30-day open storage area).

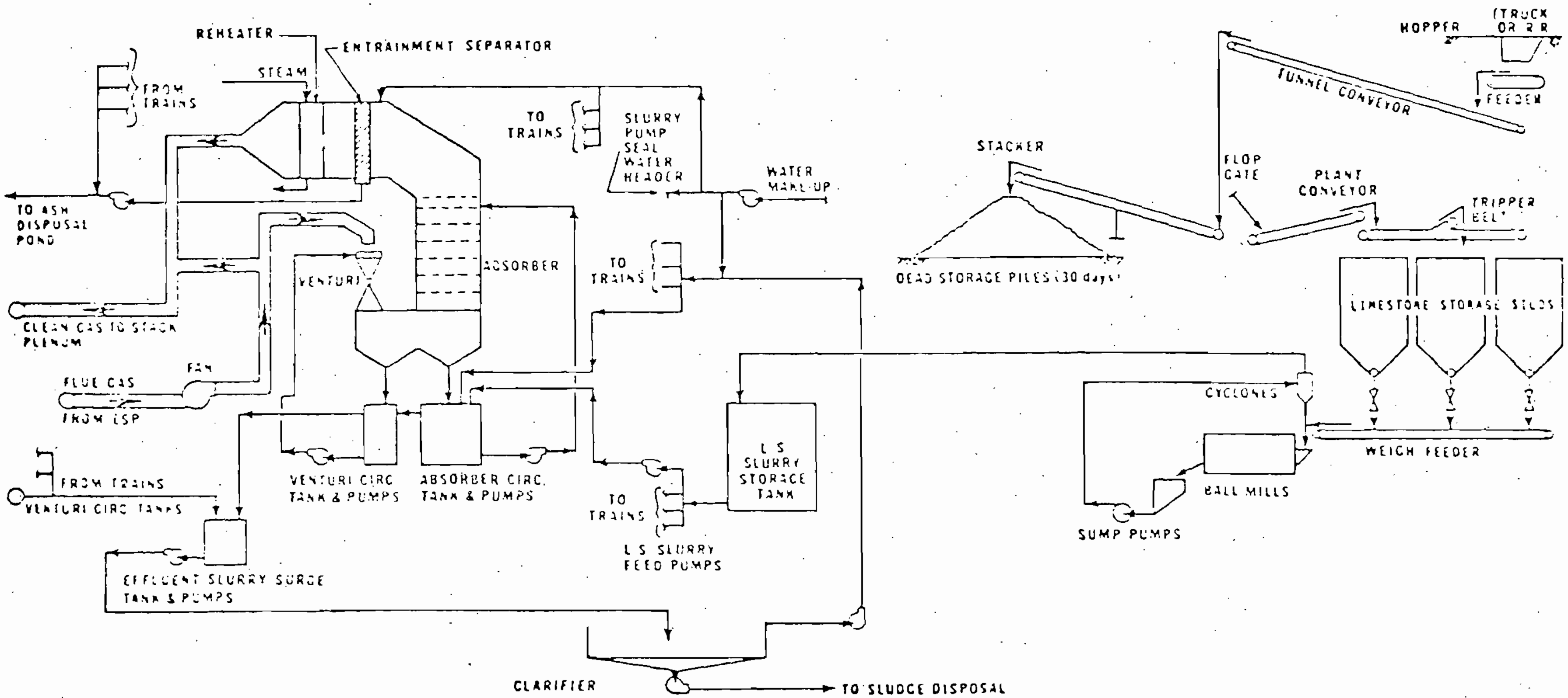

Figure 6-2. Limestone slurry system.

SECTION 7

VENTURI SCRUBBERS WITH ABSORBERS

Another option which we considered is that of using venturi scrubbers in combination with the FGD system. Venturi scrubbers use water spray to trap dust particles for removal from gas streams. The venturi precede the absorbers so that the particulates are removed before the flue gas enters the absorbers. In a venturi scrubber flue gases pass through a venturi at a velocity of 15,000 to 20,000 ft/min, and low-pressure water is added at the throat. The gas pressure drop through the venturi ranges from 10 to about 30 in. H_2O depending on design. The extreme turbulence in the venturi promotes very complete particle-water contact in spite of a relatively short contact time. The dust particle-impregnated water droplets and are collected in a cyclone spray separator. The flue gases then passes to the lime or limestone absorber for SO_2 removal. Generally, we have assumed three absorber modules per boiler, two in operation at full load and one serving as a standby unit. Boiler No. 4 will have four modules, including one standby unit.

PEDCo has determined that using a lime FGD system the capital costs for installing venturis for Boilers 1 through 4 will be around $238 million, with annual operating costs of around $77 million. For a limestone FGD system, capital costs are approximately $239 million, with annual operating costs of $78 million.

PEDCo has also investigated the use of scrubbers on Boilers 3 and 4 alone. If the bubble limit for SO_2 emissions is used, it may be feasible to control Boilers 3 and 4 and to curtail loads on Units 1 and 2 severely to bring the station under the 10.6 ton SO_2/h limit that TECO is requesting. If a lime system with a venturi were used on Boilers 3 and 4, capital costs would be about $126 million and annual operating costs would be $41 million. If the existing ESPs are used instead of venturis, the capital costs fall to $119 million with annual operating costs of $39 million.

SECTION 8

LOW-SULFUR COAL

The success of TECO's proposed strategy to meet a bubble limit of 10.6 tons per hour depends only on three factors: the interpretation of the regulation for enforcement, the quality of the coal, and the station load at the Gannon Plant.

ENFORCEMENT ASPECTS

The bubble limit must be enforced on the basis of some prescribed averaging time. In theory the regulatory agency might require Gannon to show that the emission limit is met during each hour of operation or that the limit is not exceeded for more than a certain number of hours in each week, month, or year. TECO could construct a data handling system to demonstrate compliance on that basis, but a one-hour regulatory time frame would be difficult for TECO to react to. For example, if the station load were such that a one-hour violation occurred and if the SO_2 monitoring system flagged the violation immediately, it might be several hours before TECO could shift the load to another station or purge the bunkers to begin feeding cleaner coal that would bring the unit back within limits. Thus, although one-hour readings might be useful for TECO to maintain emissions within bounds, the reporting of hourly readings might tend to overwhelm the regulatory agency with data that would never be used.

The question that needs to be answered is whether the regulatory agency would tolerate a few excursions above the hourly standard in a given day, enforcing only against emissions that exceed a prescribed limit on a longer time base such as 24 hours. This seems more reasonable than the prospect of creating multiple violations in one episode merely because sophisticated monitoring machinery can be put in place to measure such violations.

A multi-tiered regulation may be in order. For example, it may be appropriate to restrict Gannon to a limit of 254 tons of SO_2 in a calendar day, not to be exceeded more than 4 days per year (1% of the time). Such a regulation might be enforced on the basis of reports submitted by TECO to the state on a weekly or monthly basis in which cumulative daily exceedances would be reported for the calendar year. In addition to the daily limit it might be appropriate to set an hourly limit somewhat greater than 10.6 tons to insure that Gannon would not overload the atmosphere for short periods. For example, the hourly limit might be set at 120 percent of the product of TECO's indicated maximum station heat input and the mean coal equivalent SO_2 content, i.e. 13.7 tons/hr (1.20 x 1.9 lb $SO_2/10^6$ Btu x 12 x 10^9 Btu/hr ÷ 2000 lb/ton). Thus TECO could not operate at full load with inferior coal for short periods in anticipation that the load would not be sustained throughout the day. Any exceedance or multiple exceedance of this limit in a given day would have to be reported and would constitute a daily violation, chargeable against the four allowable daily exceedances per year. The fifth exceedance in a calendar year would constitute a violation, punishable by prescribed fine.

COAL QUALITY

Coal's variability must be accommodated in a pollution control strategy and should be considered carefully in the formulation of an enforceable regulation. If a coal supply has an average equivalent SO_2 emission content of 1.9 lb per million Btu, then at any given instant a portion of that coal, upon combustion will produce more or less than 1.9 lb SO_2 per million Btu. If an emission limit is set at 1.9, the coal will comply about half the time on any averaging-time basis. To insure compliance with the regulation for more than 50 percent of the time it would be necessary to burn coal with a somewhat lower equivalent SO_2 content than 1.9. As the required percentage of time in compliance is increased beyond 50 percent, the equivalent SO_2 content of the coal must be decreased. As the coal variability increases, the margin between the regulatory limit and the mean coal equivalent SO_2 content must also be increased.

The introduction of a bubble limit in terms of tons of pollutant per unit of time may permit a facility to comply by means of load reduction in conjunction with the fuel being burned. Table 8-1 shows the percentage of time that a facility is out of compliance as a function of load and of the variability of the equivalent SO_2 content of the coal. The following assumptions are pertinent.

- Emission limit = 254.4 lb SO_2/day
- 24-hour coal equivalent SO_2 content averages are normally distributed
  Mean = 1.6, 1.9, 2.2 lb SO_2/million Btu
  Relative standard deviation (RSD) = 3, 6, 12, 18 percent of mean

The table showns that 1.6 lb coal will insure that there is virtually no noncompliance likelihood (<0.1 percent) if the coal SO_2 variability (expressed as RSD) is 3 percent (or less). If the variability of the 1.6 lb coal is 18 percent, the station operating at 100 percent load will be out of compliance 29.5 percent of the time, and only at 70 percent load or less will the station be in compliance essentially all the time. If a 2.2 lb coal with a 12 percent RSD is used at a 70 percent station load, the station will be out of compliance 21.8 percent of the time. This illustrates dramatically that a prediction of compliance or noncompliance relies heavily on an accurate characterization of the coal in terms of its quality and its variability. Using the normality assumption for coal variability we can calculate the likelihood of compliance using any prescribed coal quality (SO_2 mean and RSD), station load, and bubble regulation.

TECO has reported monthly coal quality averages for calendar year 1979 which show a month-to-month RSD of 32 percent. Day-to-day variations for this coal supply would be somewhat larger. The large variation is due in part to the fact that TECO's 1979 coal supply was from six different sources and was reported on an as-received basis. Various techniques such as coal blending and coal cleaning will have to be incorporated to reduce this coal quality variation to a reasonable level.

TABLE 8-1. GANNON NONCOMPLIANCE LIKELIHOOD AS A FUNCTION OF COAL SO_2 QUALITY AND STATION LOAD

	Noncompliance likelihood: percent											
	1.6 lb Coal				1.9 lb Coal				2.2 lb Coal			
Load	RSD %				RSD %				RSD %			
%	3	6	12	18	3	6	12	18	3	6	12	18
100	0.0	5.2	20.6	29.5	99.4	89.6	73.6	66.3	100.0	100.0	95.4	86.9
95		0.5	9.7	19.2	81.3	67.4	58.7	56.0	100.0	99.6	90.8	81.3
90		0.0	3.4	11.1	18.1	32.3	40.9	44.0	100.0	97.0	82.6	73.6
85			0.8	5.3	0.2	7.2	23.3	31.2	97.8	84.4	69.2	63.3
80			0.0	1.9	0.0	0.5	9.7	19.2	52.4	51.2	50.8	50.4
75				0.5		0.0	2.6	9.9	1.5	14.0	29.5	35.9
70				0.0			0.4	3.8	0.0	0.9	12.1	21.8
65							0.0	0.9		0.0	2.9	10.2
60								0.1			0.3	3.3
55								0.0			0.0	0.6
50												0.0

STATION LOAD

TECO maintains that as the Gannon Plant gets older it will be used less so that SO_2 emissions will not exceed current levels. Because the area is nonattainment for SO_2, SO_2 emission increases cannot be permitted in the revised SIP regulation that will be required for the plant. TECO has presented evidence that conversion to low-sulfur coal will not increase emissions beyond the 1979 level for future years through 1989 unless maximum interchange sales are assumed. In that case emissions will still not exceed the 1976 level. As an additional exercise we have calculated the percentage likelihood of exceeding the proposed bubble regulation of 254.4 ton SO_2/day assuming that the station will be loaded as it was in 1979. For this calculation we have used an unofficial TECO tabulation of daily Gannon station loads for 1979. Our results are shown in Table 8-2.

These load frequencies are combined with the estimated likelihoods of being out of compliance with SO_2 regulations, using various qualities of coal at the prescribed assumed loads. Table 8-3 indicates the estimated percentage of days that Gannon would be out of compliance on the basis of TECO's assumed 1979 load distribution. The 1.6 lb coals are not included because they all show essentially zero likelihood of noncompliance using the 1979 load profile.

The data in Table 8-3 indicate that if the 1979 station load profile is typical, the 1.9 lb coals will not result in more than 1 percent noncompliance. However, 2.2 lb coal will result in 1.1 to 4.5 percent noncompliance, depending on the variability of the coal. Our conclusion then is that TECO's low sulfur coal proposal is basically a sound concept, but that sufficient safeguards will have to incorporated into their program to insure that they meet the imposed limits by maintaining proper coal quality and appropriate station loads.

TECO's success in using the proposed low-sulfur coal option depends on the utility's ability to maintain a reliable supply of compliance coal. TECO indicates confidence that by cleaning the coal and using proper additives, the utility will be able to burn the coal in the cyclone-fired boilers. Ash content and ash fusion temperature can be maintained to prevent excessive fouling and slagging of the boilers; coal sulfur content and boiler load can be manipulated to meet the SO_2 emission limit. Adequate ESP capacity can be installed to meet particulate emission requirements. Furthermore, TECO should

TABLE 8-2. DAILY STATION LOADS - GANNON - 1979

Days	Load, %	Relative frequency	Assumed load, %
1	Above 80	0.003	85.0
11	75 - 80	0.030	77.5
20	70 - 75	0.055	72.5
24	65 - 70	0.066	67.5
27	60 - 65	0.074	62.5
30	55 - 60	0.082	57.5
32	50 - 55	0.088	52.5
50	45 - 50	0.317	47.5
61	40 - 45	0.168	42.5
43	35 - 40	0.118	37.5
30	30 - 35	0.082	32.5
17	25 - 30	0.047	27.5
9	20 - 25	0.025	22.5
9	15 - 20	0.025	17.5

TABLE 8-3. PERCENT LIKELIHOOD OF EXCEEDING DAILY SO_2 LIMIT AS A FUNCTION OF COAL QUALITY

		1.9 lb $SO_2/10^6$ Btu coal				2.2 lb $SO_2/10^6$ Btu coal			
Station load, %	Relative frequency	RSD % 3	RSD % 6	RSD % 12	RSD % 18	RSD % 3	RSD % 6	RSD % 12	RSD % 18
85.0	0.003	0.0	0.0	0.1	0.1	0.3	0.3	0.2	0.2
77.5	0.030			0.2	0.4	0.8	0.9	1.2	1.3
72.5	0.059			0.1	0.3	0.0	0.3	1.1	1.6
67.5	0.066			0.0	0.1		0.0	0.5	0.8
62.5	0.074				0.0			0.1	0.5
57.5	0.082							0.0	0.1
52.5	0.088								0.0
≦47.5	0.602								
TOTAL	1.000		0.0	0.0	0.4	0.9	1.1	1.5	3.1

be expected to install and operate continuous opacity and SO_2 emission monitoring equipment to demonstrate compliance with regulations on a continuing basis. A description of various continuous monitors is described in Appendix B.

The conversion of these boilers to coal will result in their more frequent dispatch to meet electrical load, a situation that runs counter to TECO's contention that the boilers will be used less frequently in future years. Some provision must be incorporated in TECO's program to input the environmental restrictions for the station into their economic dispatch system. Regulatory and other implications of overriding TECO's existing economic dispatch program are not addressed in this report.

SECTION 9
SO_2 EMISSIONS REGULATIONS AND CONTINUING COMPLIANCE

BACKGROUND

Although the Tampa area is in compliance with National Ambient Air Quality Standards (NAAQS) for SO_2, compliance is marginal. The three-hour ambient SO_2 standard is in greatest jeopardy; thus the Florida Department of Environmental Regulation (DER) has a responsibility to protect that standard and to insure that TECO does not cause a violation of that standard as a consequence of converting the Gannon boilers to coal. Accordingly, Florida has drafted a regulation to limit emissions from Gannon coal-fired units to 2.4 lb SO_2 per million Btu heat input for each unit on a weekly average. Furthermore, combined emissions from all six boilers are not to exceed 10.6 ton SO_2/h on a weekly basis. TECO is to verify compliance by submitting weekly station generation data and weekly composite fuel quality analysis data. Compliance with 3-hour and 24-hour ambient standards is to be insured by load limiting in conjunction with daily fuel quality; details are to be specified in the station operating permit(s).

This new regulation has not been promulgated, pending a public hearing in mid-October. The intent of the proposed regulation is to allow TECO to demonstrate continuing compliance to the satisfaction of the state agency at reasonable cost. The alternative to the use of routine coal analyses would be to require the installation and operation of a continuous emissions monitoring (CEM) system. In order to investigate the merits of such a requirement we visited Gulf Power Company and the Tennessee Valley Authority (TVA), two utilities that each maintain a number of CEM systems for SO_2.

Gulf Power has seven generating units at its Crist Plant in Penascola, Florida. The company maintains Lear Siegler monitors for opacity, SO_2, O_2, and NO on four coal-fired units at the plant (Units 4-7). A computer system calculates 3-hour averages for lb SO_2 per million Btu for each boiler in 1-hour steps. The regulation at the plant is 4.9 lb SO_2 per million Btu. Gulf Power indicates that the monitors have shown that the standard is never violated. Before the monitors were installed some coal analyses showed violations.

The emissions monitors are serviced by Lear Siegler under a maintenance contract. Plant personnel provide only routine support (1/2 man per year) to the Lear Siegler representative who spends full time maintaining the monitors on 11 units at three Gulf Power plants. Preventive maintenance service by Gulf Power amounts to about 2 man years per year. Thus, the total manpower requirement to service and maintain the monitors on the 11 units is about 3 1/2 people. The maintenance contract to Lear Siegler costs about $70,000 per year. System up-time on the monitors runs about 85 percent. Gulf Power has no legal requirement to maintain the monitors, nor to report CEM data to the state on a routine basis. However, it is possible that reporting requirements may be incorporated into future state operating permit renewals for the plants.

Gulf Power has not prepared any formal comparisons between CEM data and coal analysis data, but Gulf Power personnel indicate that the monitor data seem to run slightly lower than the coal analyses. The amount of the discrepancy was not indicated. Other studies have shown that 90 to 95 percent of the sulfur in coal is emitted as SO_2.

TVA has operated CEM systems for several years as part of a program to curtail emissions during periods of adverse meteorological conditions. More recently TVA has installed a large number of Lear Siegler instruments at various plants in conjunction with a consent agreement with EPA. At the Widows Creek plant TVA maintains seven DuPont SO_2 analyzers and three Lear Siegler systems that each measure SO_2, NO, O_2, and opacity. The Lear Siegler units alternate at 1-minute intervals between the measurement of NO and SO_2. SO_2 data for each monitor are reported for each 15-minute period. At present a full-time statistician transfers strip chart data to report forms that array 96 15-minute average readings for each day. TVA is planning to develop and install a computer system to handle this data load for compliance monitoring. In addition to the statistician, TVA employs four mechanics and one foreman full-time to maintain these instruments. In contrast with Gulf Power, TVA does not subscribe to a maintenance contract with Lear Siegler. Instead, TVA maintains a rather exhaustive instrument diagnosis and repair facility. The instruments seem to require frequent circuit board repairs. TVA will eventually have a total of 111 CEM units in 12 plants, each subject to annual recertification. However, there are no established EPA calibration requirements, according to TVA. Routine calibration (zero and span) is performed automatically once each day on each instrument, and voluntary calibration checks are run quarterly by TVA. Only 20 percent relative accuracy is required at instrument operating conditions. TVA has attained a very high up-time percentage for these instruments by devoting a lot of attention to them. Each time there is an instrument malfunction TVA is required to report the incident to EPA. TVA claims that this involves considerable unnecessary time and expense (including a mailgram).

Each Lear Siegler analyzer system costs about $20,000. TVA recently ordered $250,000 worth of spare parts for all of its plants and is gathering data to define requirements for spare parts and supplies requirements in greater detail.

For each boiler TVA fills the coal bunker each night for the next day's burn and collects a coal sample as the coal is charged into the bunker. This sample is analyzed in the laboratory; results are available about two days after the coal sample is collected. Thus the coal is usually burned a day or so before the coal analysis is completed.

DATA

TVA has provided us with several months of data, including CEM data and coal analysis data. Using these data, three points were investigated.

1. Relationships between short-term and long-term coal or emissions variability.

2. Relationships between coal sulfur content and sulfur dioxide emissions.

3. Relationships between coal analysis data and CEM emissions data.

Beginning on November 19, 1979, TVA has produced daily CEM summaries for Widows Creek Unit 7 that each consist of 96 15-minute average SO_2 emission readings (lb SO_2 per million Btu). These data permit us to estimate the variability in emissions on any time basis that is an integral multiple of

15 minutes. If emissions data points were truly independent it would be possible to calculate the variability for any time frame (i.e., hourly, daily, weekly, etc.) once we know the variability for one time frame. However, emissions data are not really independent; thus short-term and long-term emissions trends make it impossible to infer the variability for one time frame from another one. Variabilities in coal quality and emissions must be estimated by accumulating relatively large quantities of sample data over long periods of time.

TVA has provided 85 days of CEM data formatted in daily arrays each consisting of 96 fifteen-minute SO_2 emission averages for Widows Creek Unit 7. In addition, TVA has sampled and analyzed the coal supply to the Unit 7 bunker each night as the coal is loaded to the bunker for the next day's operation; TVA has also provided these data for 154 days for our analysis. Using these various data, we have calculated the following parameters.

Mean daily emissions based on 24 consecutive daily coal samples:
4.00 lb $SO_2/10^6$ Btu

Mean daily emissions based on the same 24 consecutive days of CEM data:
4.31 lb $SO_2/10^6$ Btu

Daily standard deviation based on 24 consecutive daily coal samples:
0.935 lb $SO_2/10^6$ Btu

Daily standard deviation based on the same 24 consecutive days of CEM data:
0.927 lb $SO_2/10^6$ Btu

Mean daily emissions based on 78 days of CEM data:
4.54 lb $SO_2/10^6$ Btu

Daily standard deviation based on 78 days of CEM data:
0.689 lb $SO_2/10^6$ Btu

Three-hour standard deviation based on 624 three-hour periods (78 days) of CEM data:
0.778 lb $SO_2/10^6$ Btu.

One-hour standard deviation based on 1872 hours (78 days) of CEM data:
0.794 lb $SO_2/10^6$ Btu.

Average daily three-hour standard deviation based on 78 days of CEM data:
0.336 lb $SO_2/10^6$ Btu

Average daily one-hour standard deviation based on 78 days of CEM data:
0.355 lb $SO_2/10^6$ Btu

Mean daily emissions based on 154 daily coal samples:
$4.32 \text{ lb } SO_2/10^6 \text{ Btu}$

Daily standard deviation based on 154 daily coal samples:
$1.475 \text{ lb } SO_2/10^6 \text{ Btu}$

The above data presentation is somewhat disjointed, but a closer examination reveals several points. For the 24-day period in which there are comparative coal sample and CEM data there is no significant correlation between the daily coal analyses and the average daily CEM analyses. The calculated correlation coefficients for these data were -0.02 and -0.14 based on respective assumed lag times of one day and two days between loading the bunker and burning the coal. Unit 7 is rated at 530 MW, and the bunker is large enough to substain a 24-hour burn at 500 MW. On the average the boiler generates 300 MW so the coal is usually burned within a day or two after it is charged into the bunker. The variable lag time between charging the bunker and burning the coal thus tends to weaken the correlation that we expect between coal data and CEM data, but it does not seem reasonable that the correlation coefficient should be essentially zero. It is disconcerting that the coal data and the CEM data appear to be totally unrelated, and further effort should be exerted to demonstrate the underlying correlation.

The CEM data for the 24-day period indicate that emissions average eight percent higher than the corresponding coal analysis data. Because not all of the sulfur in the coal is converted to SO_2 in the boiler, the CEM data would be expected to be slightly lower than the coal analysis data. This logical inconsistency needs to be investigated in further detail to determine whether or not there is a systematic error in either the coal sampling and analysis procedures, the emissions monitoring system, or the various calculations associated with the analyses. The two data sets should both reflect actual emissions; it is possible that the accuracy in the two data sets for the 24-day term was not sufficient to compare the emissions indicated by the two methods.

The data show that for this plant long-term coal variability tends to the greater than short-term variability. The day-to-day variability for the 24-day period is less than the day-to-day variability over a 154-day period, and a sample 1-hour standard deviation calculated from a single day of data tends to be lower than the 1-hour standard deviation calculated over a longer period. This indicates that overall coal variability should probably not be inferred from short-term data and that conventional statistical procedures are inappropriate if they assume that sample data points are independent.

TVA supplied us with CEM data for the 113-day period from October 19, 1979, through February 8, 1980. In that period the boiler was out of service for all or part of 35 calendar days. Three CEM failures of 4 hours, 8 hours, and 4 hours respectively during that period precluded obtaining complete data on three days when the boiler was operating, so the CEM provided essentially complete data on 96 percent of the days that the boiler operated. This leads us to the conclusion that CEM reliability can be high if good maintenance procedures are adopted, but that maintenance costs are also high, as indicated earlier.

CONCLUSIONS

Our conclusions to this study are necessarily tentative because of its limited scope. Our data base would have to be expanded in order to draw more general conclusions about CEM performance. However, the following conclusions seem appropriate.

Any system of data collection and reporting that is agreed upon between the utility and the state must report data in a form that is usable to the state and which gives strong evidence that agreed emission limits are being met so that ambient standards will not be violated. The reporting system must be simple enough that the state is not burdened with a mountain of data to sort through, but yet the utility must be able to maintain backup data for a reasonable period of time to defend any challenge that the plant may not be in compliance. By the same token, the utility needs to protect itself from a cumbersome data reduction task. TVA's painstaking procedure of visual integration of 15-minute averages from strip chart data appears to be too expensive and cumbersome for TECO to have to adopt.

Although an underlying relationship necessarily exists between the sulfur content of coal and the SO_2 emissions from burning the coal, we have been unable to correlate TVA's coal analysis data with corresponding CEM data. This may be partly because in our correlation we have not incorporated the variable lag time between loading the bunker and burning the coal. However, some question exists that the two data sets are equivalent for demonstration of compliance with emissions regulations. Whether Florida decides to require coal analysis data or CEM data to demonstrate compliance, it is very important to insure that the selected method accurately reflect true SO_2 emissions.

TVA analyzes each coal sample two or three days after the coal is put into the bunker. In most cases the coal is burned about a day before an analysis can be available. Thus the analysis is of little more than historical interest and cannot be used for essentially real-time control. On the other hand CEM data are available only minutes after the coal is burned, and it is conceivable that a system could be developed to divert clean coal into a boiler quickly to bring indicated high SO_2 emissions into line with regulatory limits. However, if no such system is available to TECO, there may be little practical value in eliminating any lag time that coal analysis necessitates.

Because coal has inherent variability in quality, any strategy to comply with emissions regulations must incorporate a statistical analysis to comply with those regulations for a certain minimum percentage of the time. Any regulation that is promulgated should take this statistical variation into account and should permit a given limit to be exceeded only with limited frequency such as one day per month or three weeks per year or ten days per year. Penalties for exceeding the prescribed frequency should be indicated, and the system whereby TECO is to demonstrate continuing compliance should be described in detail.

APPENDIX A

POWER PLANT SURVEY FORM

A. COMPANY INFORMATION:

1. COMPANY NAME: Tampa Electric Company
2. MAIN OFFICE: P.O. Box 111, Tampa, FL 33601
3. RESPONSIBLE OFFICER: G.F. Anderson
4. POSITION: Vice President - Production, Operations, Maintenance
5. PLANT NAME: Gannon Station
6. PLANT LOCATION: Port Sutton Road
7. RESPONSIBLE OFFICER AT PLANT LOCATION: H.D. Broome
8. POSITION: Plant Superintendent
9. POWER POOL N.A.

DATE INFORMATION GATHERED:

Updated May 1980

PARTICIPANTS IN MEETING:

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	Boiler number					
	1	2	3	4	5	
B. ATMOSPHERIC EMISSIONS						
1. PARTICULATE EMISSIONS[a]						
LB/MM BTU (1979 Stack Test Results)	0.04	0.04	0.03	0.07	0.004	0
GRAINS/ACF N.A.						
LB/HR (FULL LOAD)	50	50	48	131	10	
TONS/YEAR (1979)	80	98	93	229	23	2(
2. APPLICABLE PARTICULATE EMISSION REGULATION						
a) CURRENT REQUIREMENT						
AQCR PRIORITY CLASSIFICATION	Florida Administrative Code					
REGULATION & SECTION NO.	17-2.05(6) E.(1)(b)1.e and 17-2.05(6) E.(1)(b)2.a.					
LB/MM BTU	0.1	0.1	0.1	0.1	0.1	0
b) FUTURE REQUIREMENT (DATE:)						
REGULATION & SECTION NO.						
LB/MM BTU						
3. SO_2 EMISSIONS[a]						
LB/MM BTU (1979 Stack Test Results)	1.03	1.06	0.96	1.10	1.43	1
LB/HR (FULL LOAD)	1295	1332	1535	2064	3267	7
TONS/YEAR (1979)	2071	2604	2971	3592	7950	20,
4. APPLICABLE SO_2 EMISSION REGULATION						
a) CURRENT REQUIREMENT	Florida Administrative Code					
REGULATION & SECTION NO.	17-2.05(b)E.(1)(b)1.e and 17-2.05(6)E.(1)(b)2.a					
LB/MM BTU	1.1	1.1	1.1	1.1	2.4	2
b) FUTURE REQUIREMENT (DATE:)						
REGULATION & SECTION NO.						
LB/MM BTU						

a) Identify whether results are from stack tests or estimates

C. SITE DATA

1. U.T.M. COORDINATES 360,100 mE and 3,087,500 mN
2. ELEVATION ABOVE MEAN SEA LEVEL (FT) +9.0 MLW
3. SOIL DATA: BEARING VALUE ~2000 #/ft^2

   PILE DATA See attached report
4. DRAWINGS REQUIRED provided to PedCo on May 5, 1980

   PLOT PLAN OF SITE (CONTOUR)

   EQUIPMENT LAYOUT AND ELEVATION

   AERIAL PHOTOGRAPHS OF SITE INCLUDING POWER PLANT, COAL STORAGE AND ASH DISPOSAL AREA
5. HEIGHT OF TALLEST BUILDING AT PLANT SITE OR IN CLOSE PROXIMITY TO STACK (FT. ABOVE GRADE)
6. HEIGHT OF COOLING TOWERS (FT. ABOVE GRADE): N.A.

Month (1972)	Fuel Consumption		Fuel Characteristics				
			Oil		Coal		
	Oil Gallons (1000)	Coal Tons (1000)	Avg S %	Max S %	Min S %	Avg S %	Max S %
January							
February	See attached 1979			See attached 1979 FPC-67 Form - page 2			
March	FPC-67 Form - page 5						
April							
May							
June							
July							
August							
September							
October							
November							
December							

Month (1972)	Average Boiler Load Factors (Weekday)									
	Boiler ___		Boiler ___		Boiler ___		Boiler ___		Boiler ___	
	4 hr Peak Period	Average 24 hr Period	4 hr Peak Period	Average 24 hr Period	4 hr Peak Period	Average 24 hr Period	4 hr Peak Period	Average 24 hr Period	4 hr Peak Period	Average 24 hr Period
January										
February										
March						See attached 1979 FPC-67 Form - page 5				
April										
May										
June										
July										
August										
September										
October										
November										
December										

E. BOILER DATA	Boiler number 1	2	3	4	5	
1. SERVICE: BASE LOAD STANDBY, FLOATING, PEAK		See capacity factor below				
2. TOTAL HOURS OPERATION (~~1977~~) (1979)	5278	6416	5448	5369	6630	6
3. AVERAGE CAPACITY FACTOR (~~10/71~~) (1979)	48%	48%	44%	42%	59%	6
4. SERVED BY STACK NO.	1	2	3	4a & 4b	5	6
5. BOILER MANUFACTURER	B&W	B&W	B&W	B&W	Riley	Ri
6. YEAR BOILER PLACED IN SERVICE 35 Yr	1957	1958	1960	1963	1965	19
7. REMAINING LIFE OF UNIT	12	13	15	18	20	2
8. GENERATING CAPACITY (MW)						
NAMEPLATE	125	125	179.52	187.5	239.36	4
MAXIMUM CONTINUOUS (Net)	98	108	150	169	214	3
PEAK (no distinction from maximum continuous)						
9. MAXIMUM HEAT INPUT (MM BTU/HR)	1257	1257	1599	1876	2284	5
10. FUEL CONSUMPTION: MAX/~~DESIGN~~/AVER						
COAL (TPH)					93.4/77.7	15 / 12
OIL (GPH)	8,044/5080	8,044/5100	10,846/7,573	12,900/8,110		
11. ACTUAL FUEL CONSUMPTION						
COAL (TPY) (1979) x 1000					457.8	5
OIL (GPY) (1979) x 1000	26,813	32,748	41,262	43,543		
12. WET OR DRY BOTTOM	Wet	Wet	Wet	Wet	Wet	We
13. FLY ASH REINJECTION (YES OR NO)	N.A.	N.A.	N.A.	N.A.	Yes	Ye
14. STACK HGT ABOVE GRADE (FT.)	306	306	306	306	306	30
15. I.D. OF STACK AT TOP (~~INCHES~~)(Ft)	10.0	10.0	10.6	9.6 each	14.6	17

Notes:

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	Boiler number					
	1	2	3	4	5	
16. FLUE GAS CLEANING EQUIPMENT						
a) MECHANICAL COLLECTORS None						
MANUFACTURER						
TYPE						
EFFICIENCY: DESIGN/ACTUAL (%)						
MASS EMISSION RATE:						
(GR/ACF)						
(#/HR)						
(#/MM BTU)						
b) ELECTROSTATIC PRECIPITATOR						
MANUFACTURER	Research Cottrell	Research Cottrell	Research Cottrell	American Standard	Research Cottrell	
TYPE						
EFFICIENCY: DESIGN/~~ACTUAL (%)~~ Upgraded	90	90	93	95.5	98.5/99.8	
MASS EMISSION RATE See question 2 of this form						
(GR/ACF)						
(#/HR)						
(#/MM BTU)						
NO. OF IND. BUS SECTIONS	6	6	12	8	8	
TOTAL PLATE AREA (FT^2)	34,800	34,800	62,400	62,200	106,800	14
FLUE GAS TEMPERATURE @ INLET ESP @ 100% LOAD (°F)	309	309	266	286	288	
17. EXCESS AIR: DESIGN/ACTUAL (%)	13	13	16	16	15	

Notes:

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	Boiler number				
	1	2	3	4	5
18. FLUE GAS RATE (ACFM)					
@ 100% LOAD (Note 1)	500,000	500,000	615,000	700,000	681,000
@ 75% LOAD (Note 2)	383,000	383,000	469,000	520,000	552,000
@ 50% LOAD (Note 2)	252,000	252,000	342,000	353,000	440,000
19. STACK GAS EXIT TEMPERATURE (°F)					
@ 100% LOAD	309	309	266	286	288
@ 75% LOAD	280	280	249	266	278
@ 50% LOAD	265	265	242	252	273
20. EXIT GAS STACK VELOCITY (FPS)					
@ 100% LOAD	79	79	98.8	71.7	64.1
@ 75% LOAD	62	62	74.1	53.8	52.0
@ 50% LOAD	41	41	49.4	35.9	41.4
21. FLY ASH: TOTAL COLLECTED (TONS/YEAR)					
DISPOSAL METHOD		See attached FPC-67 Form - page 7			
DISPOSAL COST ($/TON)					
22. BOTTOM ASH: TOTAL COLLECTED (TONS/YEAR)					
DISPOSAL METHOD		See attached FPC Form - page 7			
DISPOSAL COST ($/TON)					
23. EXHAUST DUCT DIMENSIONS @ STACK	7'0"x24'0"	7'0"x24'0"	7'5"x29'4"	10' I.D.	15' I.D.
24. ELEVATION OF TIE IN POINT TO STACK	116'0"	116'0"	123'9"	106'6"	120'0"
25. SCHEDULED MAINTENANCE SHUTDOWN (ATTACH PROJECTED SCHEDULE)					

Notes:
(1) Based on measurements taken by precipitator manufacturers for performance tests and measurements taken at later dates by TECO.
(2) Estimated based upon Note 1 above and boiler design data.

	Boiler number				
F. I.D. FAN DATA N.A.					
1. MAXIMUM STATIC HEAD (IN. W.G.)					
2. WORKING STATIC HEAD (IN. W.G.)					

Notes:

G. FLY ASH DISPOSAL AREAS

1. AREAS AVAILABLE (ACRES) - Indefinite - we presently sell
2. YEARS STORAGE (ASH ONLY) or reinject all fly ash
3. DISTANCE FROM STACK (FT.)
4. DOES THIS PLANT HAVE PONDING PROBLEMS? DESCRIBE IN ATTACHMENT

H. COAL DATA

1. COAL SEAM, MINE, MINE LOCATION
   a. See attached FPC-67 Form - page 3
   b.
   c.
   d.
2. QUANTITY USED BY SEAM AND/OR MINE
   a.
   b.
   c.
   d.
3. ANALYSIS
   GHV (BTU/LB) See attached FPC Form - page 2
   S (%)
   ASH (%)
   MOISTURE (%)
4. PPT PERFORMANCE EXPERIENCED WITH LOW S FUELS (DESCRIBE IN ATTACHMENT)

I. FUEL OIL DATA

1. TYPE See attached FPC-67 Form - page 2
2. S CONTENT (%)
3. ASH CONTENT (%)

J. COST DATA

ELECTRICITY

WATER

STEAM

K. PLANT SUBSTATION CAPACITY

APPROXIMATELY WHAT PERCENTAGE OF RATED STATION CAPACITY CAN PLANT SUBSTATION PROVIDE?

NORMAL LOAD ON PLANT SUBSTATION?

VOLTAGE AT WHICH POWER IS AVAILABLE?

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RAYMOND

CONCRETE PILE DIVISION

A DIVISION OF RAYMOND INTERNATIONAL INC.

140 CEDAR STREET - NEW YORK 6, N. Y.

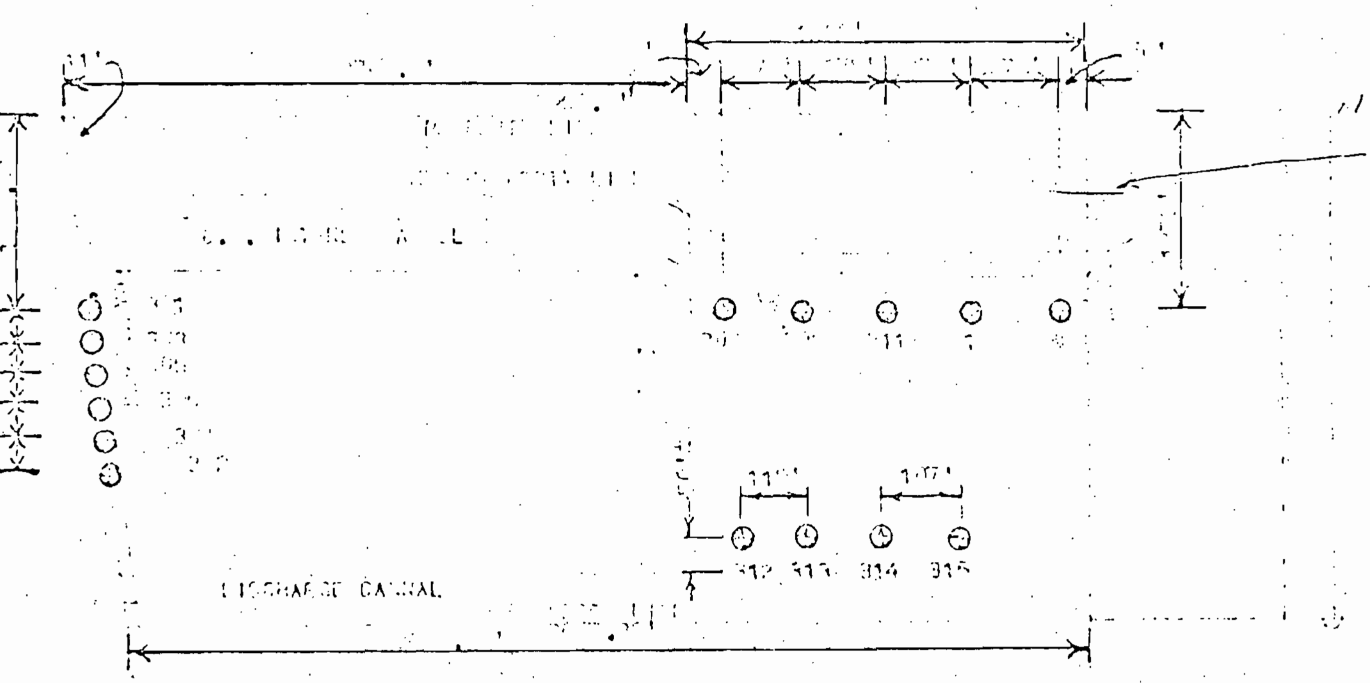
2 cc sent to PC [illegible] 2/23/[illegible]

To [illegible] Date FEBRUARY 22 19[illegible]

Address [illegible]

We have completed the following borings for you at [illegible] with results shown below. In accordance with your instructions, we have sent labelled samples of the strata encountered To DELIVERED TO CLIENT Address TAMPA, FLORIDA Via [illegible] under date of [illegible] Raymond Concrete Pile Co. A Division of Raymond International Inc.

LOCATION PLAN SCALE 1" = [illegible]



Compass Points

This boring report prepared in the [illegible] OFFICE of the Raymond Concrete Pile Company

A DIVISION OF RAYMOND INTERNATIONAL INC.

By [illegible]

Job No: [illegible]

Sheet 1 of 3

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RAYMOND

CONCRETE PILE DIVISION

A DIVISION OF RAYMOND INTERNATIONAL, INC.

To TAMPA ELECTRIC COMPANY, Date FEBRUARY 20, 1968

Location of Borings UNIT NO. 1 - BIG BEND STATION, TAMPA, FLORIDA

All borings are plotted to a scale of 1" = 8 ft. using MEAN LOW WATER as a fixed datum.

Boring No. B-301

GROUND SURFACE ELEV. +3.00 — 0'

TOP OF 4" CASING TO WATER = 3' — 3'

WATER — 28'6"

LOOSE GRAY SILT, MUCK — WT. OF RODS/6" — 36'6"

FINE GRAY SAND, LENSES OF DARK GRAY SILT, SHELLS 5-7-8 — 40'

FINE SAND, WITH CLAYEY GREENISH GRAY SILT, SOME SHELLS 7-10-18, 11-17-23 — 52'

FINE SAND WITH CLAYEY GREENISH GRAY SILT 20-22-18 — 56'

HARD SILTY BLUISH GRAY CLAY WITH SEAMS OF FINE TO MEDIUM GRAY SAND 14-25-30, 27-31-38 — 65'

USED 45' OF 4" CASING

1-16-68

Boring No. B-302

GROUND SURFACE ELEV. +3.00 — 0'

TOP OF CASING TO WATER SURFACE — 2'6"

WATER — 26'6"

LOOSE GRAY SILT (MUCK) — WT. OF RODS/6" — 34'

FINE SAND, GRAY SILT, SHELLS & LENSES OF DARK GRAY SILT 6-3-2, 5-12-14 — 40'6"

SILTY, STIFF, BLUISH GRAY CLAY, WITH FINE SAND, SOME SHELLS (MARL) 15-20-46, 7-9-14, 8-9-11 — 56'

CLAYEY GRAY SILT, WITH SOME FINE SAND, SHELLS AND SOFT LIMESTONE FRAGMENTS NOTED 9-4-5 — 61'

MARL WITH SOFT WHITE LIMESTONE 10/6, 50/6 — 65'6"

USED 45' OF 4" CASING

1-9-68

Boring No. B-303

GROUND SURFACE ELEV. +3.00 — 0'

TOP OF CASING TO WATER — 2'6"

WATER — 26'

LOOSE GRAY SILT (MUCK) — WT. OF RODS/6" — 34'

FINE GRAY SAND, GRAY SILT, SHELLS, TRACE OF BLUISH GRAY CLAY 2-1-2 — 40'

FINE SAND WITH GREENISH GRAY SILT, TRACE OF SHELLS 7-13-12 — 44'

NOTE A 11-14-17 — 47'

SILTY GRAY AND GREEN CLAY W/ SOME FINE SAND AND SHELLS 1-12-16 — 53'

CLAYEY GREEN & GRAY SILT W/ SOME FINE SAND 15-15-17 — 56'

HARD SILTY BLUISH GRAY CLAY WITH SOME FINE SAND 13-30-38, 15-27-30 — 65'6"

NOTE A: FINE SAND WITH GREENISH GRAY SILT, SOME CLAY, TRACE OF SHELLS

USED 45' OF 4" CASING

1-13-68

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RAYMOND

CONCRETE PILE DIVISION

A DIVISION OF RAYMOND INTERNATIONAL, INC.

To: TAMPA ELECTRIC COMPANY

Date: FEBRUARY 20, 1968

Location of Borings: UNIT NO. 1 - BIG BEND STATION, TAMPA, FLORIDA

All borings are plotted to a scale of 1" = 8 ft. using MEAN LOW WATER as a fixed datum.

Boring No. B-304

GROUND SURFACE ELEV. +3.50'

Depth	Description	Blows
0' – 3'6"	TOP OF CASING TO WATER	
3'6" – 27'6"	WATER	
27'6" – 34'6"	LOOSE GRAY SILT	WT. OF RODS
34'6" – 42'	FINE GRAY SAND, GRAY SILT, AND SHELLS	4-6-6
42' – [illegible]	CLAYEY BLUISH GRAY SILT AND FINE SAND, SOME SHELLS	15-22-35 14-18-30
[illegible] – [illegible]2'	CLAYEY BLUISH GRAY SILT, TRACE OF FINE SAND	16-22-30 27-33-40
[illegible]2' – 65'	NOTE A	1[illegible]-1[illegible]-12

NOTE A:
SILTY, GRAYISH BLUE CLAY, THIN SAND LENSES NOTED, SOME SHELLS

USED 45' OF 4" CASING

1-11-68

Boring No. B-305

GROUND SURFACE ELEV. +3.00'

Depth	Description	Blows
0' – 3'	TOP OF CASING TO WATER	
3' – 25'	WATER	
25' – 34'	LOOSE GRAY SILT (MUCK)	WT. OF RODS/60"
34' – 38'6"	FINE GRAY SAND, TRACE OF GRAY SILT AND SHELLS	8-7-8
38'6" – 59'	SILTY, BLUISH GRAY CLAY, FINE SAND AND SOME SHELLS (MARL)	20-22-12 12-25-30 17-23-30 80-47-33
59' – 62'6"	NOTE A	7-13-20
62'6" – 63'6"	NOTE B	70

NOTE A:
FINE TO COARSE SAND, SOME CLAYEY GREENISH GRAY SILT AND CLAY STAINS

NOTE B:
SOFT WHITE LIMESTONE

USED 45' OF 4" CASING

1-[illegible]-68

Boring No. B-306

GROUND SURFACE ELEV. +1.00'

Depth	Description	Blows
0' – [illegible]1'	WATER	
[illegible]1' – 32'6"	VERY LOOSE GRAY SILT	WT. OF RODS
32'6" – 3[illegible]'	FINE SAND, GRAY SILT, AND SHELLS	3-6-8
3[illegible]' – 65'	MARL - CLAYEY SANDY BLUE GRAY SILT, SOME SHELLS	12-23-16 4-7-9 20-22-32 10-34-46 7-14-25 14-24-34

USED 43' OF 4" CASING

1-3-68

TEST BORING REPORT

RAYMOND

CONCRETE PILE DIVISION

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To [illegible] Date [illegible] FEBRUARY [illegible]

Location of Borings [illegible]

All borings are plotted to scale of 1" = [illegible] ft. using [illegible] SURFACE as a fixed datum.

Boring No. [illegible] Boring No. [illegible] Boring No. [illegible]

Boring No. [illegible] (left)

GROUND SURFACE

Description	Blows	Depth
[illegible]		2'[illegible]"
NOTE A	[illegible]	4'
[illegible] WITH SHELL	[illegible]	6'
LOOSE GRAY SAND WITH SHELL	2-2-3	1[illegible]'
FIRM GRAY SAND WITH SHELL	3-7-[illegible] [illegible]	17'[illegible]"
[illegible] GRAY SAND, [illegible] CLAYEY	[illegible]	21'

NOTE A:
VERY STIFF TAN SANDY CLAY WITH SHELL

4" AUGER BORING
NO CASING USED

2-11-[illegible]

Boring No. [illegible] (center)

GROUND SURFACE

Description	Blows	Depth
LOOSE GRAY SAND		
[illegible]	2-1-1	
LOOSE GRAY SAND WITH [illegible]	2-3-[illegible] 3-[illegible] 2-[illegible] 3-[illegible]	1[illegible]'
VERY STIFF [illegible]-GRAY CLAY WITH SAND [illegible]		21'

4" AUGER BORING
NO CASING USED

2-11-[illegible]

Boring No. [illegible] (right)

GROUND SURFACE

Description	Blows	Depth
LOOSE GRAY SAND		1'[illegible]"
[illegible] SHELL AND SAND	[illegible]	3'[illegible]"
LOOSE GRAY SAND AND SHELL	[illegible]	
NOTE A	2-1-3	[illegible]"
LOOSE GRAY SAND AND SHELL	3-4-3	1[illegible]"
[illegible] TAN CLAY WITH [illegible]	1[illegible]-[illegible]	1[illegible]'
NOTE B	[illegible]	1[illegible]'

NOTE A:
VERY LOOSE GRAY SAND AND SHELL

NOTE B:
HARD TAN CALCAREOUS CLAY WITH ROCK FRAGMENTS

4" AUGER BORING
NO CASING USED

2-11-[illegible]

Classifications are made from visual inspection.

Water Levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil stratas, variations of rainfall, site topography, etc., may cause changes in these levels.

Figures in right hand column indicate number of blows required to drive 2" O. D. sampling pipe one foot using a 140 lb. weight falling 30 inches.

Total Footage [illegible]

Foreman [illegible]

Classifications by [illegible]

Job No. B-[illegible]

Sheet [illegible] of [illegible]

TEST BORING REPORT

RAYMOND

CONCRETE PILE DIVISION

A DIVISION OF RAYMOND INTERNATIONAL, INC.

BEST AVAILABLE COPY

To TAMPA ELECTRIC COMPANY Date FEBRUARY 20, 1968

Location of Borings UNIT NO. 1 - BIG BEND STATION, TAMPA, FLORIDA

All borings are plotted to a scale of 1" = 8 ft. using MEAN LOW WATER as a fixed datum.

Boring No. B-307

GROUND SURFACE ELEV. [illegible]

WL (12)

Depth	Description	Blows
0' – 4'	FINE SANDY GRAY SILT, SHELLS, LIMESTONE FRAGMENTS	5
4' – 9'	LOOSE FINE SAND WITH LIGHT AND DARK GRAY SILT, SOME SHELLS	4
9' – 13'6"	LOOSE FINE SAND WITH LOOSE DARK GRAY SILT, TRACE OF SHELLS	2 1
13'6" – 21'	SHELLS AND SANDY GRAY SILT	16
21' – 26'	CLAYEY GRAY SILT WITH LENSES OF FINE SAND, TRACE OF SHELLS	7 6
26' – 30'	SOFT LIMESTONE WITH GRAY SILT AND SHELLS	58
30' – 35'6"	CEMENTED FINE GRAY SAND SILT AND CLAY	100/10
35'6" – 41'6"	SOFT LIMESTONE WITH LENSES OF CLAYEY GRAY SILT	24/6-60/6 60-[illegible]
41'6" – 45'6"	HARD SANDY SILTY BLUE-GRAY CLAY	22-35-[illegible]

USED NX CASING TO 20' AND BX CASING TO 30'

BORING OFFSET 13'6" SOUTH

FOREMAN NOTES LOSS OF WATER AT 17' AND 30'

12-21-67

Boring No. B-308

GROUND SURFACE ELEV. 7.[illegible]

WL (8)

Depth	Description	Blows
0' – 3'6"	FINE SAND WITH GRAY SILT AND SHELLS	2-3-4
3'6" – 6'	FINE SAND W/DARK GRAY SILT, SOME SHELLS	1-1-2
6' – 13'6"	SHELLS AND SANDY GRAY SILT	10-10-3 [illegible]-1
13'6" – 18'	SILTY FINE GRAY SAND AND SHELLS	5-[illegible]-4
18' – 39'6"	FINE SAND WITH LIGHT AND DARK GRAY SILT, SOME SHELLS	4-4-5 2-1-6 5-11-24 1[illegible]-1[illegible]-14
39'6" – 42'6"	SILTY GRAY AND BLUE CLAY, SOME FINE SAND & SHELLS	1[illegible]-1[illegible]-15
42'6" – 47'	SOFT LIMESTONE W/ GRAY SILT LENSES	100/[illegible] 1[illegible]/[illegible]

USED 21' OF 4" CASING

BORING OFFSET 1[illegible]'[illegible]" SOUTH

FOREMAN NOTES LOSS OF WATER AT 13' TO 18'

12-22-67

Boring No. B-309

GROUND SURFACE ELEV. [illegible]

WL ([illegible])

Depth	Description	Blows
0' – [illegible]	FINE GRAY SAND, SHELLS, SOME GRAY SILT	1-1-1
[illegible] – [illegible]	FINE GRAY SAND W/GRAY SILT AND SHELLS	3-[illegible]-[illegible]
[illegible] – [illegible]	LOOSE FINE GRAY SAND, SILT AND SHELLS	1-1-1
[illegible] – 22'	FINE GRAY SAND AND GRAY SILT WITH SHELL LAYERS	3-[illegible]-6 3-[illegible]-[illegible]
22' – [illegible]	FINE SAND AND GRAY SILT, TRACE OF CLAY	2-3-3
[illegible] – 31'	STIFF SILTY SANDY GREENISH GRAY CLAY	7-[illegible]-12
31' – [illegible]	CEMENTED SAND AND GRAY SILT & LIMESTONE	100/[illegible] 100/4
[illegible] – [illegible]	FINE GRAY SAND AND CLAYEY GREENISH-GRAY SILT	13-1[illegible]-3[illegible]
[illegible] – [illegible]	HARD SANDY SILTY GREENISH-GRAY CLAY	[illegible]-33-77
[illegible] – [illegible]	DENSE SANDY CLAYEY GREENISH-GRAY SILT	[illegible]

USED 2[illegible]' OF 4" CASING

FOREMAN NOTES WATER LOSS AT 1[illegible]' - 2[illegible]'

1-1-68

RAYMOND

CONCRETE PILE DIVISION

A DIVISION OF RAYMOND INTERNATIONAL INC.

BEST AVAILABLE COPY

To TAMPA ELECTRIC COMPANY　　Date 20 FEBRUARY 1968

Location of Borings UNIT NO. 1 - BIG BEND STATION, TAMPA, FLORIDA

All borings are plotted to a scale of 1" = 3 ft. using MEAN LOW WATER as a fixed datum.

Boring No. 313

GROUND SURFACE ELEV. 7.0'

Depth	Description	Blows
0' – 4'	FINE GRAY SAND, SHELLS, SOME SILT	2-4-5
4' – 15'6"	WL(?) FINE GRAY SAND AND SHELLS WITH CLAYEY GRAY SILT	6-4-5; 1-2-6; 4-4-5
15'6" – 22'6"	FINE GRAY SAND WITH CLAYEY GRAY SILT, TRACE SHELLS	3-3-3
22'6" – 27'	CLAYEY FINE GRAY SILT WITH LENSES OF FINE GRAY SAND	2-2-2
27' – 30'6"	FINE GRAY SAND W/CLAYEY GRAY SILT AND SHELLS	1-2-5
30'6" – 33'6"	TYPE A	9-11-12
33'6" – 47'	CLAYEY SANDY LIGHT GRAY SILT WITH LIMESTONE FRAGMENTS (MARL)	4-6-11; 37-40-56; 100-70; 100/6

TYPE A:
FINE GRAY SAND WITH GRAY SILT AND BANDS OF SILTY GRAY AND GREEN CLAY

USED 21' OF 4" CASING

1-24-68

Boring No. 314

GROUND SURFACE ELEV. 7.0'

Depth	Description	Blows
0' – 4'	FINE GRAY SAND, SILT, SOME CLAYEY GRAY SILT	3-3-3
4' – 11'	WL(?) FINE GRAY SAND, SHELLS, SOME SILT, TRACE OF CLAY	4-4-4; 2-4-5
11' – 14'	FINE GRAY SAND, SOME SILT & BROKEN SHELLS	11-20
14' – 18'	SHELLS AND SILTY FINE GRAY SAND	4-4-7
18' – 22'	FINE GRAY SAND & CLAYEY GRAY SILT	5-4-4
22' – 32'	FINE GRAY SAND, SHELLS AND GRAY SILT	2-2-3; 4-9-12
32' – 36'	CLAYEY LIGHT GRAY SILT WITH FINE SAND AND BANDS OF LIMESTONE (MARL)	10-11-5
36' – 47'	CLAYEY LIGHT-GRAY SILT WITH FINE SAND AND BANDS OF LIMESTONE MARL	9-7-6; 83-100; 100/6

USED 21' OF 4" CASING

1-20-68

Boring No. 315

GROUND SURFACE ELEV. 7.0'

Depth	Description	Blows
0' – 4'	FINE GRAY SAND, SHELLS, SOME SILT	4-4-3
4' – [illegible]	WL(?) CLAYEY SILTY FINE SAND, SOME SHELLS	1-1-2; 1-1-2
[illegible]	SILTY GRAY SILT & SHELLS, SOME FINE SAND	[illegible]
[illegible]	SILTY FINE GRAY SAND, SOME CLAY, TRACE OF SHELL	2-4-4
[illegible]	SILTY DARK GRAY CLAY WITH LENSES OF FINE SAND	3-4-5
[illegible]	STIFF SILTY GRAY AND GREEN CLAY, SOME FINE SAND	4-4-3
[illegible] – 37'	CLAYEY SANDY GREEN AND GRAY SILT	2-[illegible]-6
37' – 47'	LIGHT GRAY MARL WITH LIMESTONE BANDS 3" TO 4" THICK	150-70; 140/5; 100/6

USED 21' OF 4" CASING

1-27-68

TEST BORING REPORT

RAYMOND

CONCRETE PILE DIVISION

A DIVISION OF RAYMOND INTERNATIONAL INC.

BEST AVAILABLE COPY

To TAMPA ELECTRIC COMPANY

Date FEBRUARY 20, 1968

Location of Borings BIG BEND STATION, TAMPA ELECTRIC CO. TAMPA, FLORIDA

All borings are plotted to a scale of 1" = 8 ft. using MEAN LOW GULF as a fixed datum.

Boring No. 310

GROUND SURFACE ELEV. +8.50'

Depth	Description	Blows
0' – 4'	FINE GRAY SAND W/ LIGHT & DARK-GRAY SILT & SHELLS-FILL	2-3-5
4' – 8'	FINE GRAY SAND SOME GRAY SILT SHELLS TRACES OF ORGANIC MATERIAL	4-7-9
8' – 10'6	FINE GRAY SAND GRAY SILT & SHELLS	3-4-?
10'6 – 14'	SHELLS & SILTY FINE GRAY SAND	6-7-10
14' – 19'	FINE GRAY SAND GRAY SILT & SHELLS	4-4-4
19' – 31'6	LOOSE FINE SAND AND GRAY SILT	2-3-2, 2-1-2, 7-7-7
31'6 – 38'6	DENSE FINE GRAY SAND W/GRAY SILT, TRACE OF SHELLS	12-17-21
38'6 – 45'	LIGHT GRAY MARL	24-100
45' – 47'	CEMENTED FINE GRAY SAND & SILT	15-100
47' – 48'6	NOTE A	55-2?-?5

NOTE A: DENSE, FINE GRAY SAND GRAY SILT, SOME CLAY AND LIMESTONE FRAGMENTS.

4" CASING USED 21'

WATER LEVEL AT 6'0"

BORING OFFSET 12'0" SOUTH

1-22-68

Boring No. 311

GROUND SURFACE ELEV. +8.00'

Depth	Description	Blows
0' – 4'	FINE GRAY SAND, SHELLS, SOME GRAY SILT FILL	3-4-3
4' – 7'6	FINE SAND, W/GRAY SILT SHELLS SMALL TO MED. ROCK FRAG.	10-12-12
7'6 – 27'	FINE GRAY SAND, GRAY SILT, SHELLS, TRACE OF CLAY	1-1-1, 2-3-4, 2-3-2, 3-3-2
27' – 32'	FINE GRAY SAND, GRAY SILT, SOME CLAY, SOME SHELLS	2-2-3
32' – 36'	FINE GRAY SAND W/ SOME SILT & SHELL LAYERS	?-?-12
36' – 39'	NOTE A	6-24-15
39' – 45'	HARD CLAYEY, SANDY GRAY SILT W/ LIMESTONE FRAGMENTS (MARL)	12-100
45' – 48'	VERY DENSE SILTY FINE SAND, SOME CLAY	?-100

NOTE A: CLAYEY GRAY SILT, SOME FINE SAND LIMESTONE FRAGMENTS NOTED (MARL)

4" CASING USED 21'

BORING OFFSET 15' SOUTH

WATER LEVEL AT 6'0"

1-24-68

Boring No. 312

GROUND SURFACE ELEV. +7.00'

Depth	Description	Blows
0' – 4'	FINE GRAY SAND SHELLS W/SOME SILT FILL	3-4-3
4' – 14'	FINE GRAY SAND W/CLAYEY GRAY SILT AND SHELLS	1-4-3, 2-3-4
14' – 16'	NOTE A	??-12-14
16' – 21'	FINE SAND W/GRAY SILT SOME CLAY	4-3-3
21' – 24'	CLAYEY SANDY DARK GRAY SILT, SOME SHELLS	?-?-?
24' – 31'	CLAYEY, SANDY, GRAY & GREEN SILT, LIMESTONE FRAGMENTS NOTED	4-?-?
31' – 33'	NOTE B	1??/?
33' – 38'	STRATIFIED, SILTY SANDY GRAY CLAY & BANDS OF LIGHT GRAY CLAYEY SILT W/ LIMESTONE FRAGMENTS	5-?-1
38' – 48'	CLAYEY SANDY LIGHT GRAY SILT WITH LIMESTONE FRAGMENTS (NOTED)	60-100, 7-1?-14, 24-100

NOTE A: DENSE FINE GRAY SAND W/ CLAYEY GRAY SILT SMALL TO LARGE SHELLS.

NOTE B: CLAYEY SANDY, LIGHT GRAY SILT LIMESTONE FRAGMENTS NOTED (MARL)

4" CASING USED 21'

WATER LEVEL AT 5'

1-23-68

RAYMOND

CONCRETE PILE DIVISION

BEST AVAILABLE COPY

To TAMPA ELECTRIC COMPANY Date 26 FEBRUARY [illegible]

Location of Borings [illegible] - [illegible] STATION, TAMPA, FLORIDA

All borings are plotted to scale of 1" = [illegible] ft. using GROUND SURFACE as a fixed datum.

Boring No. 31? Boring No. Boring No.

GROUND SURFACE

Description	Blows	Depth
		0'
LOOSE BROWN & GRAY SAND W/ROOTS		
		2'6"
NOTE A	[illegible]	
		3'6"
LOOSE GRAY SAND WITH SHELL AND ROCK FRAGMENTS	5-3-2	
	4-4-5	
		1[illegible]'
FIRM GRAY SAND, VERY CLAYEY	3-6-7	
		12'6"
FIRM GRAY SAND	6-6-6	
	9-3-5	
		21'

L(1)

NOTE A:
FIRM YELLOW SAND WITH SHELL AND ROCK FRAGMENTS

4" AUGER BORING
NO CASING USED

[illegible]-1?-68

GENERAL NOTE: FIGURES REPRESENTED AS FRACTIONS IN RIGHT HAND COLUMN OF BORING LOG ARE DEFINED BY THE NOTATION

NUMERATOR / DENOMINATOR = NUMBER OF BLOWS / PENETRATION IN INCHES

Classifications are made from visual inspection.

Water Levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil stratas, variations of rainfall, site topography, etc., may cause changes in these levels.

Figures in right hand column indicate number of blows required to drive 2" O. D. sampling pipe one foot, using a 140 lb. weight falling 30 inches.

[illegible]

Total Footage 21'

Foreman [illegible]

Classifications by [illegible]

Job No. B-[illegible]

Sheet 5 of 6

APPENDIX B

CONTINUOUS MONITORS

GENERAL REQUIREMENTS

TECO's Gannon Station will probably be subject to continous monitoring requirements for SO_2 and opacity. System requirements are not highly dependent on the precise SIP regulation that is adopted for the plant, because a computerized data reduction system will be necessary in any case. A recent agreement by West Penn Power for the Mitchell Plant included requirements to transmit ambient data directly to the state on an hourly basis. For Gannon it might be practical to report only the hourly emissions that exceed emission standards and to report daily emissions in a simple report each month. The monthly report format might be as simple as the following:

SO_2 Emissions Report - August 31, 1984

Excursions Above Limits To Date (13.7 ton/h, 254 ton/day) - Gannon

Max. hour	Date	Max ton/h	Ton/day
1100	01-14-84	13.0	270*
1300	04-01-84	13.9*	241
1100	06-17-84	12.8	258*
1400	06-18-84	14.2*	255*
1300	08-27-84	13.8*	259*

*Indicates an exceedance.

Only days with exceedances would be reported. For all reported days, the maximum hourly reading would be reported. Exceedances would be identified by an asterisk. The above report indicates that four days exceeded the daily cap. Short-term (hourly) exceedances accounted for the other infraction. Two days exceeded both the hourly and daily limits.

To implement the SO_2 emission bubble and to insure the successful enforcement of SO_2 emission limits TECO will have to install and operate a sophisticated continuous emissions monitoring system (CMS). The following description of emissions monitoring concepts and requirements for existing boilers is condensed mainly from "Evaluation Of Continuous Monitoring Systems For Stationary Sources", a manual prepared by Engineering-Science, McLean, Virginia, for the U.S. Environmental Protection Agency, Region IV, August 1, 1978.

We have not performed an in-depth cost analysis for continuous emissions monitoring systems that will be required by TECO, but other clients have indicated costs in the neighborhood of $100,000 to monitor a single unit. Some economics can be effected in a system to process and report data for six boilers at once; $500,000 might be a good first guess at the capital cost for the system. At least one operator will probably be required on a full-time basis to maintain the system.

REGULATIONS

On October 6, 1975, EPA adopted requirements for the continuous emission monitoring of certain new and existing sources. The requirements for existing sources were adopted under 40 CFR Part 51, "Requirements for the Preparation, Adoption and Submittal of Implementaion Plans. The requirements for new sources were adopted under 40 CFR Part 60, Standards of Performance for New Stationary Sources. These regulations appeared in the Federal Register at 40 FR 46256, October 6, 1975. The continuous monitoring requirements adopted by EPA are minimum requirements. State and local agencies may, at their discretion, adopt more comprehensive or stringent requirements.

In general, these regulations require that specific categories of industrial sources shall install continuous monitoring systems to monitor emissions of sulfur dioxide, oxides of nitrogen, and opacity. In certain cases, sources are also required to monitor carbon dioxide or oxygen so that the output from the SO_2 and NO_x monitors can be converted to units of the standard. The regulations include requirements for design and performance specifications, procedures for conducting performance evaluations, and requirements for record keeping. These regulations provide the basic framework for EPA's continuous monitoring programs under the Clean Air Act and thus provide a useful reference for federal, state, and local air pollution officials involved in implementing these programs.

The requirements for existing sources to install continuous monitoring systems were designed to partially implement the requirements of Sections 110(a)(2)(F)(ii) and (iii) of the Clean Air Act, which state that implementation plans must provide "requirements for installation of equipment by owners or operators of stationary sources to monitor emissions from such sources", and "for periodic reports on the nature and amounts of such emissions". However, the original implementation plan requirements did not require SIP's to contain legally enforceable procedures mandating continuous emission monitoring and recording. At the time the original requirements were published, EPA had accumulated little data on the availability and reliability of continuous monitoring devices. The Agency felt that the state-of-the-art was such that it was not prudent to require existing sources to install such devices.

Since that time, much work has been done by EPA and others to field test and compare various continuous emission monitors. As a result of this work, the Agency now believes that for certain sources, performance specifications for accuracy, reliability, and durability can be established for continous emission monitors of oxygen, carbon dioxide, sulfur dioxide, and oxides of nitrogen and for the continuous measurement of opacity. Accordingly EPA adopted the requirements now contained at 40 CFR 51.19(e) which requires states to revise their implementation plans to include legally enforceable procedures to require certain stationary sources to install, calibrate, maintain, and operate equipment for continously monitoring and recording emissions. The specific stationary sources and pollutants to be monitored are identified in 40 CFR 51, Appendix P - Minimum Emission Monitoring Require ments. Appendix P outlines the specifics of the applicability of the continous monitoring regulations regarding size (throughput) limitations for the affected facilities, the pollutants that must be monitored, exemptions, performance specifications, and evaluation procedures, data reduction and maintenance requirements, and special considerations regarding alternative procedures.

The States were required to revise their implementation plans to include specific procedures for continuous monitoring systems within one year after EPA adopted its requirements under 40 CFR Part 51; that is, the revised plans were due to be submitted by October 6, 1976. Source owners are required to have the continuous monitoring systems on-line within eighteen months of EPA's approval of promulgation of the revised plans.

Several of the salient features of the CMS requirements for existing sources are discussed in the paragraphs below.

Affected Facilities

Fossil-fuel fired steam generators must, under certain circumstances, be monitored for emissions of opacity, sulfur dioxide, nitrogen oxides, and, if necessary to convert to units of the applicable standard, oxygen or carbon dioxide. No monitoring is required if the annual average capacity factor is less than or equal to 30 percent, as reported to the Federal Power Commission for the calendar year 1974. In addition, monitoring is not required if no SIP emission limitation is in effect.

Opacity monitoring is required for coal-fired units having greater than 250 million Btu/h heat input. Oil and combination oil and gas-fired units are exempt if a particulate collection device is not necessary to meet the SIP emission limit at for particulate collection device is not necessary to meet the SIP emission limit for particulates and the unit has no history of visible emissions violations. Sulfur dioxide monitoring is required for units having a heat input greater than 250 million Btu/h and that utilize SO_2 control equipment.

Reporting Requirements

The SIP's should provide for quarterly reporting by source operators. The reports must contain data regarding excess emissions and periods when the continous monitoring equipment was inoperative (40 CFR 51, Appendix P, Paragraph 4). If neither situation occurred during the quarter, a report documenting the absence of these events must still be filed.

The reports should identify, where applicable, the cause of excess emissions, the dates, times, and magnitude of such emissions and the dates and times when the continuous monitoring system was inoperative and the nature of repairs and adjustments. Excess opacity emissions should be reported as one-minute averages or other time periods prescribed by the state. Excess emissions for SO_2 and NO_x should be reported in units of the standard; the averaging time should be required to be consistent with the averaging period specified in the emission test method used to determine compliance with the applicable SIP emission limitation.

Data reduction procedures are essentially the same as required for new sources under 40 CFR 60. However, the units of the SIP emission limitations may be different from those for sources subject to NSPS, thus requiring some alteration of certain data reduction procedures.

Performance Specifications

The performance specifications for monitors installed on existing facilities are the same as those for new facilities. These specifications are tabulated in Tables II-1 through II-3. It should be noted, however, that for existing sources that purchased an emission monitoring system prior to September 11, 1974, the SIP may provide for an exemption from meeting the performance specifications and associated test procedures for a period not to exceed five years from plan approval or promulgation.

Special Considerations

In Appendix P, Paragraph 6.0, EPA has recognized the difficulty in setting uniform requirements for continuous monitoring systems at existing facilities and has allowed the SIPs to include flexible requirements that will not impede the development of new technology and will provide the minimum installation and operating costs. Alternative monitoring requirements may be adopted on a case-by-case basis. Specific problems that may be encountered (ii) infrequent operation of the facility, (iii) extreme economic burden, and (iv) physical limitations at the facility.

Major Differences in Requirements For New and Existing Sources

EPA allows more flexibility in implementing CMS requirements for existing sources as compared to new sources. For new sources, the continous monitoring system can be integrated into the original design of the facility. Retrofitting CMS equipment on existing facilities may require significant additional expenses relating to altering existing equipment, e.g., representative

TABLE II-1. PERFORMANCE SPECIFICATIONS FOR TRANSMISSOMETERS

	Parameter	Specification
A.	Calibration error*	±3% opacity
B.	Zero drift (24h)*	±2% opacity
C.	Calibration drift (24 h)	±2% opacity
D.	Response time	10 seconds (maximum)
E.	Operation test period	168 hours

*Expressed as a sum of absolute mean value plus 95 percent confidence interval of a series of tests.

PERFORMANCE SPECIFICATIONS FOR GAS MONITORS

TABLE II-2. SO_2 AND NO_x MONITORS

	Parameter	Specification
A.	Accuracy*	±20% of mean value of reference method test data.
B.	Calibration error*	±5% of each (50%, 90%) calibration gas mixture
C.	Zero drift (2 h)*	2% of Span
D.	Zero drift (24 h)*	2% of Span
E.	Calibration drift (2 h)*	2% of Span
F.	Calibration drift (24 h)*	2.5% of Span
G.	Response time	15 minutes (maximum)
E.	Operational period	168 hours (minimum)

TABLE II-3. CO_2 AND O_x MONITORS

	Parameter	Specification
A.	Zero drift (2 h)*	±0.4% O_2 or CO_2
B.	Zero drift (24 h)*	±0.5% O_2 or CO_2
C.	Calibration drift (2 h)*	±0.4% O_2 or CO_2
D.	Calibration drift (24 h)*	±0.5% O_2 or CO_2
E.	Response time	10 minutes (maximum)
F.	Operational period	168 hours (minimum)

*Expressed as a sum of absolute mean value plus 95 percent confidence interval of a series of tests.

sampling locations may be inaccessible or nonexistent. If retirement of the facility is scheduled in the near future, or if it is operated only on a limited basis, CMS installation and operating costs may not be warranted. Thus, under the requirements of 40 CFR 51, Appendix P, EPA suggests that the States provide for case-by-case determinations of the desirability of continous emission monitoring systems. Similarly, EPA generally requires all new sources within a category to install monitoring systems, whereas smaller existing sources are exempted.

Other major differences between the requirements for new and existing sources are summarized as follows:

- EPA regulates new sources directly NSPS; existing sources are regulated by states according to minimum requirements set by EPA.

- NSPS specify a six-minute averaging time for opacity measurements be used to determine compliance whereas Part 51 specifies a one-minute averaging time (or such time period prescribed by the state) be used to compute excess emissions.

- NSPS specify a three-hour averaging time for gaseous pollutants--Part 51 specifies that the averaging time used by the state for manual compliance testing shall be used.

- Oil-burning and oil/gas-burning boilers are exempted from opacity monitoring requirements if they are existing sources and have no record of visible emissions violations, whereas all such boilers are required to monitor opacity under NSPS.

- Monitors for nitrogen oxides are required only in those AQCR's where the Administrator has called for a control strategy for nitrogen dioxide for Part 51 requirements whereas Part 60 regulations require nitrogen oxides monitors regardless of SIP requirements.

EXTRACTIVE AND IN-SITU MONITORS

All categories of sources required to install continuous gaseous emission monitors are faced with the problem of selecting instruments that will give data representative of the actual source emissions. The extraction of a sample gas from a stack or duct presents a number of problems for extractive continuous analyzers. To obtain accurate results, a representative sample must be extracted and transported to the monitor itself. Beforehand, the sample must be processed by removing particulate matter, water vapor, and, in some cases, specific gases that interfere in the analytical method. In-situ monitors, in contrast with extractive monitors, do not require the removal of particulates or water vapor. The analytical methods used in in-situ monitors have been chosen to avoid these interferences. In-situ monitors do, however, have limitations in their application. If a stack or duct contains entrained water in the form of liquid droplets, light scattering problems and adsorption of the pollutant gases in the liquid may cause the instrument values to differ from those obtained by the EPA reference method. The choice of the type of system (extractive or in-situ) to be used in a given application will often depend upon features of the plant design.

The selection of a monitor is also dependent upon the criteria for performance. An SO_2 emissions monitoring system must meet the following specifications after it is installed on the source:

Accuracy	≦20%
Calibration error	≦5%
Zero drift	
2 hour	≦2% of span
24 hour	≦2% of span
Calibration drift	
2 hour	≦2% of span
24 hour	≦2.5% of span
Response time	15 minutes (maximum)
Operational period	168 hours

Extractive and in-situ SO_2 emission monitors can be characterized by the principles of chemical physics used. The methods used can be grouped into three major categories:

- absorption spectrometers
- luminescene analyzers
- electroanalytical methods

Extractive SO_2 monitors utilize methods from all of these categories, whereas in-situ systems generally use spectroscopic absorption methods. An exception is thermal conductivity used in a few in-situ SO_2 monitors.

EXTRACTIVE ANALYZERS

In the past, either existing ambient air monitors or common laboratory instruments were modified for source-level monitoring applications. Problems tended to arise with the inevitable dilution systems and delicate nature of some of these systems. Many of these earlier problems have since been solved. Extractive analyzers are now designed to specifically monitor at source-level concentrations and are constructed to withstand the rigors of a plant environment.

Absorption Spectrometers

Nondispersive infrared (NDIR) analyzers have been developed to monitor SO_2, NO, CO, CO_2, and other gases that absorb in the infrared, including hydrocarbons. An NDIR analyzer utilizes a broad band of infrared light centered at an absorption peak of the pollutant molecule.

The advantages of the NDIR analyzers are their relatively low cost and the ability to apply the method to many types of gases. Problems associated with the method arise from interfering species, the degradation of optical systems due to corrosive atmospheres, and in some cases, limited sensitivity. Detectors are sensitive to vibration, often requiring electronic and mechanical damping.

MANUFACTURERS OF NDIR MONITORS

Beckman Instruments, Inc.
2500 Harbor Boulevard
Fullerton, CA 92634
(714) 871-4848

Bendix Corporation
Process Instruments Div.
P. O. Drawer 831
Lewisburg, WV 24901
(304) 647-4358

Calibrated Instruments, Inc.
431 Saw Mill River Road
Ardsley, NY 10502
(914) 692-9232

Esterline-Angus
19 Rozel Road
Princeton, NJ 08540
(609) 452-8600

CEA Instruments (Peerless)
555 Madison Avenue
New York, NY 10022
(212) 247-2518

Leeds & Northrop
Sumneytown Pike
Northwales, PA 19454
(215) 643-2000

Horiba Instruments, Inc.
1021 Buryea Avenue
Irvine, CA 92714
(714) 540-7874

MSA Instrument Division
Mine Safety Appliances
400 Penn Center Blvd.
(412) 241-5900

Infra-red Industries
P. O. Box 989
Santa Barbara, CA 93102

Teledyne
Analytical Instruments
333 West Mission Drive
P. O. Box 70
San Gabriel, CA 91776

Several nondispersive systems are available that use light in the ultraviolet and visible regions of the spectrum rather than in the infrared. To analyze for SO_2, these instruments utilize one of the narrow absorption bands of the ultraviolet absorption spectrum. The instruments work in a similar manner to the NDIR method discussed previously. Essentially, the analyzers measure the degree of absorption at a wavelength in the absorption band of the molecule of interest, (280 mm for SO_2). This method of analysis is often termed "differential absorption" because measurements are performed at two different frequencies. One at the wavelength of maximum absorption and one where SO_2 has minimal absorption.

MANUFACTURERS OF EXTRACTIVE DIFFERENTIAL ABSORPTION ANALYZERS

GEA Instruments
555 Madison Avenue
New York, NY 10022
(212) 247-2518

DuPont Company
Instrument Products
Scientific & Process Div.
Wilmington, DE 19898
(302) 772-5500

Western Research and
Development Ltd.
Marketing Department
#3, 1313 - 44th Avenue, N.E.
Calgary - Alberta T2E GL5
(403) 276-8806

Esterline-Angus
19 Rozel Road
Princeton, NJ 08540
(609) 452-8600

Teledyne
Analytical Instruments
333 West Mission Drive
P. O. Box 70
San Gabriel, CA 91776

Luminescence Methods

Luminescence is the emission of light from a molecule that has been excited in some manner and photoluminescence is the release of light after a molecule has been excited by ultraviolet, visible, or infrared radiation. The emission of light from an excited molecule created in a chemical reaction is known as chemiluminescence. The atoms of a molecule can even be excited to luminescence in a hydrogen flame. These three types of luminescent processes are used in source monitoring applications. Monitors utilizing the effects of luminescene can be very specific for given pollutant species and can have greater sensitivity than some of the absorption or electrochemical methods.

Fluorescence is a photoluminescent in which light energy of a given wavelength is absorbed and light energy of a different wavelength is emitted. In this process, the molecule excited by the light energy will remain excited for about 10^{-8} to 10^{-4} seconds. This period of time will be sufficient for the molecule to dissipate some of this energy in the form of vibrational and rotational motions. When the remaining energy is re-emitted as light, the energy of the light will be lower, meaning light of a longer wavelength (lower frequency) will be observed. Thus, the basis the fluorescence technique is to irradiate the molecule with light at a given wavelength (usually in the near ultraviolet) and to measure the emitted light at a longer wavelength.

The SO_2 fluorescence monitors are customarily calibrated using SO_2 in air mixtures. It has often happened that a technician will take a convenient cylinder of span gas having SO_2 in nitrogen instead of air. Spanning the instrument with such a mixture will cause the subsequent SO_2 readings to be approximately 30% lower than the true values. Ideally, the best way to span fluorescence analyzers for source application is to use a span gas with a composition similar to that of the stack effluent. Fluorescence monitors, aside from this quenching problem, have no other significant interference problems. Particulates and water must be completely removed from the sampling stream before it enters the sampling chamber or else the instrument will easily be fouled. Permeation tube dryers are generally used in the instrument itself to eliminate any water vapor that is not removed by the extractive system.

MANUFACTURERS OF FLUORESCENCE SOURCE ANALYZERS

Thermo Electron Corporation
Environmental Instruments Div.
108 South Street
Hopkinton, MA 01748
(617) 435-5321

Research Appliance Corp.
Route 8
Gibsonia, PA 15044
(412) 443-5935

Electroanalytical Methods

Another class of instruments based upon electroanalytical methods of measurement has found great utility in source monitoring applications. There are four distinct types of electroanalytical methods used in source monitoring. These are:

- Polarography
- Electrocatalysis
- Amperometric Analysis
- Conductivity

A number of monitors based on polarographic and electrocatalytic methods are available for source monitoring applications. Polarographic analyzers have been developed for a number of gases and can be inexpensive and portable; ideal for inspection work. Complete continuous source-monitoring systems are also available from manufacturers of these instruments. The electrocatalytic or high temperature fuel-cell method, as it is often called, is used to moni tor oxygen only. Both extractive and in-stack monitors are available using this technique. The methods of amperometric analysis and conductivity are less widely used and are subject to a number of interferences. They will not be discussed further in the report.

Polarographic analyzers have variously been called voltammetric analyzers or electrochemical transducers. With the proper choice of electrodes and electrolytes, instruments have been developed utilizing the principles of polarography to monitor SO_2, NO_2, CO, O_2, H_2S, and other gases.

The transducer in these instruments is generally a self-contained electrochemical cell in which a chemical reaction takes place involving the pollutant molecule. Two basic techniques are used in the transducer: (a) the utilization of a selective semipermeable membrane that allows the pollutant molecule to diffuse to an electrolytic solution, and (b) the measurement of the current change produced at an electrode by the oxidation or reduction of the dissolved gas at the electrode. For SO_2, the oxidation that takes place is:

$$SO_2 + 2H_2O \rightarrow SO_4^{-2} + 4H^+ + 2e^-$$

The polarographic analyzers in their earlier development were temperature sensitive, but temperature compensation devices are now generally provided to avoid this problem. This electrolyte of the cells will generally be used up in 3 to 6 months of continuous use. The cells can be sent back to the manufacturer and recharged, or new ones can be purchased. It is extremely important that the sample gas be conditioned before entering these analyzers. The stack gas should come to ambient temperature and the particulate matter and water vapor should be removed to avoid fouling the cell membrane.

With proper use, polarographic analyzers can be a valuable tool to an air pollution agency's inspection program or to a source operator wishing to check pollutant levels at various plant locations. Complete systems are also available for continuous monitoring, but should be designed carefully so as to give accurate data.

MANUFACTURERS OF POLAROGRAPHIC ANALYZERS

Dynasciences (Whitaker Corp.)
Township Line Road
Blue Bell, PA 19422
(215) 643-0250

IBC/Berkeley Instruments
2700 DuPont Drive
Irvine, CA 92715
(714) 833-3300

Western Precipitation Division
Joy Manufacturing Company
P. O. Box 2744 Terminal Annex
Los Angeles, CA 90051
(Portable models - not designed for continuous stack application)

Beckman Instruments, Inc.
Process Instruments Division
2500 Harbor Blvd.
Fullerton, CA 92634
(714) 871-4848
(O_2 only)

Interscan Corp.
20620 Superior St.
Chatsworth, CA 91311
(213) 882-2331

Theta Sensors, Inc.
Box 637
Altadena, CA 91001
(213) 798-9101
(will provide systems)

Teledyne Analytical Instruments
333 West Mission Drive
San Gabriel, CA 91776
(213) 282-7181
(O_2 only - micro-fuel cell)

IN-SITU MONITORING SYSTEMS

The problems and expense sometimes associated with extractive monitoring systems have led to the development of instrumentation that can directly measure source-level gas concentrations in the stack. The so-called "in-situ" systems do not modify the flue gas composition and are designed to detect gas concentrations in the presence of particulate matter. Since particulate matter causes a reduction in light transmission, in-situ monitors utilize advanced electro-optical techniques to eliminate this effect when detecting gases. These techniques are:

- Differential absorption
- Gas filter correlation
- Second derivative spectroscopy

Also, as discussed earlier, an electrocatalytic analyzer has been designed to monitor oxygen concentrations in-situ.

Terminology

A number of terms categorize the different types of in-situ monitors.

Cross-stack in-situ monitors measure a pollutant level across the complete diameter or a major portion of the diameter of a stack or duct. There are two types of cross-stack monitors: (a) single pass and (b) double pass. Single-pass and double-pass transmissometers have been discussed earlier, and the distinction holds for in-situ gas monitoring systems. Single-pass systems locate the light transmitter and the detector on opposite ends of the optical sample path. Double-pass systems locate the light transmitter and the detector on one end of the optical sample path. To do this, the light beam must fold back on itself by the use of a retroreflector. Double-pass systems are usually easier to service than single-pass systems since all of the active components are in one location.

In-stack in-situ systems monitor emission levels by using a probe that measures over a limited sample path length. All of the commercial optical in-stack monitors are double-pass systems (the in-stack electrocatalytic oxygen monitor discussed earlier is not an optical system). The path length may vary from 8 cm to a meter. A retroreflector, usually made of quartz, is located at the end of the probe. The in-stack systems are all double-pass and have also been termed short-path monitors. The siting of such systems should follow the same guidelines as those given for extractive systems. A location representative of the pollutant level should be determined before installation.

There are currently only three vendors of in-situ optical gaseous emission monitors. Environmental Data Corporation (EDC) uses the technique of differential absorption to monitor CO_2, SO_2 and NO, and the gas filter correlation technique to monitor CO. Contraves markets an instrument that measures SO_2, NO, CO_2, and CO levels all by the gas filter correlation method. Lear Siegler, Inc. utilizes second derivative spectroscopy to measure SO_2 and NO levels with their in-stack monitor. The following discussion of each of these methods is intended to provide the reader with a background in these new technologies so that informed evaluations may be made of the commercially marketed systems.

Cross-Stack Analyzers

The technique of differential absorption spectroscopy used in the EDC cross-stack gas monitor is similar to that used in the NDUV extractive analyzers discussed earlier. To obtain a narrow band of radiation over which the pollutant molecule will absorb energy, a diffraction grating is used in this analyzer. A grating disperses light from a UV lamp and light of the appropriate wavelength is picked off; one wavelength for monitoring the pollutant level, another to serve as a reference wavelength.

The ratio of intensities in the differential absorption technique is important in the case of in-stack monitors. Particulates in the flue gas will attenuate the amount of light energy passing through the optical path. This is the principle of measurement in the opacity monitors. If the light attenuation is the same for the light energy at the measuring wavelength and that at the reference wavelength, each intensity is reduced by a constant factor.

This satisfies a requirement demanded of all in-situ monitors: that particulates not interfere in the analytical method. Interference due to the broad band absorption by water vapor or other molecular species should similarly cancel out if the measuring and reference wavelengths do not differ too greatly. Further information on this system may be obtained from:

Environmental Data Corporation
608 Fig Avenue
Monrovia, California 91019
(213) 358-4551

The gas-filter correlation (GFC) method is used in an analyzer produced by Contraves-Goerz Corp. to monitor CO_2, CO, SO_2, and NO. This method shows potential in both in-situ and remote pollutant emissions monitoring.

The GFC method has been found to be a very sensitive and specific method in the infrared. The ability to monitor a large number of absorption lines provides greater sensitivity, in some cases, than can be obtained with the differential absorption technique using only filters. The GFC method is an NDIR method; the light is not dispersed.

The Contraves-Goerz system uses only one correlation cell containing CO, CO_2, SO_2, and NO. Full advantage is taken of the spectral characteristics of these molecules to prevent problems of interference in the measurement. More information may be obtained on this system from:

Contraves-Goerz Corporation
610 Epsilon Drive
Pittsburgh, PA 15238
(412) 782-7700

In-Stack Analyzers

At the present time, only one instrument is manufactured that monitors SO_2 and NO in-stack. This is the Lear-Siegler second derivative "stack-gas monitor". Although the second derivation technique is somewhat more complicated than those discussed earlier, an understanding of the method is necessary if a source operator or agency observer has to make an evaluation of different monitoring systems.

This monitor analyzes the gas in-situ; the gas is not extracted, but is monitored as it exists in the flue gas stream. The tip of the probe contains the measuring chamber, which senses across a distance of 10 cm. The instrument therefore does not measure "cross-stack". It is an in-stack "point" monitor or "short-path" monitor. Care should be taken siting such a system since a representative location must be monitored. The guidelines given for siting of the probe of an extractive system could be followed in choosing the location of an in-stack monitor, although EPA has not published any specific siting criteria for this technique outside of the general criteria for representative measuring.

The second derivative in-stack monitor is, of course, limited to monitoring one stack at a time. Vibration can also be a problem since the optical system can suffer in extreme cases. One of the most common problems in this and similar electro-optical systems is the failure of electronic components. The complicated circuitry of such systems in some cases may lead to a higher probability of component failure. A significant feature of the LSI system is that zero and span gases can be used to flood the sample chamber to a pressure greater than the stack static pressure. This provides an alternate method to the use calibration cells if desired. The calibration cells may be used for daily span checks and would save the expense of span gas and associated plumbing systems. The LSI second derivative source monitor may also be modified to measure ammonia concentrations. More information may be obtained on the analyzer from:

Lear Siegler, Inc.
Environmental Technology Division
74 Inverness Drive East
Englewood, CO 90110
(303) 770-3300

DATA HANDLING TECHNIQUES

The continuous emission monitoring regulations do not contain detailed specifications for data handling equipment. Other than specifically requiring that a data recorder be used, in most instances there are few or no additional requirements. Given only rather general "data recorder" requirements, one is tempted to conclude that just about any recorder would be acceptable, but closer scrutiny of the regulations reveals that this is not the case. Performance specifications are stipulated for the entire continuous monitoring system which consists of several subsystems, including the data recorder. Therefore, by being a part of the monitoring system, the data recorder must function properly if the monitoring system is to meet the performance specifications.

The monitoring system data need not be continuously recorded. Continuous monitoring systems must meet only the following operating requirements:

- Opacity monitoring system - minimum of one cycle of sampling and analysis every 10 seconds and one cycle of data recording every 6 minutes.

- Gaseous (SO_2, NO_x, CO_2, O_2) monitoring system - minimum of one cycle of operation (sampling, analyzing, and data recording) every 15 minutes.

The number of different data handling systems greatly exceeds the types of continuous monitors. All data acquisition systems (DAS) can be grouped into three major categories:

- Strip chart recorder

- Data logger and support device

- Mini computer and support device

Strip chart recorders creat a continuous trace of the analog signal corresponding to the parameter being measured. The primary disadvantage to the use of a strip chart recorder is the time requirement involved in manually reducing the data. For opacity monitoring data, six-minute averages have to be calculated from a minimum of 24 equally-spaced points. In the case of gaseous monitoring data, one-hour averages must be calculated from a minimum of four equally-spaced points. Only excess emissions need to be reduced and reported, but the process of reducing a large volume of strip chart data is quite tedious and time-consuming. When measuring SO_2 and/or NO_x at fossil fuel-fired steam generators, the corresponding O_2 (or CO_2) measurement and the appropriate "wet" or "dry" F factor must be used to determine if the pollutant value is an excess emission point.

At most sources the monitoring data are handled with automated data processing (ADP). A single data logger, the most basic type of ADP system, can be an active or passive device. As a passive device, the data logger will collect analog data from the analyzers at pre-selected intervals as required by the standards, transform this analog data to a digital signal using an internal digitizer, and then output this signal to a recording device. As an active device, the data logger incorporates a programmable microprocessor. In this case, after the signal from the analyzer has been digitized, the data is then converted to the proper engineering units and is then output to a recording device. Depending upon the programming capacity of the microprocessor, the data logger can flag or delete periods of analyzer malfunctions and of calibration checks. The data logger may also be used to average the data and to warn of system measurements that exceed the applicable standard. Because the output is in digital form, the data logger can act as a remote device to send data long distances over dedicated telephone lines.

The second kind of available ADP system is that controlled by a mini-computer. Because of the large programming and storage potential of the computer, many data handling functions can be performed automatically. The computer is used frequently to control a remote data logger. Because of the long distance data transmission capabilities of a digital signal, a most significant aspect of the computer is its capability for processing data as it is being collected. Most computer systems available today can perform the following:

- Collect raw data from analyzer/data logger
- Convert data to proper units
- Average data according to standard
- Output data to multiple recording devices
- Automatically control daily calibration of instruments

From an inspector's viewpoint, it is extremely difficult to discern much from a data handling procedure conducted exclusively by automated processing equipment. Even with the examination of chart recorded data, the best that can be expected at this time is the detection of more commonly occurring errors and the identification of trends in the data which may point to possible malfunctions in one of the monitoring subsystems.

DATA REDUCTION PROCEDURES AND EXCESS EMISSION REPORTS

Conversion Factors

Gaseous emission standards for fossil fuel-fired steam generators (FFFSG) covered by NSPS, as well as many state emission limitations for existing facilities in that source category, are expressed in terms of mass per unit of heat input, i.e. lb/10^6 Btu. On the other hand, the output from continuous systems to monitor these emissions is expressed in terms of pollutant concentration, i.e. ppm. In order to determine the compliance status of gaseous emissions from FFFSG, it is, therefore, necessary to apply a conversion factor to the monitor data (ppm) in order to determine the emission rate (lb/10^6 Btu).

This issue of converting monitoring data to units of the standards becomes more complex for the case of steam generators. For these types of fossil fuel-fired facilties, large errors can result in the computation of emission rates if no correction is made for the presence of excess air. These potential inaccuracies can be minimized by simultaneously monitoring a "diluent gas", such as O_2 or CO_2, at the point where the pollutant(s) is measured, and then adjusting or normalizing the pollutant concentration to a common basis.

Therefore, the conversion process for FFFSG in calculating source emission rates in units of the standards from monitoring data in units of concentration involves two additional parameters known as (1) an F factor and (2) a diluent gas concentration. The generalized equations for converting pollutant monitoring data to units of the standard are shown below for the cases where O_2 is the diluent gas monitored and where CO_2 is the diluent gas monitored, respectively.

$$E = K \times Cp \times F \times \frac{20.9}{(20.9 - \%O_2)}$$

and

$$E = K \times Cp \times F \times \frac{100}{\%\ CO_2}$$

where E = pollutant emission rate, lb/10^6 Btu

Cp = pollutant concentration as measured by the continuous monitoring system, ppm

K = constant; factor that converts units of Cp from ppm to lb/dscf

$\%O_2$ = percent volumetric concentration of O_2 determined at same location and same time as Cp

$\%CO_2$ = percent volumetric concentration of CO_2 determined at same location and at same as Cp

F = factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted, dscf/10^6 Btu

F_c = factor representing a ratio of the volume of carbon dioxide generated to the colorific valve of the fuel combusted, dscf/10^6 Btu

Although use of either of the above equations would appear rather uncomplicated and straightforward, conversion of the monitoring data requires that the pollutant and diluent gases be measured on a consistent basis, i.e. either dry or "wet" (including water vapor) and the corresponding F (or F_c) factor also be on that same dry or "wet" basis. It is of utmost importance that conversion calculations do not employ a combination of dry concentration measurements and a "wet" F (or F_c) factor or vice versa. It should be apparent that conversions using the F factor are utilized in conjunction with O_2 measurements. Either method may be used, but consistency in the basis of the calculation is critical.

The F (or F_c) factor for a given fuel can be determined from the stoichiometry of the reactions for complete combustion if the composition of the fuel is known. Therefore, by conducting both an ultimate analysis on the given fuel and a determination of the gross heating value of that fuel, equations for the different basis F factors are derived as follows:

$$F_d = \frac{10^6\ (3.64\%H + 1.53\%C\ 0.57\%S + 0.14\%N - 0.46\%O)}{GCV}$$

$$F_w = \frac{10^6\ (5.57\%H + 1.53\%C + 0.57\%S + 0.14\%N - 0.46\%O + 0.21\%H_2O)}{GCV}$$

$$F_c = \frac{10^6\ (0.321\%C)}{GCV}$$

where: F_d = F factor on a dry basis and 0^2 is the diluent gas monitored

F_w = F factor on a wet basis and O_2 is the diluent gas monitored

F_c = F_c factor when CO_2 is the diluent gas monitored (either dry or wet basis)

%H, %C, %S, %N, %O = weight percent of these respective elements in the fuel, as determined by the ultimate analysis

$\%H_2O$ = weight percent of free water in the fuel sample, analyzed on an "as-received" basis

GCV = gross calorific value of the fuel combusted, Btu/lb

It must be emphasized that F_c factors are used in conjunction with CO_2 diluent monitoring; F_d (dry) and F_w (wet) are F factors that correspond to O_2 diluent monitoring.

As shown in Table II-4, average values for F_d, F_w, and F_c have been compiled for the more common types of fossil fuels being burned. The affected facility has been given the option of either using an average F factor value from the table or experimentally determining that value from fuel analysis together with equation 3, 4, or 5 above.

Once the particular F factor has been selected, SO_2 and NO_x continuous monitoring data can be converted from ppm to lb/10^6 Btu using one of the following appropriate equations:

TABLE II-4. F FACTORS FOR VARIOUS FUELS[1]

Fuel Type	F_d dscf/10^6 Btu	F_w wscf/10^6 Btu	F_c scf/10^6 Btu
Coal			
Anthracite	10140 (2.0)	10580 (1.5)	1980 (4.1)
Bituminous	9820 (3.1)	10680 (2.7)	1810 (5.9)
Lignite	9900 (2.2)	12000 (3.8)	1920 (4.6)
Oil	9220 (3.0)	10360 (3.5)	1430 (5.1)
Gas			
Natural	8740 (2.2)	10650 (0.8)	1040 (3.9)
Propane	8740 (2.2)	10240 (0.4)	1200 (1.0)*
Butane	8740 (2.2)	10430 (0.7)	1260 (1.0)
Wood	9280 (1.9)*	-----------	1840 (5.0)

Wood Bark 9640 (4.1) ----------- 1860 (3.6)

[1]Shigehra, R. T., et al "Summary of F Factor Methods for Determing Emissions from Combustion Sources." Source Evaluation Society Newsletter Vol. 1, No. 4, November 12, 1976.

[a]Numbers in parenthesis are maximum deviations (%) from either the midpoint or average F Factors.

Note: To convert to metric system, multiply the above values by 1.123×10^{-4} to obtain $scm/10^6$ cal.

[b]All numbers below the asterisks (*) in each column are midpoint values. All others are averages.

$$E = C_d F_d \frac{20.9}{20.9 - \%O_{2_d}}$$

$$E = C_w F_d \frac{20.9}{20.9\ (1 - B_{ws}) - \%O_{2_w}}$$

$$E = C_w F_w \frac{20.9}{20.9\ (1 - B_{wa}) - \%O_{2_w}}$$

$$E = C_d F_c \frac{100}{\%CO_{2_d}} = C_w F_c \frac{100}{\%CO_{2_w}}$$

where

E = Emission rate in $lb/10^6$ Btu

C_d = Average dry continuous monitor data in lb/dscf obtained by multiplying hourly average concentration in ppm by 2.64×10^{-9} (m) lb/dscf/ppm where

m = molecular wt of pollutant measured
m for SO_2 = 64.07
m for NO_x = 46.01

C_w = Same as C_d but on a wet basis

$\%O_{2_d}$ = Volume percent of O_2 continuously measured over the same time base as pollutant emissions, dry basis

$\%O_{2_w}$ = Volume percent of O_2 continuously measured over the same time base as pollutant emissions, wet basis

$\%CO_{2_d}$ = Volume percent of CO_2 continuously measured over the same time base as pollutant emissions, dry basis

$\%CO_{2_w}$ = Volume percent of CO_2 continuously measured over the same time base as pollutant emissions, wet basis

B_{ws} = Moisture content of stack gas, volume fraction

B_{wa} = Moisture content of air entering combustion chamber, volume fraction

Data Averaging

When continuous monitoring data are being reduced, i.e. converted to units of the standard and then averaged, there are differences in averaging methods depending upon the type of applicable regulation, i.e. either an NSPS or an SIP emission limitation. Only in states which employ NSPS-type emission standards for existing sources will the data averaging scheme be a common procedure.

Opacity--

For opacity data NSPS regulations require that measurements be averaged on a six-minute basis in order to coincide with the Reference Method 9 procedure for evaluating visible emissions. Many state-of-the-art transmissometer systems are now being equipped with an internal, averaging function that automatically stores the opacity measurements over a six-minute interval, integrates that data, and prints out the six-minute averaging value. (Note: This coincides with the NSPS cycle time requirement for measurement of opacity at least once every ten seconds but data recording at least once every six minutes.)

On the other hand, the SIP requirement for opacity data (40 CFR 51, Appendix P) specifies a one-minute averaging of the data or some other time period that is deemed acceptable by the State. In some states the one-minute period is the basis for the opacity standard. Other states have elected to use the option available in Appendix P and have based their opacity standards on a six-minute interval consistent with NSPS. Therefore, the inspector must obviously be familiar with the applicable opacity standard time basis in order to confirm the correct interval for opacity averaging.

Regardless of the time basis for opacity averaging (one-minute or six-minute), that average may be determined either by (1) integration or by (2) arithematic averaging. In the case where arithematic averaging is employed, the regulations require using a minimum of four equally spaced data readings per minute.

Gases--

For averaging data from gaseous monitors on NSPS facilities, the process is rather straightforward. Gaseous monitoring data (either pollutant or diluent) are averaged on an hourly basis. Again the averages may be calculated either by (1) integration over the hourly interval or by (2) arithematic averaging over the hour. In the case of arithematic averages, the regulations require using a minimum of four equally spaced data points for determining an hourly average.

There is no comparable regulation applicable to existing sources subject to a SIP monitoring requirement. Paragraph 4.1 of Appendix P (40 CFR 51) dictates that "The averaging period used for data reporting should be established by the State to correspond to the averaging period specified in the emission test method used to determine compliance with an emission standard for the pollutant/source category in question." That requirement poses few problems for opacity, as previously discussed, over one-minute intervals in lieu of the NSPS six-minute period. However, for gaseous monitoring, each State must specify the averaging periods for required compliance tests.

Excess Emission Reports (EER)

Stationary sources subject to NSPS Regulation 40 CFR 60.7 must submit quarterly written reports of excess emissions. Similarly, 40 CFR 51 requires that all existing stationary sources, directed to implement a continuous monitoring program, must also provide quarterly excess emission reports (EER). This reporting requirement, as originally conceived in the September 11, 1974, proposal of continuous monitoring rules, specified not only quarterly reporting of excess emissions but also quarterly submittal of all monitoring results.

The public comments to that particular proposal were heavily against such procedures citing the voluminous amount of records involved and the associated costs to maintain such a reporting program. Accordingly, the promulgated rules were revised to necessitate only reporting of excess emissions.

An excess emission is one whose average emission over the time period of the subject standard exceeds the emission value. For example, if a new oil-fired steam generator emits SO_2 for three successive hours at rates of 0.6, 0.9, and 0.9 lb/10^6 Btu, it emits at an average of 0.8 lb/10^6 Btu for that three-hour period. Excess emissions are calculated on a three-hour basis for SO_2 from FFFSG, so this 0.8 lb/10^6 Btu (averaged over three hours) does not exceed the applicable 0.8 lb/10^6 Btu standard even though the boiler emitted at a higher rate than the standard for two of the three hours.

In addition to the emission value and the associated time period, some standards have exceptions which permit brief excursions above the nominal value of the standard. This is most prominent with opacity standards which normally allow two to three minutes per hour for emissions greater than the standard. When determining the occurrences of excess emissions, any exceptions such as these must be accounted for and cannot be considered in calculating an excess emission.

The regulations do not specify exact methods to report excess emissions. Basically, the minimum information that must be included in these quarterly reports includes the following:

1. The magnitude of excess emissions, date and time of occurrence (both beginning and ending); conversion factors used in data reduction.

2. Specific periods of excess emissions due to:

   °startup at facility
   °shutdown at facility
   °malfunctions at facility, and nature and cause of malfunction together with the corrective action taken

3. Specific periods when continuous monitoring system was inoperative and the nature of the system repairs

In addition, if during the calendar quarter there were no periods of excess emissions, malfunctions or inoperative monitoring systems, the quarterly report should indicate that information.

Different groups throughout the country are currently addressing the issue of excess emission reports - format, content, means of standardization, etc. Region VIII has developed the form shown on the following pages as a guideline to be used for FFFSG in preparing their emission reports.*

*Floyd, John R., "The Implementation of the NSPS Continuous Monitoring Regulations in EPA, Region VIII, presented at the 71st Annual Meeting of APCA, Houston, Texas, June 28, 1978.

State of Florida

DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices
And/Or To Other Than The Addressee

To: 3.9.1 Loctn.: file
To: Pedco- Loctn.:
To: Correspondence Loctn.: Consultants
From: Date:

2.

TO: Steve Smallwood

THRU: Bill Thomas BT

FROM: Bob King B. King

DATE: October 22, 1980

SUBJ: PEDCo's report of Evaluation of Alternative Strategies for the reconversion of the Gannon Steam Plant to Burn Coal.

1. PEDCo's report is a good technical information source, which evaluates the subjects of low-sulfur coal conversion with ESP installation, high-sulfur coal with FGD, retrofit and coal conversion costs, and continuous emission monitor requirements.

2. Total particulate and SO_2 emissions were 890 tons (0.056 lb/MMBTU yearly average) and 38,500 tons (2.42 lb/MMBTU) from TECO Gannon Units 1-6 in 1979. Using low sulfur coal (1.2%) TECO calculates the expected emissions to be 1.73 lb SO_2/MMBTU which is higher than the current limit (1.2 lb/MMBTU), so TECO is requesting an overall emission cap of 10.6 ton/hr to limit SO_2 emission levels. (10.6 tons/hr. is equivalent to 92,600 tons/yr.)

3. The report indicates that the existing ESPs on Units 1-4 would decrease collection efficiency from 80-90% to 50% if using low sulfur coal instead of oil fuel. So TECO plans to install add-on precipitators on Gannon Units 1-4 to keep high particulate removing efficiency.

4. PEDCo's report (on page 15) has comments on feasibility of FGD systems at Gannon, and indicates that FGD installation would be an extremely difficult retrofit, but it also indicates that the FGD system could be built on part of the area where the existing coal pile is located.

5. The report estimates that capital costs for conversion to low-sulfur coal and high-sulfur coal with FGD system are $\$76.7 \times 10^6$ and $\$304.4 \times 10^6$ respectively. The cost analysis on the report also includes lime and limestone FGD systems with ESP or venturi scrubbers. Both FGD systems can reach 85% or better efficiency at removing SO_2 from flue gas. Costs for a lime FGD system are usually lower and space requirements are less than those for a limestone FGD system.

6. The report points out the success of TECO's proposed strategy to meet a bubble limit of 10.6 tons per hour depends only on three factors: the interpretation of the regulation for enforcement, the quality of the coal, and the station load at the Gannon Plant.

PEDCo ENVIRONMENTAL, INC.

MEMORANDUM

TO: Project File

DATE: July 16, 1980

SUBJECT: Meeting In Tampa - June 2

FROM: C. C. Crane /GAI

FILE: PN 3280-S

cc: M. Clark
W. Cunningham
R. DuBose
G. Isaacs

cc: A. Lee
R. Pollard-Cavalli
T. Ponder
R. A. Ressl
S. Smallwood ✓

On Monday, June 2, 1980, Tom Ponder and Jerry Isaacs attended a meeting in Tampa to discuss the proposed reconversion of the Gannon station by Tampa Electric Company to fire coal. The meeting at the regional office of the Florida Department of Environmental Regulation was attended by representatives of the Florida Department of Environmental Regulation and the Florida Public Service Commission. The following subjects were discussed:

- Ambient air considerations
- FGD and low-sulfur coal options
- Reconversion costs and plant use projections
- Reconversion schedules
- Fuel reserves and fuel quality
- Recommendations for rule adoption
- DOE order, delayed compliance order, oil backout program
- Continuous monitoring requirements

Tom Ponder discussed some of the aspects of a DOE conversion order. Al Metz of DOE will issue a preliminary order in about a month, based on the outcome of this meeting. An environmental impact study by DOE will probably take 18 to 24 months to complete. Conceivably the environmental impact study could delay coal conversion. Tampa is a nonattainment area for particulates and oxidants. TECO's reconversion schedule is inordinately long and will probably be challenged by DOE. Other utilities have installed ESPs on schedules as short as 14 months.

TECO can petition EPA for a delayed compliance order to burn coal even before ESPs are installed if the conversion does not violate primary NAAQS. However, TECO would have to commit to an expeditious schedule for the ESP installation rather than the schedule that they have proposed.

Under DOE's proposed oil backout program TECO is eligible for reimbursement of half of the cost of pollution controls, but BACT (i.e. FGD in most cases) would have to be installed. This program is not yet in effect, and has not been funded by congress.

Larry George of Florida Department of Environmental Regulation, discussed ambient impact and fuel quality. TECO proposes to meet a limit of 2.4 lb SO_2 per million Btu on each unit and to meet a limit of 10.6 x 24 = 254.4 tons SO_2/day. TECO would like to average over a long period of time to smooth out the variations in the emissions. Current ambient air standards are set on 3-hour, 24-hour, and annual average time periods. However, the 3-hour and 24-hour standards are currently in jeopardy. TECO would also like to verify emissions by coal sampling.

Florida wants assurance that the current 3-hour and 24-hour standards will not be violated, and the state will not tolerate any emissions exceeding these standards. On a 24-hour average, TECO coal data indicate that emissions would exceed 2.4 lb SO_2/million Btu approximately 74 times per year. If the standard is based on a 7-day average, emissions would exceed the limits only once per year.

On a 24-hour average, emissions of 10.6 ton/h would cause ambient levels close to the current NAAQS. This is equivalent to a plantwide emission rate of 1.82 lb/million Btu at full load. There is a discrepancy that the heat input rates in TECO's operating permit exceed TECO's indicated maximum inputs by about 25 percnet.

Boiler No.	Model	Permit
1 & 2	2864×10^6 Btu/h	4273.6×10^6 Btu/h
3	1851×10^6 Btu/h	2535.2×10^6 Btu/h
4	2042×10^6 Btu/h	2811.7×10^6 Btu/h
5	2284×10^6 Btu/h	2415.9×10^6 Btu/h
6	3798×10^6 Btu/h	3559.1×10^6 Btu/h
Total	$12{,}839 \times 10^6$ Btu/h	$15{,}595.5 \times 10^6$ Btu/h

If TECO were to use 2.4 lb/million Btu coal, they would exceed the 3-hour standard approximately 11 percent of the time. They would have to meet an emission level of 2.18 lb/million Btu or a cap of 13.9 tons/h to meet Florida's regulations. A new permit may have to limit the heat input rate.

A cap on the plant may not have much effect. At a lower load, the loss of plume buoyancy tends to offset the effect of the load reduction so that the ambient effect is essentially the same regardless of the load. Thus, ambient concentration may not be affected to any extent by the load. Stack gas temperature as a function of the load is of great interest. If one unit is retired however, the probability of meeting the cap is increased. There seems to be a very high likelihood that ambient air quality standards will be violated if TECO's proposal is accepted. Control equipment or a carefully designed control strategy is necessary.

The PSC requires all utilities to put in three incremental and three decremental quotes each hour. A computer then tells each utility how to interchange power for the next hour. With maximum interchange, emission rates will increase about 25 percent over 1979. However, an increase in electricity demand may shift the load from Gannon to newer plants which have NSPS control. COM will also aid in reducing emissions if it works.

The following schedule will be required for Florida to adopt a new regulation.

- Rule workshop in July
- 30 days notice
- Rule Adoption meeting
- SIP revision Sept.-Oct.
- EPA approval

The emissions cap is only one option open to TECO. This will limit emissions to 13.9 ton/h over a 3-hour period and 12.6 over a 24-hour period, neither of which are to be exceeded. A limit of about 2.0 lb/million Btu averaged over a seven-day period with no emission cap may be an option, but may not be a viable approach. Different varieties of coal may create short-term problems with ambient levels if this method is tried.

GANNON 1-4 RECONVERSION
MEETING OF JUNE 2, 1980

Attendees

Steve Smallwood	Dept. Environmental Regulation (Tal)
Mary Clark	Dept. Environmental Regulation/OGC
Larry George	Dept. Environmental Regulation
Dan Williams	Dept. Environmental Regulation (Tpa)
George Woerner	Dept. Environmental Regulation (Tpa)
Tom Ponder	PEDCo Environmental Inc.
Jerry Isaacs	PEDCo Environmental Inc.

PEDCo ENVIRONMENTAL, INC.

MEMORANDUM

TO: File

DATE: July 16, 1980

SUBJECT: Gannon Reconversion Meeting June 5, 1980

FROM: C. C. Crane /GAI

FILE: PN 3280-S

cc: M. Clark
W. R. Cunningham
R. DuBose
W. E. Gallagher
G. A. Isaacs
A. Lee
R. I. Pollard-Cavalli
T. C. Ponder
R. A. Ressl
S. Smallwood

On June 5, 1980, G. A. Isaacs met with thirty representatives of TECO and various government agencies (see attached list for names and affiliations) at TECO Headquarters in Tampa, Florida, to further discuss the issues of the reconversion of Gannon Units 1-4. Vicki Tschinkel, representing the Department of Energy (DOE), voiced her conditional approval of the planned conversion although compliance with current ambient air standards is a necessity. Without offsets, actual emissions will increase by a substantial 25 percent over previous levels. With offsets, however, the emissions may not violate current ambient air standards. The offset issue will have to be addressed at another time, however. Also, load regulation may not insure meeting ambient standards. Steve Smallwood of DER presented the general agenda for discussion as:

- Fuel impacts on ambient air quality.
- Feasible control options for Gannon.
- Plant use and feasibility cost projections.
- Conversion schedules.
- The nature of TECO's fuel reserves.
- An approach to a viable solution.

The air quality in Tampa is very close to current National Ambient Air Quality Standards for sulfur dioxide. Gannon is also located in a nonattainment area for particulate emissions.

A main concern is whether a bubble regulation will result in increased emissions over the current levels. Florida does not want to allow increased emissions. The variability of the sulfur and ash content of coal will be greater than for oil; hence, short-term emissions will be higher. On a three-hour average, 13.5 to 14 tons per hour may be allowed, while on a daily average, only approximately 11 tons per hour may be allowed. Load control would not be a realistic option because the ambient air impact as a function of boiler load is not certain. High temperature at full load enhances plume rise to help offset additional emissions. On a daily average, it appears that the coal would violate the emission limits from 70 to 80 times per year. However, on a weekly average, the plant probably could meet an average of 2.4 pounds per million Btu - the current limits established by Florida. Scrubbers could be installed, but the costs will be very high and the retrofit would be especially difficult. A scrubber installation is not a favorable option at the present time. Also, the conversion schedules appear to be longer than necessary. Use of low sulfur coal is the preferred option, if the sulfur content of the coal can be maintained at a consistently low level. Partial conversion may be a practical alternative. The present gas flow rates are high. It may be appropriate to rework the units to reduce the gas volumes handled.

TECO proposes a 7-day averaging period, but Steve Smallwood points out that Florida has to protect the 3-hour and 24-hour ambient standards. Currently, EPA is not addressing the 3-hour period, and the 24-hour period is the shortest basis being used. The 7-day averaging period is being used by TVA to demonstrate compliance with interim limits using continuous monitoring. The TECO data for 1977 are quite different from the data obtained for 1978-79. There is a question whether the data for 1978-79 will be more representative of future coal. The coal preparation plant at Gannon did not come into service until October 1979.

The emission limiting standard is the 24-hour ambient standard. It must be insured that the ambient standard is met and that short-term and long-term variability are related. The selection of a rate regulation depends on exhaust gas temperature data as a function of load. If faced with the installation of an FGD system, TECO would probably shut the units down, even though that strategy would not conserve any oil.

Florida wants to know the quality of the coal from Cal-Glo mines. From fuel reserve data, the mines have a proven 2-3 year supply, a probable 10-20 year supply, and an inferred 30-year supply. TECO will need to insure an uninterruptible coal supply. Currently, backup coal for Units 5 and 6 is being maintained near New Orleans at Mile 53-1/2 on the Mississippi River (80,000 tons of coal is equivalent to a 16-day supply for Units 5 and 6). It might be feasible to have backup oil-firing capability. Presently the margins are so tight that oil might be necessary to use for a fall-back position. TECO needs to list the changes in heat rate, the effects on coal use upon conversion to coal, the effects on temperatures and gas flows, and how these affect the modeled results. The effects of modeling a GEP stack height should also be determined.

To insure air quality, Florida will probably require a rate regulation of 2.09 pounds per million Btu, and a 24-hour rate regulation of 1.86 pounds per million Btu. Continuous stack monitors for sulfur dioxide and opacity will likely be required. Because of the possibility of a dual fuel capability, a phased installation program may be in order.

Wallace Pitts of Entropy Environmentalists presented a report on the feasibility of going from hourly averages to daily averages. Using a Monte Carlo simulation, he concluded that we cannot deduce 1-hour emissions distributions from 24-hour data mathematically. Conventional statistics do not work in this situation. Approximately 730 24-hour samples were taken from the coal going from the belt into the bunkers and were used in the Entropy analysis. This includes all of the coal in the plant, which is predominantly Cal-Glo coal.

TECO submitted an ambient model based on all units emitting 2.4 pounds of sulfur dioxide per million Btu. Florida suggests adding 50 micrograms per cubic meter for background sulfur dioxide. This model exceeds the 3-hour standards about 77 percent of the time. It exceeds the 24-hour standard approximately 30 percent of the time. Increment consumption is less limiting. Use of a bubble assumes that emissions and ambient impact are directly related; however, plume rise is decreased under reduced load, countering this effect. At 50 percent load, the reduction in ambient impact seems to be only about 10 percent. If all six units are on coal and load control is not feasible, air quality will exceed the 24-hour standard 250 times per year. If units 1 and 2 are left on oil, daily air quality could be unacceptable 160 times per year. If units 1 and 2 are shut down, the 24-hour NAAQS would be exceeded 160 times per year. Bill Cantrell of TECO used the present allowable emissions to calculate the 10.6 tons per hour regulation. Steve Smallwood challenged whether the emission regulation is appropriate. He questioned that perhaps the rate in pounds per million Btu is more important, in light of the fact that load reduction has little effect on the ambient air quality.

Gary Tipps of TECO indicated that one unit would have to be taken out per year for conversion to coal during the off-peak season. However, the unit would not be reliable for 12 months even though it would be down only for a 6-month retrofit. DOE plans to issue a proposed order that will open a 90-day comment period. DOE is generally not receptive to a partial order before the comment period.

The final order will probably take effect 2 to 2 1/2 years from now. Within three weeks, DOE will order a complete estimate of coal usage and conversion costs. Following this, there will be a 90-day comment period. The utility must identify exemptions from orders that are proposed. DOE will report their findings, and a public hearing may be requested, which will result in a tentative staff decision. A detailed analysis or EIS will take from 1 to 2 years with a final decision coming after approximately two years. The order will take effect 60 days after publication. A DCO can be issued when DOE issues the conversion order. By regulation CAA 113 B5, DOE cannot issue a DCO to a source that will impact a nonattainment area. No DCO can be issued beyond 1985.

A technical session is needed to correlate the modeling inputs and the type of regulation needed. Also, comprehensive and complete fuel analysis for continuous monitoring are needed. Different methods for reducing emission rates might also be needed. For the ambient modeling effort, TECO needs to determine gas temperature as a function of load for each unit. TECO must also determine whether or not these parameters can be changed. The effect of stack manifolding as well as an increase in stack height must be determined. Gary Tipps suggests calibrating the model against the monitors. Sulfur dioxide variability with the coal cleaning plant should be documented. A GEP stack height and an air preheater leak fix should also be factored into the model to estimate ambient air quality.

For continuous monitoring, fluxing for sulfur dioxide control may remove some sulfur. For subpart DA Entropy reviewed the state-of-the-art of continuous monitoring. EPA now allows 56 percent data capture for 1983 systems. During the next conference, legal limitations on the use of continuous monitoring data will be presented.

Coal analysis for all six bunkers of coal can be done in three hours. TECO wants to establish a relationship between the 3-hour and 7-day standards and to demonstrate compliance on a 7-day basis. A modeling task force will look at the various strategies. Bill Cantrell of TECO will determine within a week how long it will take to generate the data they need.

GANNON 1-4 RECONVERSION

MEETING OF JUNE 5, 1980

ATTENDEES

Bob Murray	Holland & Knight	813/682-1161
Larry Curtin	Holland & Knight	813/682-1161
Jerry Williams	Tampa Electric Company	813/879-4111
Gary Tipps	Tampa Electric Company	813/879-4111
Dean Broome	Tampa Electric Company	813/879-4111
Stephen Jenkins	Tampa Electric Company	813/879-4111
Art Tidwell	Hillsborough County (Engr)	813/272-5906
G. F. Anderson	Tampa Electric Company	813/879-4111
G. T. Kilkelly	Entropy Environmentalists	919/781-3550
W. S. Pitts	Entropy Environmentalists	919/781-3550
W. N. Cantrell	Tampa Electric Company	813/879-4111
Jim Hudson	Tampa Electric Company	813/879-4111
Ray Allen	Tampa Electric Company	813/879-4111
George W. Woerner	Florida Public Service Comm.	904/488-8501
Dan A. Williams	Dept. Environmental Reg. (Tpa)	813/985-7402
Vicki Tschinkel	Dept. Environmental Reg. (Tal)	904/488-4807
Steve Smallwood	Dept. Environmental Reg. (Tal)	904/488-1344
Mary Clark	Dept. Environmental Reg./OGC	904/488-9730
Larry George	Dept. Environmental Reg.	904/488-1344
Ray Cunningham	Environmental Protection Agency	404/881-3286
Dick DuBose	Environmental Protection Agency	404-881-4298
Ken Roberts	Hillsborough County E.P.C.	813/272-5960
Joe Griffith	Hillsborough County E.P.C.	813/272-5960
Don Suberroc	Department of Energy	202/653-3726
Jerry Isaacs	PEDCo	817-460-0777
William J. Johnson	Tampa Electric Company	813/879-4111
Heywood A. Turner	Tampa Electric Company	813/879-4111
Andrew Libby	Hillsborough County	813/272-5602
J. D. Hicks	Tampa Electric Company	813/879-4111
Alex Kaiser	Tampa Electric Company	813/879-4111
E. G. Simmons	Tampa Electric Company	813/879-4111

Department of Environmental Protection

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

September 18, 1997

Mr. Patrick A. Ho
Tampa Electric Company
Post Office Box 111
Tampa, FL 33601-0111 /

Dear Mr. Ho:

Re: Gannon Fuel Yard Modification, Application Reference 0570040-006-AC

On August 20, 1997, the Department received your response to the incompleteness letter of July 25, 1997. During the meeting on September 10, 1997 these responses were discussed. This meeting brought up more questions. The application is still incomplete and the Department is requesting the following information pursuant to Rule 62-4.050(1), F.A.C.:

1. Please respond to the items specified in the attached letter from the EPCHC.

Note - Rule 62-4.050 requires application of this type to be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses for additional information of an engineering nature. Therefore, your response to the above requested information should be certified as above.

"Notice: Pursuant to the provisions of Section 120.660, Florida Statutes, and Rule 62-4.070(5), Florida Administrative Code, if the Department does not receive a response to this request for information within 90 days of the date of this letter, the Department will issue a final order denying your application. You need to respond within 30 days after you receive this letter, responding to as much of the information as possible and indicating when a response to any unanswered questions will be submitted. If the response will require longer than 90 days to develop, you should develop a specific time table for the submission of the requested information for Department review and consideration. Failure to comply with a time table accepted by the Department will be grounds for the Department to issue a Final Order for Denial for lack of timely response. A denial for lack of information or response will be unbiased as to the merits of the application. The applicant can reapply as soon as the requested information is available."

A copy of your response should also be sent to Mr. Rick Kirby of the EPCHC, If you have any questions, please call me at (813)744-6100 extension 105.

Sincerely,

George W. Richardson
Air Permitting Engineer
Southwest District

cc: Rick Kirby, EPCHC

Enclosure

ENVIRONMENTAL PROTECTION COMMISSION
HILLSBOROUGH COUNTY

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WASTE MANAGEMENT DIVISION
TELEPHONE (813) 272-5788

WETLANDS MANAGEMENT DIVISION
TELEPHONE (813) 272-7104

MEMORANDUM

DATE: September 16, 1997

TO: Jerry Kissel, FDEP

RK

FROM: Jeff Ouellette JO **THRU:** Rick Kirby

SUBJECT: **Tampa Electric Company - Gannon Coal Yard (0570040-006-AC)**

The following comments are being provided as discussed during the meeting with Tampa Electric Company (TEC) on September 10, 1997 in regards to the proposed increase in coal yard throughput from 2.85 million tons per year to 4.0 million tons per year.

1. The increase in allowable coal throughput of the fuel yard seems to remove a "bottle neck" in fuel usage in the furnaces. TEC should provide reasonable assurance that the increase in coal yard throughput will not cause a significant increase in pollutants emitted from any of the boiler units 1-6. The attached letters from EPA as well as a portion of the New Source Review Workshop Manual, explain the reasoning behind the concern the EPC has with this issue.

2. The EPC does not have confidence that the control efficiencies used to calculate particulate matter emissions are accurate. In the previous permit, control efficiencies were considerably lower and TEC has not provided any reasonable explanation for the use of 90% for all activities at the facility. TECO should compare emissions estimates done to estimates using AP-42, Chapter 11.9 - Western Surface Coal Mining. Estimates should be done for bulldozing active piles and wind erosion and maintenance from active piles.

3. The moisture content used in the calculations at the facility are for total material moisture. Based on input from USEPA, it is appropriate to use the surface moisture content. The facility should recalculate coal yard figures based on surface moisture content of 2%.

4. The EPC does not consider the drop equation appropriate for crushing activities at the facility. In order to provide a more accurate assessment of emissions from the crushers, TEC should propose a new method for calculating these emissions.

5. Per agreement between EPC, DEP, and TECO during our meeting September 10, 1997, the issue of NSPS applicability to the replacement coal crushers is not part of this application.

bm

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ENVIRONMENTAL PROTECTION COMMISSION HILLSBOROUGH COUNTY

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ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY

FAX TRANSMITTAL SHEET

DATE: 9/15/97

TO: Jerry Kissel / George Richardson

FAX PHONE: ______ VOICE PHONE: ______

TOTAL NUMBER OF PAGES INCLUDING THIS COVER PAGE: 3

EPC FAX TRANSMISSION LINE: (813) 272-5605
FOR RETRANSMISSION OR ANY FAX PROBLEMS, CALL: (813) 272-5530

FROM: Jeff Ouellette
(CIRCLE APPLICABLE SECTION BELOW)

AIR DIVISION

-ENFORCEMENT

-ENGINEERING

-SUPPORT OPERATIONS

SPECIAL INSTRUCTIONS: ______

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

July 25, 1997

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Patrick A. Ho
Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Re: Gannon Fuel Yard Modification, Application
Reference 0570040-006-AC

Dear Mr. Ho:

On July 1, 1997, the Department received the referenced application. In order to continue processing the application, the Department will need the following additional information pursuant to Rule 62-4.050(1), F.A.C.:

1. Please respond to the items specified in the attached letter from Hillsborough County.

Note - Rule 62-4.050 requires applications of this type to be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses for additional information of an engineering nature. Therefore, your response to the above requests should be certified as above.

"NOTICE: Pursuant to the provisions of Section 120.60, F.S. and Chapter 17-12.070(5), F.A.C., if the Department does not receive a response to this request for information within 90 days of the date of this letter, the Department will issue a final order denying your application. You need to respond within 30 days after you receive this letter, responding to as many of the information requests as possible and indicating when a response to any unanswered question will be submitted. If the response will require longer than 90 days to develop, an application for new construction should be withdrawn and resubmitted when completed information is available. Or for operating permits, you should develop a specific time table for the submission of the requested information for Department review and consideration. Failure to comply with a time table accepted by the Department will be grounds for the Department to issue a Final Order of Denial for lack of timely response. A denial for lack of information or response will be unbiased as to the merits of the application. The applicant can reapply as soon as the requested information is available."

A copy of your response should also be sent to Mr. Rick Kirby of Hillsborough County. If you have any questions, please call me at (813)744-6100 extension 105.

Sincerely,

For George Richardson
Air Permitting Engineer

GR/pp

cc: R. Kirby, EPC

Enclosure

b:\master.doc\pp

P 079 941 235

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

Mr. Patrick A. Ho
Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

7/25/97

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PS Form 3800, June 1985

ENVIRONMENTAL PROTECTION COMMISSION
HILLSBOROUGH COUNTY

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WETLANDS MANAGEMENT DIVISION
TELEPHONE (813) 272-7104

M E M O R A N D U M

DATE: July 25, 1997

TO: Jerry Kissel, P.E., DEP

FROM: Jeff Ouellette, EPC JO THRU: RK Rick Kirby, P.E.

SUBJECT: Tampa Electric Company - Gannon Coal Yard Construction Application

The EPC has reviewed the construction application for the above referenced facility and has the following comments:

1. Permit No. AC29-114676 was issued on April 8, 1987 which allows Tampa Electric Company (TEC) Gannon Station to increase the coal yard throughput from an annual rate of 2.4 million tons to 2.85 million tons. The corresponding particulate matter emissions generated from throughputs are 156.97 TPY and 180.94 TPY, respectively. This 450,000 TPY throughput increase results in an emissions increase of 23.97 TPY, just below the PSD threshold of 25 TPY.

The proposed project requests an annual throughput increase from 2.85 million tons to 4.0 million tons, an increase of 1,150,000 tons per year. A rough estimate of particulate matter based on emission calculations in previous permits would generate an increase of approximately 61.26 tons per year. This increase exceeds the 25 TPY PSD threshold, and would subject the facility to PSD review.

The application prepared by the facility provides calculations that are based on Sections 13.2.2, 13.2.4, and 13.2.5 of AP-42, Fifth Edition. Previous calculations were based on equations found in the DOE document <u>Technical Guide for Estimating Fugitive Dust Impacts from Coal Handling Operations</u>. This methodology used in the application is unconservative and unacceptable, particularly for stockpile maintenance. The facility is using a control efficiency of 85-95 percent for all coal yard activities. The EPC believes that the control efficiencies found in the previous permits to be more representative of the actual emissions from the coal yard. In addition, the application addresses PM10 emissions for ambient air quality purposes without addressing PM emissions for PSD purposes.

The calculated emissions for the stockpile maintenance in the application are based on Section 13.2.2 of AP-42, Unpaved Roads. PM10 emissions are calculated at an actual emission rate of 2.17 TPY and control efficiency of 90 percent. In comparison, stockpile maintenance emissions for PM are calculated at 119 TPY in Permit No. AC29-114676 with a 50 percent control efficiency. There is clearly a discrepancy between emission calculations methodology. The EPC does not have the input parameters for the calculations made in previous permits in order to properly compare the two methods. TEC should provide the department a detailed explanation to justify the dramatic decrease in emissions between these two methods of calculation.

In the previous permits for the coal yard, the emissions from the stockpile are approximately 58 TPY with a control efficiency of 50 and 70 percent for live and dead coal storage, respectively. Calculations based on AP-42, Section 13.2.5 for PM10 emissions in the current application are totaled at just 0.0050 TPY. TEC should provide emission calculations for total PM. In addition, the calculations provided in the application summarize the results but do not show how calculations were performed. TEC should provide the department with detailed calculations comparing past emission rates with current emission rates and a reasonable explanation for such a decrease in emissions.

2. TEC should clarify whether the moisture content used in the calculations is total moisture content or surface moisture content. When coal remains in the yard as it does at Gannon, the surface of the material dries and has been found to be more representative of a 2 percent moisture content which creates much more particulate than ideal conditions which are between 4 and 8 percent.

3. The application states that construction of new crushers is not subject to NSPS. Coal crushers are included in the applicability for 40 CFR 60, Subpart Y, Standards of Performance for Coal Preparation Plant. 40 CFR 60, Subpart A gives the definition of "affected facility" as any apparatus to which a standard is applicable. The two proposed replacement crushers are clearly subject to this NSPS. An application for construction permit must be submitted and the permit issued prior to installation of the new units. TEC should provide specific information to the department which compares the existing fuel crushers to the proposed fuel crushers. Information should include throughput capacity, control efficiency, etc...

BEST AVAILABLE COPY

4. The emissions estimates for alternative fuels must be based on the worst case material if TEC wishes to group the materials under one throughput limit. The methodology used was for aggregate handling. TEC should demonstrate the appropriateness of these calculations. Also TEC must state specifically the alternate fuels for which they are seeking authorization.

5. Does the ambient air modeling referred to in the application address the new ambient air quality standards? Details of the model and all input parameters must be provided.

6. TEC should explain why this significant increase in fuel handling is needed. Will the Gannon facility be used to process, store, or stevedore fuels for other facilities?

Thank you for the opportunity to provide comment. If you should have any questions please call me.

bm

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ADMINISTRATIVE OFFICES, LEGAL & WATER MANAGEMENT DIVISION
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ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY

FAX TRANSMITTAL SHEET

DATE: 7/25/97

TO: Pat /Air Permitting

FAX PHONE: ______ VOICE PHONE: ______

TOTAL NUMBER OF PAGES INCLUDING THIS COVER PAGE: 4

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FROM: Jeff Ouellette
(CIRCLE APPLICABLE SECTION BELOW)

AIR DIVISION

- ENFORCEMENT
- ENGINEERING
- SUPPORT OPERATIONS

SPECIAL INSTRUCTIONS: ______

TECO

TAMPA ELECTRIC

August 20, 1997

Mr. Gerald Kissell, P.E. **Via Hand Delivery**
Air Permitting Supervisor
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Re: Tampa Electric Company (TEC)
Fuel Yard Modification Construction Permit Application
Response to Agency Comments
Application Reference No. 0570040-006-AC

Dear Mr. Kissell:

Please find enclosed three (3) signed and sealed copies of TEC's responses to agency comments regarding the above referenced construction permit application. One (1) "binder ready" copy, suitable for incorporation with the previously submitted "working" copy, has been provided to assist with your review. Also, as per your request, one (1) signed and sealed copy has been sent to Mr. Rick Kirby, P.E. at the Environmental Protection Commission of Hillsborough County.

TEC would be pleased to meet with you or your staff at your convenience to discuss these responses in detail. If you have any additional questions or comments, feel free to contact me at (813) 641-5087. Thank you for your assistance on this project.

Sincerely,

Laura D. Rector

Laura A. Rector
Engineer - Environmental Planning

EP\gm\LAR091

Enclosures

c/enc: Mr. Richard Kirby - EPCHC

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AIR REGULATION

TAMPA ELECTRIC COMPANY
P.O. BOX 111
TAMPA, FL 33601-0111
HILLSBOROUGH COUNTY 223-0800
OUTSIDE OF HILLSBOROUGH COUNTY 1-888-223-0800
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RECEIVED
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AIR REGULATION

September 24, 1997

Mr. Gerald Kissell, P.E.
Air Permitting Supervisor
Florida Department of Environmental Protection (FDEP)
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Via Hand Delivery

Re: Tampa Electric Company (TEC)
Gannon Station
Fuel Yard Modification Construction Permit Application
Response to Agency Comments
Application Reference No. 0570040-006-AC

Dear Mr. Kissell:

Enclosed are three (3) signed and sealed copies of TEC's responses to agency comments regarding the above referenced construction permit application. One (1) "binder ready" copy, suitable for incorporation with the previously submitted "working" copy, has been provided to assist with your review. Also, as per your request, one (1) signed and sealed copy has been sent to Mr. Rick Kirby, P.E. at the Environmental Protection Commission of Hillsborough County (EPCHC).

This submission is in response to several requests for clarification that resulted from our meeting on September 10, 1997, and subsequent agency correspondence that summarized that meeting, dated September 18, 1997, TEC. TEC has responded to each of the agency comments, including the "bottle neck" issue, in detail. However, the "bottle neck" issue was not identified in the original letter of incompleteness and should not be considered in determining the completeness of this permit application.

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TEC would be pleased to meet with you or your staff at your convenience to discuss these responses in detail. If you have any additional questions or comments, feel free to contact me at (813) 641-5087. Thank you for your assistance on this project.

Sincerely,

Laura A. Rector

Laura A. Rector
Engineer - Environmental Planning

EP\gm\LAR093

Enclosures

c/enc: Mr. Richard Kirby - EPCHC

F.J. GANNON STATION

FUEL YARD MODIFICATION CONSTRUCTION PERMIT APPLICATION

TECO

TAMPA ELECTRIC

JUNE 1997

ADDENDUM
AUGUST 1997

F.J. GANNON STATION

FUEL YARD MODIFICATION
CONSTRUCTION PERMIT APPLICATION

TECO
TAMPA ELECTRIC

JUNE 1997

ADDENDUM
AUGUST 1997

RESPONSES

FUEL YARD
CONSTRUCTION PERMIT APPLICATION

Tampa Electric Company - F.J. Gannon Station
Fuel Yard Construction Permit Application Responses

FDEP Comment No. 1

Permit No. AC29-114676 was issued on April 8, 1987. This permit allowed Tampa Electric Company (TEC) F.J. Gannon Station to increase the coal yard throughput from an annual rate of 2.4 million tons to 2.85 million tons. The corresponding particulate matter emissions generated from throughputs are 156.7 TPY and 180.94 TPY, respectively. This 450,000 TPY throughput increase results in an emissions increase of 23.97 TPY, just below the PSD threshold of 25 TPY.

The proposed project requests an annual throughput increase from 2.85 million tons to 4.0 million tons, an increase of 1,150,000 tons per year. A rough estimate of particulate matter based on emission calculations in previous permits would generate an increase of approximately 61.26 tons per year. This increase exceeds the 25 TPY PSD threshold, and would subject the facility to PSD review.

The application prepared by the facility provides calculations that are based on Sections 13.2.2, 13.2.4, and 13.2.5 of AP-42, Fifth Edition. Previous calculations were based on equations found in the DOE document <u>Technical Guide for Estimating Fugitive Dust Impacts from Coal Handling Operations</u>. This methodology used in the application is unconservative and unacceptable, particularly for stockpile maintenance. The facility is using a control efficiency of 85-95 percent for all coal yard activities. The EPC believes that the control efficiencies found in the previous permits to be more representative of the actual emissions from the coal yard. In addition, the application addresses PM10 emissions for ambient air quality purposes without addressing PM emissions for PSD purposes.

The calculated emissions for the stockpile maintenance in the application are based on Section 13.2.2 of AP-42, Unpaved Roads. PM10 emissions are calculated at an actual emission rate of 2.17 TPY and control efficiency of 90 percent. In comparison, stockpile maintenance emissions for PM are calculated at 119 TPY in Permit No. AC29-114676 with a 50 percent control efficiency. There is clearly a discrepancy between emission calculations methodology. The EPC does not have the input parameters for the calculations made in previous permits in order to properly compare the two methods. TEC should provide the department a detailed explanation to justify the dramatic decrease in emissions between these two methods of calculation.

In the previous permits for the coal yard, the emissions from the stockpile are approximately 58 TPY with a control efficiency of 50 and 70 percent for live and dead coal storage, respectively. Calculations based on AP-42 Section 13.2.5 for PM10 emissions in the current application are totaled at just 0.0050 TPY. TEC should provide emission calculations for total PM. In addition, the calculation provided in the application summarize the results but do not show how calculations were performed. TEC should provide the department with detailed calculations comparing past emission rates with current emission rates and a reasonable explanation for such a decrease in emissions.

TEC Response No. 1

The requested total particulate matter (PM) analysis for Prevention of Significant Deterioration (PSD) applicability is attached as DOC.II.E.6.2.a. This analysis demonstrates that PM emissions will increase no more than 3.87 tons per year (tpy). Because this PM emissions increase is less than the 25 tpy PM significance level, PSD rules are not applicable to this fuel yard modification. The detailed PM emission calculations are provided as Appendices B.3 and B.4.

Per Florida Department of Environmental Protection (FDEP) guidance, all respirable particulate matter (PM_{10}) and PM emissions were calculated using the most recently available *emissions factors from the U. S. Environmental Protection Agency's (EPA's) Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources (AP-42). The AP-42 reference for each specific factor used to calculate the emission from a specific source is provided on each spreadsheet in Appendix B of the modification application. EPA has given these emission factors, the most accurate available, the highest rating of "A." FDEP Instructions for DEP Form No. 62-210.900(1), Application for Air Permit - Long Form states that AP-42 and EPA FIRE-system emission factors are preferred over any other emission factors. FDEP has approved the use of these emission factors in permit applications for other facilities, including the recently permitted Big Bend Station fuel yard transloading project.*

TEC does not believe that the emission factors used in previous fuel yard permit applications are appropriate for current use. The emission factors used to support the application for F.J. Gannon Station fuel yard Construction Permit AC29-61276, issued April 12, 1983 were derived from three EPA documents published in the late 1970's. These documents are:

- *Fugitive Emissions from Integrated Iron and Steel Plants; March 1978: EPA 600/2-78-050.*
- *Particulate Emission Factors Applicable to the Iron and Steel Industry; September 1979; EPA 450/4-79-028.*
- *Iron and Steel Plant Open Source Fugitive Emission Evaluation; May 1979; EPA 600/2-79-103.*

Since the publication of these three documents, EPA has sponsored additional PM emissions research. The research results have been incorporated into AP-42 to improve emission factor accuracy. No purpose is served using older, less accurate emission factors to calculate current and future emissions.

In general, AP-42 does not provide specific control efficiencies for the various PM control techniques. With respect to aggregate handling, AP-42 cites a control efficiency of up to 90 percent from the use of chemical wetting agents, but provides no detailed analysis. As a result, specific control efficiencies were obtained from two documents:

- *Fugitive Emissions from Power Plants; Electric Power Research Institute (EPRI); June 1984; EPRI CS-3455.*

- *Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources; Utility Air Regulatory Group (UARG); September 1981; P-A857.*

The PM control efficiencies used for each emission source are provided on the emission calculation spreadsheet for that source in Appendix B. These efficiencies are consistent with AP-42's 90 percent figure generally cited for chemical wetting agent control. FDEP has approved the use of these control efficiencies in permit applications for other facilities, including the recently permitted Big Bend Station fuel yard transloading project. TEC notes that the control efficiency used at some specific emission sources in the F.J. Gannon fuel yard modification application has been reduced from the control efficiency used in the original fuel yard construction permit application.

Per the recommendation in AP-42, Section 13.2.4.3, Aggregate Handling and Storage Piles, the emission factor from AP-42 Section 13.2.2, Unpaved Roads, was used to calculate emissions caused by tractor traffic on the fuel stockpiles. As explained in the modification permit application, a discrepancy exists between the emission rate calculated for the fuel yard modification permit application and the original fuel yard permit application. The primary causes of this discrepancy are:

- *Calculating PM_{10} emissions for this fuel yard modification application, as opposed to PM emissions which were calculated for the original F.J. Gannon Station fuel yard permit application, and*

- *Using the most recently available AP-42 emission factor, which is:*

$$E = k \times (5.9) \times \left(\frac{s}{12}\right) \times \left(\frac{S}{30}\right) \times \left(\frac{W}{30}\right)^{0.7} \times \left(\frac{w}{4}\right)^{0.5} \times \left(\frac{365-p}{365}\right) lb / VMT$$

where: E = *emission factor (pound per vehicle mile traveled [lb/VMT])*
k = *particle size multiplier (dimensionless)*
s = *silt content of road surface material (pct)*
S = *mean vehicle speed (miles per hour [mph])*
W = *mean vehicle weight (ton)*
w = *mean number of wheels (dimensionless)*
p = *number of days with at least 0.01 in. of rain per year.*

In contrast, the emission factor used in the original fuel yard construction permit application was:

$$E = 0.09 \times I \times \left(\frac{4}{n}\right) \times \left(\frac{s}{10}\right) \times \left(\frac{L}{100}\right) \times \left(\frac{W}{3}\right)^{0.7} lb / VMT$$

where: E = *emission factor (lb/VMT)*
I = *industrial road augmentation factor (dimensionless)*
n = *number of traffic lanes (dimensionless)*
s = *silt content of road surface material (pct)*
L = *surface dust loading (pounds per mile)*
W = *average vehicle weight (ton).*

A direct comparison of these two algorithms is not appropriate because the equations do not have common input parameters. However, consistent with FDEP guidance, the most recently available AP-42 emission factor was used in the F.J. Gannon Station fuel yard modification application.

The emission factor from AP-42 Section 13.2.5, Industrial Wind Erosion, was used to calculate wind-generated emissions from the fuel stockpiles. As explained in the modification permit application and above, a discrepancy exists between the emission rate calculated for the fuel yard modification permit application and the original fuel yard permit application. The primary causes of this discrepancy are:

- *Calculating PM_{10} emissions for this fuel yard modification application, as opposed to PM emissions which were calculated for the original F.J. Gannon Station fuel yard permit application, and*

- *Using the most recently available AP-42 emission technique, which is a complex summation process that is based on the algorithm:*

$$P = 58 \times (u^* - u_t^*)^2 + 25 \times (u^* - u_t^*) g/m^2$$

where: P = *emission factor (grams per square meter [g/m²])*
u^* = *equivalent friction velocity (meters per second [m/sec])*
u_t^* = *threshold friction velocity for coal (m/sec).*

In contrast, the emission factor used in the original fuel yard construction permit application to determine wind-generated fuel stockpile emissions was:

$$E = 0.05 \times \left(\frac{s}{1.5}\right) \times \left(\frac{d}{235}\right) \times \left(\frac{f}{15}\right) \times \left(\frac{D}{90}\right) lb/ton$$

where: *E = emission factor*

s = silt content (pct)

d = number of dry days per year (dimensionless)

f = percent of time the wind speed exceeds 12 mph

D = duration of material storage (dimensionless).

A direct comparison of these two algorithms is not appropriate because the calculation techniques do not have a common basis and because the equations do not have common input parameters. However, consistent with FDEP guidance, the most recently available AP-42 emission factor was used in the F.J. Gannon Station fuel yard modification application.

FDEP Comment No. 2

TEC should clarify whether the moisture content used in the calculation is total moisture content or surface moisture content. When coal remains in the yard as it does at F.J. Gannon, the surface of the material dries and has been found to be more representative of a 2 percent moisture content which creates much more particulate than ideal conditions which are between 4 and 8 percent.

TEC Response No. 2

The moisture content used in the calculation represents the total moisture content of the fuel, as is appropriate for the factors used to calculate emissions. Using the fuel surface moisture content is not appropriate because the emission factors were derived based on total moisture content and because the chemical dust suppressant applied to the fuel alters the surface characteristics of the fuel.

FDEP Comment No. 3

The application states that construction of new crushers is not subject to NSPS. Coal crushers are included in the applicability for 40 CFR 60, Subpart Y, Standards of Performance for Coal Preparation Plant. 40 CFR 60, Subpart A gives the definition of "affected facility" as any apparatus to which a standard is applicable. The two proposed replacement crushers are clearly subject to the NSPS. An application for construction permit must be submitted and the permit issued prior to installation of the new units. TEC should provide specific information to the department which compares the existing fuel crushers to the proposed fuel crushers. Information should include throughput capacity, control efficiency, etc. ...

TEC Response No. 3

The applicability of 40 CFR Part 60 Subpart Y - Standards of Performance for Coal Preparation Plants is defined at 40 CFR Part 60.250 as:

> (a) *The provisions of this subpart are applicable to any of the following affected facilities in coal preparation plants which process more than 200 tons per day: Thermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems, and coal transfer and loading systems.*
>
> (b) *Any facility under paragraph (a) of this section that commences construction or modification after October 24, 1974, is subject to the requirements of this subpart.*

On this basis, Subpart Y is applicable to any coal preparation plant that commences construction or modification after October 24, 1974. The F.J. Gannon Station fuel crushing equipment is a defined coal preparation plant because coal crushing is specifically included as an applicable coal preparation plant operation. However, to apply Subpart Y to the replacement *of two existing fuel crushers at F.J. Gannon Station with two new fuel crushers, the change would have to be either construction or modification of a coal preparation plant.*

Under the New Source Performance Standards (NSPS), construction is defined at 40 CFR 60.2 as the fabrication, erection, or installation of an affected facility. The replacement of two existing crushers with two new crushers at an existing facility is not construction of an affected facility because the facility is already existing. Given this definition of construction, NSPS does not apply to the F.J. Gannon Station crusher replacement.

Under NSPS, a modification is defined at 40 CFR 60.14(a), as any physical or operational change to an existing facility that results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies. If the replacement of two crushers at F.J. Gannon Station (a physical change) results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies, the replacement is a modification and Subpart Y is applicable. Emission rate is expressed as kilograms per hour (kg/hr) of any pollutant discharged for which a standard applies. Opacity is expressed as percent. As indicated in Section II.E.6.4 of TEC's modification application, the crusher replacement will not increase the maximum PM emission rate from the coal preparation plant because the maximum crushing capacity of the plant will remain unchanged at 1,600 tons per hour. Similarly, opacity will not increase because crushing capacity will not increase. Reasonable assurance of no change in crushing capacity is provided because TEC is not proposing to increase the permitted fuel handling rates of the conveyor belts entering and exiting the fuel crushers. Because the crusher replacement will not cause an emissions increase, the replacement is not a modification and NSPS does not apply.

TEC notes that Subpart Y does not require any additional control technology beyond TEC's current control requirements and plan, and has a less restrictive standard for PM emissions than the standard currently applicable to the fuel yard. The current and future standard applicable to the fuel yard is the more restrictive Reasonably Available Control Technology (RACT) standard of 5 percent opacity, not Subpart Y which allows a less restrictive standard of 20 *percent opacity. Other than additional paperwork, nothing is gained from applying Subpart Y to the fuel crusher replacement.*

FDEP Comment No. 4

The emissions estimates for alternative fuels must be based on the worst case material if TEC wishes to group the materials under one throughput limit. The methodology used was for aggregate handling. TEC should demonstrate the appropriateness of these calculations. Also TEC must state specifically the alternate fuels for which they are seeking authorization.

TEC Response No. 4

TEC is seeking authorization to handle the alternate fuels which are currently being permitted for use at F.J. Gannon Station. These fuels are tire-derived fuel (TDF, i.e., chipped tires) and wood-derived fuel (WDF, i.e., mixture of yard trash, wood chips, and paper pellets). TEC will process up to 362,025 tpy of TDF and WDF through the auxiliary unloading and handling system. This figure was calculated to accommodate TEC's potential to expand the use of alternative fuels at F.J. Gannon Station Units 1 through 4.

Of the three fuels handled in the F.J. Gannon Station fuel yard, coal has the highest potential to generate PM emissions. TDF and WDF PM emissions were conservatively calculated using coal characteristics to provide reasonable assurance of compliance.

FDEP Comment No. 5

Does the ambient air modeling referred to in the application address the new ambient air quality standards? Details of the model and all input parameters must be provided.

TEC Response No. 5

The effective promulgation date of the new ambient fine particulate matter ($PM_{2.5}$) standard is September 16, 1997. Addressing this new standard is not appropriate or required to continue FDEP processing of this modification application. Addressing the new ambient ozone standard is not appropriate because the F.J. Gannon Station fuel yard is not a source of VOC emissions.

FDEP and EPA have indicated an integrated stepwise approach to the implementation of the new and revised $PM_{2.5}$ standard. EPA has indicated that $PM_{2.5}$ monitoring will not begin any sooner than Autumn 1997. The states are required to submit a list of new $PM_{2.5}$ nonattainment, attainment, and unclassifiable areas by July 1998. EPA will promulgate $PM_{2.5}$ area designations by July 1999. States must submit state implementation plans (SIPs) to EPA by July 2000 for non-control related provisions. EPA has until July 2001 to approve or disapprove these submittals. Based on the determinations of the states and the availability of three years of monitoring data, EPA will promulgate nonattainment area designations by July 2001. States must submit SIPs with control requirements for nonattainment areas by July 2004. EPA has until July 2005 to approve or disapprove the control related SIPs. Each of these milestones operates on a sliding scale dependent upon the sufficiency of information, severity of nonattainment, and availability of control measures. Considering the effective date of promulgation and the integrated implementation schedule, addressing $PM_{2.5}$ emissions within the F.J. Gannon fuel yard modification application is not appropriate.

The requested PM_{10} dispersion modeling output files are on the attached floppy disks provided in Appendix A.

FDEP Comment No. 6

TEC should explain why this significant increase in fuel handling is needed. Will the F.J. Gannon facility be used to process, store, or stevedore fuels for other facilities?

TEC Response No. 6

Through this permit application TEC is not seeking authorization for activities that support the ability to process, store, or stevedore fuels for other facilities. However, in the process of streamlining operations and expanding business opportunities, TEC may incorporate these activities into the F.J. Gannon Station operation. Should this become the case, TEC will evaluate the activities for air quality considerations and permits, as is appropriate.

As you may be aware through recent communications with FDEP, TEC has undertaken site specific engineering evaluations to evaluate compliance with the Phase II NO_x reduction rule for TEC Group 2 boilers. These evaluations suggest several possible approaches toward Phase II NO_x compliance, including combustion modifications and fuel switching. Portions of this modification application, specifically the increase in annual fuel yard throughput limit, are directly related to TEC's ability to utilize fuel switching to its best potential for NO_x reduction.

Over the past several years, Powder River Basin (PRB) coal has been blended in various percentages with coals typically utilized at F.J. Gannon Station for testing and evaluation. PRB coal characteristically has a lower heat, higher moisture, and lower sulfur content than the typical coal utilized at F.J. Gannon Station. Utilization of PRB coal and coals with similar characteristics in conjunction with the other coals utilized at F.J. Gannon Station has been shown to significantly lower NO_x emission rates. This reduction is thought to result from the higher moisture content of the PRB coal. However, the use of PRB coal does impose operational constraints. One of these constraints, caused by the lower heat content of the PRB coal, is the need to burn more coal to generate the same quantity of electricity. The existing fuel yard throughput limit of 2.85 million tpy does not give TEC the necessary capacity to use PRB coal in an optimal manner. To relieve this constraint, TEC has requested that the fuel yard coal throughput limitation be increased to 4 million tpy. TEC has demonstrated and has provided reasonable assurance that this increase in fuel yard throughput capacity will not cause noncompliance with any applicable requirement.

In summary, use of PRB coal makes an increase of the annual fuel yard throughput at F.J. Gannon Station imperative because the low heat value of the coal requires that more coal be used to generate the same amount of electricity. To fully utilize PRB coal as part of TEC's overall NO_x reduction strategy, the annual fuel yard throughput at F.J. Gannon Station must be increased.

SIGNATURE PAGES

P.E. CERTIFICATION, AUTHORIZED REPRESENTATIVE FORM AND AUTHORIZATION

TAMPA ELECTRIC
A TECO ENERGY COMPANY

TO WHOM IT MAY CONCERN:

Please be advised that Patrick A. Ho, Manager, Environmental Planning, is the authorized representative of Tampa Electric Company concerning matters with which this permit application deals.

Very truly yours,

C R Black

Charles R. Black
Vice President
Energy Supply

CRB\gm\ADMIN\AUTH.LTR

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official: Patrick Ho, Manager, Environmental Planning	
2. Owner/Authorized Representative or Responsible Official Mailing Address: Organization/Firm: Tampa Electric Company Street Address: P.O. Box 111 City: Tampa State: Florida Zip Code: 33601-0111	
3. Owner/Authorized Representative or Responsible Official Telephone Numbers: Telephone: (813) 641-5044 Fax: (813) 641-5081	
4. Owner/Authorized Representative or Responsible Official Statement: *I, the undersigned, am the owner or authorized representative* of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.* Patt A. Ho 8/20/97 Signature Date	

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1. Professional Engineer Name: Thomas W. Davis Registration Number: 36777	
2. Professional Engineer Mailing Address: Organization/Firm: Environmental Consulting & Technology, Inc. Street Address: 3701 Northwest 98th Street City: Gainesville State: Florida Zip Code: 32606	
3. Professional Engineer Telephone Numbers: Telephone: (352) 332-0444 Fax: (352) 332-6722	

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [✓] if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Thomas W. Davis   8/18/97

Signature   Date

(seal)

* Attach any exception to certification statement.

DOCUMENT II.E.6.2.a

PM EMISSION SUMMARY AND DEMONSTRATION OF NO PREVENTION OF SIGNIFICANT DETERIORATION APPLICABILITY

DOC.II.E.6.2.a - SUMMARY OF PM EMISSION CHANGES

Emission Point Description	Emission Point ID	PM Emission Actual (tpy)	Future Actual (tpy)	Change (tpy)
Barge to clamshell	FH-002	0.16	0.06	-0.1
Barge to continuous unloader	FH-003	0.16	0.06	-0.1
Clamshell to barge unloading hopper	FH-005	0.16	0.06	-0.1
Continuous unloader to conveyor A	FH-006	0.08	0.06	-0.02
Conveyor A to continuous feeder	FH-007	0.08	0.06	-0.02
Barge unloading hopper to conveyor B	FH-009	0.08	0.06	-0.02
Conveyor B to conveyor C	FH-011	0.16	0.12	-0.04
Conveyor C to conveyors D1, D2	FH-012	0.11	0.12	0.01
Rail car to rail unloading hopper	FH-013	0.16	0.00	-0.16
Rail unloading hopper to conveyor L	FH-014	0.08	0.00	-0.08
Conveyor L to conveyors D1, D2	FH-015	0.08	0.00	-0.08
Conveyor D1 to conveyor M1	FH-016	0.08	0.13	0.05
Conveyor D2 to conveyor M2	FH-017	0.08	0.13	0.05
Conveyor M1 to conveyor E1	FH-018	0.08	0.13	0.05
Conveyor M2 to conveyor E2	FH-019	0.08	0.13	0.05
Conveyor E1 to fuel storage pile	FH-020	0.08	0.13	0.05
Conveyor E2 to fuel storage pile	FH-021	0.08	0.13	0.05
Fuel storage pile	FH-022/023	0.03	0.03	0
Underground reclaim to conveyor F1	FH-024	0.05	0.08	0.03
Underground reclaim to conveyor F4	FH-025	0.05	0.08	0.03
Underground reclaim to conveyor F3	FH-026	0.00	0.00	0.00
Underground reclaim to conveyor F2	FH-027	0.05	0.08	0.03
Conveyor F1 to conveyors G1, G2	FH-028	0.05	0.08	0.03
Conveyor F4 to conveyors G1, G2	FH-029	0.05	0.08	0.03
Conveyor F3 to conveyors G1, G2	FH-030	0.00	0.00	0.00
Conveyor F2 to conveyors G1, G2	FH-031	0.05	0.08	0.03
Conveyor G1 to crushers	FH-032	0.08	0.05	-0.03
Conveyor G2 to crushers	FH-033	0.08	0.13	0.05
Crushers to conveyor H1	FH-034	0.08	0.13	0.05
Crushers to conveyor H2	FH-035	0.08	0.13	0.05
Conveyor H1 to bunkering	FH-036/041	2.97	2.97	0.00
Conveyor H2 to bunkering	FH-036/041	2.97	2.97	0.00
Conveyor D1 to conveyor G1, G2	FH-042	0.00	0.00	0.00
Conveyor D2 to conveyor G1, G2	FH-043	0.00	0.00	0.00
Dozer operations of storage piles	FH-044	2.17	6.04	3.87
Truck unloading - auxiliary	AH-001	0.00	0.03	0.03
Storage pile to auxiliary hopper	AH-002	0.00	0.02	0.02
Auxiliary hopper to conveyor T	AH-003	0.00	0.02	0.02
Conveyor T to conveyor U	AH-004	0.00	0.02	0.02
Conveyor U to conveyors G1, G2	AH-005	0.00	0.02	0.02
PM Emission Summary		10.55	14.42	3.87

Notes:

1. Actual emissions based on average of 1995 and 1996 actual fuel usage equally divided among fuel transfer points.
2. Future actual emissions based on 4,000,000 tpy of fuel conservatively assumed to be off-loaded from barge and then equally divided among fuel transfer points.
3. Future actual emissions based on 362,025 tpy of alternate fuel usage.
4. See Appendix B for emission calculation detail.

APPENDIX A

DISPERSON MODELING RESULTS (ELECTRONIC SUBMITTAL)

F.J. Gannon Station

I.D. 0570040

Fuel Yard Modification

ISC3 Output Files

August 18, 1997

Disk 1 of 1

APPENDIX B.3

FUTURE ACTUAL PM EMISSION CALCULATION SPREADSHEETS

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–002

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Barge to West Clamshell (Spillage)

Emission Control Method(s)/ID No.(s): Dust Suppressant

Emission Point ID: FH–002 **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	4,000,000	6.5	95.0	0.07	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–003

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Barge to Continuous Unloader (Spillage)

Emission Control Method(s)/ID No.(s): Barge Enclosure and Dust Suppressant

Emission Point ID: FH–003 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	4,000,000	6.5	95.0	0.07	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–10, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–005

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – West Clamshell to West Hopper

Emission Control Method(s)/ID No.(s): Side Enclosure and Dust Suppressant

Emission Point ID: FH–005 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	4,000,000	6.5	95.0	0.07	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–10, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–006

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Continuous Unloader to Conveyor A

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: FH–006 **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	4,000,000	6.5	95.0	0.07	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–007

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor A to Continuous Feeder

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: FH–007 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	4,000,000	6.5	95.0	0.07	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–009

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fuel Handling – West Hopper to Conveyor B		
Emission Control Method(s)/ID No.(s):	Enclosure and Dust Suppressant		
Emission Point ID:	FH–009	Transfer Point ID(s):	

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	4,000,000	6.5	95.0	0.07	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions from Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–011

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor B to Conveyor C

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: FH–011 | Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–012

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor C to Conveyor D1/D2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–012 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–013

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Rail Car to Hopper

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: FH–013 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	95.0	0.14	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–014

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	**Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Hopper to Conveyor L

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: FH–014 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	95.0	0.14	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–015

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor L to Conveyor D1/D2

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: FH–015 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	2,300	4,000,000	6.5	95.0	0.14	0.12

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–016

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor D1 to Conveyor M1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–016 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Short–term (24–hr average) dispersion modeling emissions rates assume both stackers operating simultaneously, each at 2,300 tph for a total rate of 4,600 tph.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–017

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor D2 to Conveyor M2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–017 **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–018

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor M1 to Conveyor E1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–018

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–019

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor M2 to Conveyor E2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–019 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred		Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates	
	(ton/hr)	(ton/yr)			(lb/hr)	(tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–020

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor E1 to Storage Pile

Emission Control Method(s)/ID No.(s): Dust Suppressant

Emission Point ID: FH–020 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–021

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor E2 to Storage Pile

Emission Control Method(s)/ID No.(s): Dust Suppressant

Emission Point ID: FH–021 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–022

EMISSION SOURCE TYPE

STORAGE PILE WINDBLOWN FUGITIVE DUST EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Storage – North Storage Pile

Emission Control Method(s)/ID No.(s): Application of Chemical Dust Suppressant

Emission Point ID: FH–022 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Estimates of fugitive PM were made using procedures contained in AP–42, Section 13.2.5, Industrial Wind Erosion.

Source: Section 13.2.5 – Industrial Wind Erosion, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Threshold Friction Velocity: 1.12 m/s | Control Efficiency: 90 pct

Pile Length (m): 215 | Pile Width (m): 70 | Pile Height (m): 21 | Surface Area (m^2) 16,758

Meteorological Period	Friction Velocity (m/s)	Emission Potential (g/m^2)	Affected Pile Surface Area (pct)	Affected Area (m^2)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
14	1.30	6.38	4	670.3	0.24	0.0005
30	1.13	0.26	4	670.3	<0.01	<0.0001
37	1.33	7.81	4	670.3	0.29	0.0006
65	1.48	16.52	14	2,346.1	2.14	0.0043
65	1.80	43.82	4	670.3	1.62	0.0032
77	1.30	6.38	4	670.3	0.24	0.0005
90	1.33	7.81	4	670.3	0.29	0.0006
			Maximum Per Period		3.75	N/A
			Total		N/A	0.0096

SOURCES OF INPUT DATA

Parameter	Data Source
Threshold Friction Velocity (m/s)	Uncrusted coal pile, Table 13.2.5–2., AP–42, January 1995.
Control Efficiency (pct)	Table 3.2.17–2, Workbook on Estimation and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1991.
Fuel Pile Dimensions (m)	Estimated: ECT, 1997.
Pile Surface Area (m^2)	Calculated: ECT, 1997.
Meteorological Periods	1986 NWS data, processed per AP–42, ECT, 1997.
Friction Velocity (m/s)	Equation, Section 13.2.5, AP–42, January 1995.
Potential Emission (g/m^2)	Equation, Section 13.2.5, AP–42, January 1995.
Affected Pile Surface Area (pct)	Table 13.2.5–3., Section 13.2.5, AP–42, January 1995.
Affected Area	Calculated: ECT, 1997.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466CT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–023a

EMISSION SOURCE TYPE

STORAGE PILE WINDBLOWN FUGITIVE DUST EMISSION SOURCES | Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Storage – East Portion of South Storage Pile

Emission Control Method(s)/ID No.(s): Application of Chemical Dust Suppressant

Emission Point ID: FH–023a | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Estimates of fugitive PM were made using procedures contained in AP–42, Section 13.2.5, Industrial Wind Erosion.

Source: Section 13.2.5 – Industrial Wind Erosion, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Threshold Friction Velocity: 1.12 m/s | Control Efficiency: 90 pct

Pile Length (m): 170 | Pile Width (m): 91 | Pile Height (m): 21 | Surface Area (m^2) 16,754

Meteorological Period	Friction Velocity (m/s)	Emission Potential (g/m^2)	Affected Pile Surface Area (pct)	Affected Area (m^2)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
14	1.30	6.38	4	670.2	0.24	0.0005
30	1.13	0.26	4	670.2	<0.01	<0.0001
37	1.33	7.81	4	670.2	0.29	0.0006
65	1.48	16.52	14	2,345.5	2.14	0.0043
65	1.80	43.82	4	670.2	1.62	0.0032
77	1.30	6.38	4	670.2	0.24	0.0005
90	1.33	7.81	4	670.2	0.29	0.0006
			Maximum Per Period		3.75	N/A
				Total	N/A	0.0096

SOURCES OF INPUT DATA

Parameter	Data Source
Threshold Friction Velocity (m/s)	Uncrusted coal pile, Table 13.2.5–2., AP–42, January 1995.
Control Efficiency (pct)	Table 3.2.17–2, Workbook on Estimation and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1991.
Fuel Pile Dimensions (m)	Estimated: ECT, 1997.
Pile Surface Area (m^2)	Calculated: ECT, 1997.
Meteorological Periods	1986 NWS data, processed per AP–42, ECT, 1997.
Friction Velocity (m/s)	Equation, Section 13.2.5, AP–42, January 1995.
Potential Emission (g/m^2)	Equation, Section 13.2.5, AP–42, January 1995.
Affected Pile Surface Area (pct)	Table 13.2.5–3., Section 13.2.5, AP–42, January 1995.
Affected Area	Calculated: ECT, 1997.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–023b

EMISSION SOURCE TYPE

STORAGE PILE WINDBLOWN FUGITIVE DUST EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Storage – West Portion of South Storage Pile

Emission Control Method(s)/ID No.(s): Application of Chemical Dust Suppressant

Emission Point ID: FH–023b

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Estimates of fugitive PM were made using procedures contained in AP–42, Section 13.2.5, Industrial Wind Erosion.

Source: Section 13.2.5 – Industrial Wind Erosion, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Threshold Friction Velocity: 1.12 m/s — Control Efficiency: 90 pct

Pile Length (m): 140 — Pile Width (m): 125 — Pile Height (m): 21 — Surface Area (m^2): 18,855

Meteorological Period	Friction Velocity (m/s)	Emission Potential (g/m^2)	Affected Pile Surface Area (pct)	Affected Area (m^2)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
14	1.30	6.38	4	754.2	0.27	0.0005
30	1.13	0.26	4	754.2	0.01	<0.0001
37	1.33	7.81	4	754.2	0.32	0.0006
65	1.48	16.52	14	2,639.6	2.40	0.0048
65	1.80	43.82	4	754.2	1.82	0.0036
77	1.30	6.38	4	754.2	0.27	0.0005
90	1.33	7.81	4	754.2	0.32	0.0006
			Maximum Per Period		4.22	N/A
			Total		N/A	0.0106

SOURCES OF INPUT DATA

Parameter	Data Source
Threshold Friction Velocity (m/s)	Uncrusted coal pile, Table 13.2.5–2., AP–42, January 1995.
Control Efficiency (pct)	Table 3.2.17–2, Workbook on Estimation and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1991.
Fuel Pile Dimensions (m)	Estimated: ECT, 1997.
Pile Surface Area (m^2)	Calculated: ECT, 1997.
Meteorological Periods	1986 NWS data, processed per AP–42, ECT, 1997.
Friction Velocity (m/s)	Equation, Section 13.2.5, AP–42, January 1995.
Potential Emission (g/m^2)	Equation, Section 13.2.5, AP–42, January 1995.
Affected Pile Surface Area (pct)	Table 13.2.5–3., Section 13.2.5, AP–42, January 1995.
Affected Area	Calculated: ECT, 1997.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–024

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Underground Reclaim System to Conveyor F1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–024

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–025

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Underground Reclaim System to Conveyor F4

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–025

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–026

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Underground Reclaim System to Conveyor F3

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–026 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–027

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fuel Handling – Underground Reclaim System to Conveyor F2
Emission Control Method(s)/ID No.(s):	Enclosure With Dust Suppressant
Emission Point ID:	FH–027
Transfer Point ID(s):	

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–028

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F1 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–028 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–029

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F4 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–029 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–030

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F3 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–030 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–031

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F2 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–031 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	4,000,000	6.5	90.0	0.05	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	**Date:**	08/07/97
Evaluated by:	A. Trbovich	**Date:**	08/07/97
Data Entered by:	A. Trbovich	**Date:**	08/07/97
Reviewed by:		**Date:**	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–032

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor G1 to Hammermill Crusher 1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–032 **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	4,000,000	6.5	90.0	0.10	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–033

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor G2 to Hammermill Crusher 2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–033 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	4,000,000	6.5	90.0	0.10	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–034

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Hammermill Crusher 1 to Conveyor H1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–034 | Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	4,000,000	6.5	90.0	0.10	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–035

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Hammermill Crusher 2 to Conveyor H2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–035 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	4,000,000	6.5	90.0	0.10	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FH466BAT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–036–FH–041

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyors H1/H2 to Conveyors J1/J2, Conveyors J1/J2 to Bunkers 1–6

Emission Control Method(s)/ID No.(s): Rotoclones 1 through 6

Emission Point ID: FH–036 through FH–041 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
2.8	1,600	4,000,000	6.5	75.0	0.12	0.14

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Typical Indraft Velocity for Coal Bunkers, ECT 1994.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Control Equipment Vendor Data AAF, 1960.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–042

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor D1 to Conveyor G1/G2 (By–Pass Storage)

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–042 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

If the fuel stackers and fuel stacker bypasses are operated simultaneously, the total amount of fuel handled will not exceed 4,600 tph.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–043

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor D2 to Conveyor G1/G2 (By–Pass Storage)

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–043

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	4,000,000	6.5	90.0	0.29	0.25

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

If the fuel stackers and fuel stacker bypasses are operated simultaneously, the total amount of fuel handled will not exceed 4,600 tph.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–044

EMISSION SOURCE TYPE

VEHICULAR TRAFFIC ON UNPAVED ROADS – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Storage Pile Maintenance

Emission Control Method(s)/ID No.(s): Dust Suppressant Sprays

Emission Point ID: FH–044

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = $5.9 \times (s/12) \times (S/30) \times (W/3)^{0.7} \times (w/4)^{0.5} \times ((365-p)/365) \times$ vehicle miles per hour (VMT/hr) $\times$ (100–control[pct]/100)

Emission (ton/yr) = $5.9 \times (s/12) \times (S/30) \times (W/3)^{0.7} \times (w/4)^{0.5} \times ((365-p)/365) \times$ vehicle miles per year (VMT/yr) $\times$ (1 ton/ 2,000 lb) $\times$ (100–control[pct]/100)

Source: Section 13.2.2 – Unpaved Roads, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Operating Hours: 16 Hrs/Day | 7 Days/Wk | 5,824 Hrs/Yr

s Silt Content (pct)	S Vehicle Speed (mph)	W Vehicle Weight (ton)	w No. of Wheels	p Rainfall Days	Vehicle Miles Travelled (VMT/hr)	Vehicle Miles Travelled (VMT/yr)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.4	2.5	48	6	107	10.0	58,240	90.0	2.08	6.04

SOURCES OF INPUT DATA

Parameter	Data Source
Operating Hours	ECT, 1997. Estimated.
Silt Content, s	Table 13.2.2–1, Section 13.2.2, AP–42, January 1995.
Vehicle Speed, S	TEC, 1997. Average value.
Vehicle Weight, W	TEC, 1997. Average value.
No. of Wheels	TEC, 1997. Average value.
Rainfall Days	Climate of the States, Third Edition, 1985. Data for Tampa, FL.
Vehicle Miles Traveled	ECT, 1997. Estimated.
Control Efficiency	Table 3.2.15–2, Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Estimate of vehicle miles traveled based on the use of four bulldozers on the storage piles.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

AH–001

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Auxiliary Handling – Truck Unloading

Emission Control Method(s)/ID No.(s): Dust Supressant

Emission Point ID: AH–001

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	362,025	6.5	85.0	0.07	0.03

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	TEC, 1997. Average fuel moisture content.
Control Efficiency	TEC, 1997.

NOTES AND OBSERVATIONS

Annual quantity transferred based on Units 1 through 4 firing an 80/20 coal/TDF blend at maximum capacity for 8,760 hrs/yr.

5,989 MMBtu/hr x 0.2 / 14,492 Btu/lb TDF x 8,760 hrs/yr x 1 ton/2,000 lb = 362,025 tpy

Alternate fuel includes TDF and WDF. The actual annual quantity of TDF and WDF transferred may vary, but the actual total quantity of alternate fuel transferred will not exceed 362,025 tpy.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

AH–002

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Auxiliary Handling – Storage Pile to Hopper

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: AH–002 **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	362,025	6.5	90.0	0.05	0.02

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	TEC, 1997. Average fuel moisture content.
Control Efficiency	Table 3–16, Fugitive Emission from Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Annual quantity transferred based on Units 1 through 4 firing an 80/20 coal/TDF blend at maximum capacity for 8,760 hrs/yr.

5,989 MMBtu/hr x 0.2 / 14,492 Btu/lb TDF x 8,760 hrs/yr x 1 ton/2,000 lb = 362,025 tpy

Alternate fuel includes TDF and WDF. The actual annual quantity of TDF and WDF transferred may vary, but the actual total quantity of alternate fuel transferred will not exceed 362,025 tpy.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

AH-003

Tampa Electric Company - F.J. Gannon Station

EMISSION SOURCE TYPE

MATERIAL TRANSFER - FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Auxiliary Handling - Hopper to Conveyor T

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: AH-003 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100-control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100-control[pct]/100) x (1/2,000)

Source: Section 13.2.4 - Aggregate Handling and Storage Piles, AP-42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	362,025	6.5	90.0	0.05	0.02

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	TEC, 1997. Average fuel moisture content.
Control Efficiency	Table 3-16, Fugitive Emission from Coal-Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Annual quantity transferred based on Units 1 through 4 firing an 80/20 coal/TDF blend at maximum capacity for 8,760 hrs/yr.

5,989 MMBtu/hr x 0.2 / 14,492 Btu/lb TDF x 8,760 hrs/yr x 1 ton/2,000 lb = 362,025 tpy

Alternate fuel includes TDF and WDF. The actual annual quantity of TDF and WDF transferred may vary, but the actual total quantity of alternate fuel transferred will not exceed 362,025 tpy.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

AH–004

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Auxiliary Handling – Conveyor T to Conveyor U

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: AH–004 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	400	362,025	6.5	90.0	0.05	0.02

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	TEC, 1997. Average fuel moisture content.
Control Efficiency	Table 3–16, Fugitive Emission from Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Annual quantity transferred based on Units 1 through 4 firing an 80/20 coal/TDF blend at maximum capacity for 8,760 hrs/yr.

5,989 MMBtu/hr x 0.2 / 14,492 Btu/lb TDF x 8,760 hrs/yr x 1 ton/2,000 lb = 362,025 tpy

Alternate fuel includes TDF and WDF. The actual annual quantity of TDF and WDF transferred may vary, but the actual total quantity of alternate fuel transferred will not exceed 362,025 tpy.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

AH466BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

AH–005

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Auxiliary Handling – Conveyor U to Conveyors H1 and H2

Emission Control Method(s)/ID No.(s): Enclosure and Dust Suppressant

Emission Point ID: AH–005 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	400	362,025	6.5	90.0	0.05	0.02

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	TEC, 1997. Average fuel moisture content.
Control Efficiency	Table 3–16, Fugitive Emission from Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Annual quantity transferred based on Units 1 through 4 firing an 80/20 coal/TDF blend at maximum capacity for 8,760 hrs/yr.

5,989 MMBtu/hr x 0.2 / 14,492 Btu/lb TDF x 8,760 hrs/yr x 1 ton/2,000 lb = 362,025 tpy

Alternate fuel includes TDF and WDF. The actual annual quantity of TDF and WDF transferred may vary, but the actual total quantity of alternate fuel transferred will not exceed 362,025 tpy.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

APPENDIX B.4

ACTUAL PM EMISSION CALCULATION SPREADSHEETS

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–002

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Barge to West Clamshell (Spillage)

Emission Control Method(s)/ID No.(s): Barge Enclosure

Emission Point ID: FH–002 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	882,681	6.5	70.0	0.43	0.16

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

Actual short–term emissions based on clamshell and continuous unloading systems operating simultaneously at 1,150 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–003

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Barge to Continuous Unloader (Spillage)

Emission Control Method(s)/ID No.(s): Barge Enclosure

Emission Point ID: FH–003 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	882,681	6.5	70.0	0.43	0.16

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–10, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

Actual short–term emissions based on clamshell and continuous unloading systems operating simultaneously at 1,150 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–005

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – West Clamshell to West Hopper

Emission Control Method(s)/ID No.(s): Side Enclosure

Emission Point ID: FH–005 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	882,681	6.5	70.0	0.43	0.16

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–10, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

Actual short–term emissions based on clamshell and continuous unloading systems operating simultaneously at 1,150 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–006

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Continuous Unloader to Conveyor A

Emission Control Method(s)/ID No.(s): Enclosure

Emission Point ID: FH–006 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	882,681	6.5	85.0	0.21	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

Actual short–term emissions based on clamshell and continuous unloading systems operating simultaneously at 1,150 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–007

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor A to Continuous Feeder

Emission Control Method(s)/ID No.(s): Enclosure

Emission Point ID: FH–007 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	882,681	6.5	85.0	0.21	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

Actual short–term emissions based on clamshell and continuous unloading systems operating simultaneously at 1,150 tph, each

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–009

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – West Hopper to Conveyor B

Emission Control Method(s)/ID No.(s): Enclosure

Emission Point ID: FH–009 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	1,150	882,681	6.5	85.0	0.21	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions from Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

Actual short–term emissions based on clamshell and continuous unloading systems operating simultaneously at 1,150 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–011

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor B to Conveyor C

Emission Control Method(s)/ID No.(s): Enclosure

Emission Point ID: FH–011 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	1,765,362	6.5	85.0	0.43	0.16

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–012

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES — Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor C to Conveyor D1/D2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–012 — **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	1,765,362	6.5	90.0	0.29	0.11

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–013

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Rail Car to Hopper

Emission Control Method(s)/ID No.(s): Partial Enclosure

Emission Point ID: FH–013

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x $[(\text{average wind speed (mph)}/5)^{1.3} / \text{moisture content (pct)}/2)^{1.4}]$ x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x $[(\text{average wind speed (mph)}/5)^{1.3} / \text{moisture content (pct)}/2)^{1.4}]$ x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	882,681	6.5	70.0	0.86	0.16

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–014

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Hopper to Conveyor L

Emission Control Method(s)/ID No.(s): Enclosure

Emission Point ID: FH–014 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	(ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	(tpy)
8.6	2,300	882,681	6.5	85.0	0.43	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–015

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor L to Conveyor D1/D2

Emission Control Method(s)/ID No.(s): Enclosure

Emission Point ID: FH–015

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	882,681	6.5	85.0	0.43	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3–16, Fugitive Emissions From Coal–Fired Power Plants, EPRI, June 1984.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided among the barge clamshell, barge continuous, and rail unloading systems, or 882,681 tons per system.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–016

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor D1 to Conveyor M1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–016 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	2,300	1,324,022	6.5	90.0	0.29	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided between conveyors D1 and D2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–017

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor D2 to Conveyor M2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–017 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	1,324,022	6.5	90.0	0.29	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided between conveyors D1 and D2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

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EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–018

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor M1 to Conveyor E1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–018 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	1,324,022	6.5	90.0	0.29	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided between conveyors M1 and M2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	**Date:**	08/07/97
Evaluated by:	A. Trbovich	**Date:**	08/07/97
Data Entered by:	A. Trbovich	**Date:**	08/07/97
Reviewed by:		**Date:**	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–019

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor M2 to Conveyor E2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–019 **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	2,300	1,324,022	6.5	90.0	0.29	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided between conveyors M1 and M2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

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EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station | **FH–020**

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor E1 to Storage Pile

Emission Control Method(s)/ID No.(s): Dust Suppressant

Emission Point ID: FH–020 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x $[(\text{average wind speed (mph)}/5)^{1.3} / \text{moisture content (pct)}/2)^{1.4}]$ x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x $[(\text{average wind speed (mph)}/5)^{1.3} / \text{moisture content (pct)}/2)^{1.4}]$ x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	1,324,022	6.5	90.0	0.29	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided between conveyors E1 and E2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–021

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor E2 to Storage Pile

Emission Control Method(s)/ID No.(s): Dust Suppressant

Emission Point ID: FH–021 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	2,300	1,324,022	6.5	90.0	0.29	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel delivery was assumed to be equally divided between conveyors E1 and E2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–022

EMISSION SOURCE TYPE

STORAGE PILE WINDBLOWN FUGITIVE DUST EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Storage – North Storage Pile

Emission Control Method(s)/ID No.(s): Application of Chemical Dust Suppressant

Emission Point ID: FH–022

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Estimates of fugitive PM were made using procedures contained in AP–42, Section 13.2.5, Industrial Wind Erosion.

Source: Section 13.2.5 – Industrial Wind Erosion, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Threshold Friction Velocity: 1.12 m/s | Control Efficiency: 90 pct

Pile Length (m): 215 | Pile Width (m): 70 | Pile Height (m): 21 | Surface Area (m^2) 16,758

Meteorological Period	Friction Velocity (m/s)	Emission Potential (g/m^2)	Affected Pile Surface Area (pct)	Affected Area (m^2)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
14	1.30	6.38	4	670.3	0.24	0.0005
30	1.13	0.26	4	670.3	<0.01	<0.0001
37	1.33	7.81	4	670.3	0.29	0.0006
65	1.48	16.52	14	2,346.1	2.14	0.0043
65	1.80	43.82	4	670.3	1.62	0.0032
77	1.30	6.38	4	670.3	0.24	0.0005
90	1.33	7.81	4	670.3	0.29	0.0006
			Maximum Per Period		3.75	N/A
				Total	N/A	0.0096

SOURCES OF INPUT DATA

Parameter	Data Source
Threshold Friction Velocity (m/s)	Uncrusted coal pile, Table 13.2.5–2., AP–42, January 1995.
Control Efficiency (pct)	Table 3.2.17–2, Workbook on Estimation and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1991.
Fuel Pile Dimensions (m)	Estimated: ECT, 1997.
Pile Surface Area (m^2)	Calculated: ECT, 1997.
Meteorological Periods	1986 NWS data, processed per AP–42, ECT, 1997.
Friction Velocity (m/s)	Equation, Section 13.2.5, AP–42, January 1995.
Potential Emission (g/m^2)	Equation, Section 13.2.5, AP–42, January 1995.
Affected Pile Surface Area (pct)	Table 13.2.5–3., Section 13.2.5, AP–42, January 1995.
Affected Area	Calculated: ECT, 1997.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–023a

EMISSION SOURCE TYPE

STORAGE PILE WINDBLOWN FUGITIVE DUST EMISSION SOURCES — Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fuel Storage – East Portion of South Storage Pile		
Emission Control Method(s)/ID No.(s):	Application of Chemical Dust Suppressant		
Emission Point ID:	FH–023a	Transfer Point ID(s):	

EMISSION ESTIMATION EQUATIONS

Estimates of fugitive PM were made using procedures contained in AP–42, Section 13.2.5, Industrial Wind Erosion.

Source: Section 13.2.5 – Industrial Wind Erosion, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Threshold Friction Velocity: 1.12 m/s — Control Efficiency: 90 pct

Pile Length (m): 170 — Pile Width (m): 91 — Pile Height (m): 21 — Surface Area (m^2) 16,754

Meteorological Period	Friction Velocity (m/s)	Emission Potential (g/m^2)	Affected Pile Surface Area (pct)	Affected Area (m^2)	Actual PM Emission Rates (lb/hr)	(tpy)
14	1.30	6.38	4	670.2	0.24	0.0005
30	1.13	0.26	4	670.2	<0.01	<0.0001
37	1.33	7.81	4	670.2	0.29	0.0006
65	1.48	16.52	14	2,345.5	2.14	0.0043
65	1.80	43.82	4	670.2	1.62	0.0032
77	1.30	6.38	4	670.2	0.24	0.0005
90	1.33	7.81	4	670.2	0.29	0.0006
			Maximum Per Period		3.75	N/A
			Total		N/A	0.0096

SOURCES OF INPUT DATA

Parameter	Data Source
Threshold Friction Velocity (m/s)	Uncrusted coal pile, Table 13.2.5–2., AP–42, January 1995.
Control Efficiency (pct)	Table 3.2.17–2, Workbook on Estimation and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1991.
Fuel Pile Dimensions (m)	Estimated: ECT, 1997.
Pile Surface Area (m^2)	Calculated: ECT, 1997.
Meteorological Periods	1986 NWS data, processed per AP–42, ECT, 1997.
Friction Velocity (m/s)	Equation, Section 13.2.5, AP–42, January 1995.
Potential Emission (g/m^2)	Equation, Section 13.2.5, AP–42, January 1995.
Affected Pile Surface Area (pct)	Table 13.2.5–3., Section 13.2.5, AP–42, January 1995.
Affected Area	Calculated: ECT, 1997.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–023b

EMISSION SOURCE TYPE

STORAGE PILE WINDBLOWN FUGITIVE DUST EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Storage – West Portion of South Storage Pile

Emission Control Method(s)/ID No.(s): Application of Chemical Dust Suppressant

Emission Point ID: FH–023b

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Estimates of fugitive PM were made using procedures contained in AP–42, Section 13.2.5, Industrial Wind Erosion.

Source: Section 13.2.5 – Industrial Wind Erosion, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Threshold Friction Velocity: 1.12 m/s | Control Efficiency: 90 pct

Pile Length (m): 140 | Pile Width (m): 125 | Pile Height (m): 21 | Surface Area (m^2) 18,855

Meteorological Period	Friction Velocity (m/s)	Emission Potential (g/m^2)	Affected Pile Surface Area (pct)	Affected Area (m^2)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
14	1.30	6.38	4	754.2	0.27	0.0005
30	1.13	0.26	4	754.2	0.01	<0.0001
37	1.33	7.81	4	754.2	0.32	0.0006
65	1.48	16.52	14	2,639.6	2.40	0.0048
65	1.80	43.82	4	754.2	1.82	0.0036
77	1.30	6.38	4	754.2	0.27	0.0005
90	1.33	7.81	4	754.2	0.32	0.0006
			Maximum Per Period		4.22	N/A
				Total	N/A	0.0108

SOURCES OF INPUT DATA

Parameter	Data Source
Threshold Friction Velocity (m/s)	Uncrusted coal pile, Table 13.2.5–2., AP–42, January 1995.
Control Efficiency (pct)	Table 3.2.17–2, Workbook on Estimation and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1991.
Fuel Pile Dimensions (m)	Estimated: ECT, 1997.
Pile Surface Area (m^2)	Calculated: ECT, 1997.
Meteorological Periods	1986 NWS data, processed per AP–42, ECT, 1997.
Friction Velocity (m/s)	Equation, Section 13.2.5, AP–42, January 1995.
Potential Emission (g/m^2)	Equation, Section 13.2.5, AP–42, January 1995.
Affected Pile Surface Area (pct)	Table 13.2.5–3., Section 13.2.5, AP–42, January 1995.
Affected Area	Calculated: ECT, 1997.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–024

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Underground Reclaim System to Conveyor F1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–024 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed	Actual Quantity Transferred		Material Moisture Content	Control Efficiency	Actual PM Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	552	882,681	6.5	90.0	0.07	0.05

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided among the reclaimers F1, F2, and F4, or 882,681 tons per reclaimer.

Actual short–term emissions based on reclaimers F1, F2, and F4 operating simultaneously at 533 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–025

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Underground Reclaim System to Conveyor F4

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–025 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	553	882,681	6.5	90.0	0.07	0.05

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided among the reclaimers F1, F2, and F4, or 882,681 tons per reclaimer.

Actual short–term emissions based on reclaimers F1, F2, and F4 operating simultaneously at 533 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–027

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Underground Reclaim System to Conveyor F2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–027 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	553	882,681	6.5	90.0	0.07	0.05

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided among the reclaimers F1, F2, and F4, or 882,681 tons per reclaimer.

Actual short–term emissions based on reclaimers F1, F2, and F4 operating simultaneously at 533 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

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EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–028

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F1 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–028 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	553	882,681	6.5	90.0	0.07	0.05

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided among the reclaimers F1, F2, and F4, or 882,681 tons per reclaimer.

Actual short–term emissions based on reclaimers F1, F2, and F4 operating simultaneously at 533 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–029

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F4 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–029 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	553	882,681	6.5	90.0	0.07	0.05

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided among the reclaimers F1, F2, and F4, or 882,681 tons per reclaimer.

Actual short–term emissions based on reclaimers F1, F2, and F4 operating simultaneously at 533 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–031

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor F2 to Conveyor G1/G2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–031 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	553	882,681	6.5	90.0	0.07	0.05

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel used is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided among relcaimers F1, F2, and F4, or 882,681 tons per reclaimer.

Actual short–term emissions based on reclaimers F1, F2, and F4 operating simultaneously at 533 tph, each.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–032

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyor G1 to Hammermill Crusher 1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–032

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	1,324,022	6.5	90.0	0.10	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided between conveyors G1 and G2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–033

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fuel Handling – Conveyor G2 to Hammermill Crusher 2
Emission Control Method(s)/ID No.(s):	Enclosure With Dust Suppressant
Emission Point ID:	FH–033
Transfer Point ID(s):	

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	(ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	(tpy)
8.6	800	1,324,022	6.5	90.0	0.10	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided between conveyors G1 and G2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–034

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Hammermill Crusher 1 to Conveyor H1

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant Sprays

Emission Point ID: FH–034 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	1,324,022	6.5	90.0	0.10	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel use is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided between conveyors H1 and H2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

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EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–035

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES | **Figure:**

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Hammermill Crusher 2 to Conveyor H2

Emission Control Method(s)/ID No.(s): Enclosure With Dust Suppressant

Emission Point ID: FH–035 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.6	800	1,324,022	6.5	90.0	0.10	0.08

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Table 3.2.17–2, Workbook on Estimation of Emissions and Dispersion Modeling of Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel used is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

Actual fuel reclaiming was assumed to be equally divided between conveyors H1 and H2, or 1,324,022 tons per conveyor.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–036– FH–041

EMISSION SOURCE TYPE

MATERIAL TRANSFER – FUGITIVE EMISSION SOURCES	Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: Fuel Handling – Conveyors H1/H2 to Conveyors J1/J2, Conveyors J1/J2 to Bunkers 1-6

Emission Control Method(s)/ID No.(s): Rotoclones 1 through 6

Emission Point ID: FH–036 through FH–041 | **Transfer Point ID(s):**

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0032 x material transferred (ton/hr) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100)

Emission (tpy) = 0.0032 x material transferred (tpy) x [(average wind speed (mph)/5)$^{1.3}$ / moisture content (pct)/2)$^{1.4}$] x (100–control[pct]/100) x (1/2,000)

Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Mean Wind Speed (mph)	Actual Quantity Transferred (ton/hr)	Actual Quantity Transferred (ton/yr)	Material Moisture Content (pct)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
2.8	1,600	2,648,044	6.5	75.0	0.12	0.10

SOURCES OF INPUT DATA

Parameter	Data Source
Mean Wind Speed	Typical Indraft Velocity for Coal Bunkers, ECT 1994.
Actual Quantity Transferred	TEC, 1997.
Material Moisture Content	Average fuel moisture content; TEC, 1994.
Control Efficiency	Control Equipment Vendor Data AAF, 1960.

NOTES AND OBSERVATIONS

Actual PM emissions based on 2,648,044 tpy of fuel used. Actual fuel used is the average of the 1995 and 1996 actual fuel used, 2,528,334 tons and 2,767,753 tons, respectively.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	

FHAC6BAT.WK1

EMISSION INVENTORY WORKSHEET

Tampa Electric Company – F.J. Gannon Station

FH–044

EMISSION SOURCE TYPE

VEHICULAR TRAFFIC ON UNPAVED ROADS – FUGITIVE EMISSION SOURCES

Figure:

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fuel Handling – Storage Pile Maintenance
Emission Control Method(s)/ID No.(s):	Dust Suppressant Sprays
Emission Point ID:	FH–044

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 5.9 x (s/12) x (S/30) x $(W/3)^{0.7}$ x $(w/4)^{0.5}$ x ((365–p)/365) x vehicle miles per hour (VMT/hr) x (100–control[pct]/100)

Emission (ton/yr) = 5.9 x (s/12) x (S/30) x $(W/3)^{0.7}$ x $(w/4)^{0.5}$ x ((365–p)/365) x vehicle miles per year (VMT/yr) x (1 ton/ 2,000 lb) x (100–control[pct]/100)

Source: Section 13.2.2 – Unpaved Roads, AP–42, Fifth Edition, January 1995.

INPUT DATA AND EMISSIONS CALCULATIONS

Operating Hours: 16 Hrs/Day 7 Days/Wk 5,824 Hrs/Yr

s Silt Content (pct)	S Vehicle Speed (mph)	W Vehicle Weight (ton)	w No. of Wheels	p Rainfall Days	Vehicle Miles Travelled (VMT/hr)	Vehicle Miles Travelled (VMT/yr)	Control Efficiency (pct)	Actual PM Emission Rates (lb/hr)	Actual PM Emission Rates (tpy)
8.4	2.5	48	6	107	10.0	58,240	90.0	2.08	6.04

SOURCES OF INPUT DATA

Parameter	Data Source
Operating Hours	ECT, 1997. Estimated.
Silt Content, s	Table 13.2.2–1, Section 13.2.2, AP–42, January 1995.
Vehicle Speed, S	TEC, 1997. Average value.
Vehicle Weight, W	TEC, 1997. Average value.
No. of Wheels	TEC, 1997. Average value.
Rainfall Days	Climate of the States, Third Edition, 1985. Data for Tampa, FL
Vehicle Miles Traveled	ECT, 1997. Estimated.
Control Efficiency	Table 3.2.15–2, Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, UARG, September 1981.

NOTES AND OBSERVATIONS

Estimate of vehicle miles traveled based on the use of four bulldozers on the storage piles.

DATA CONTROL

Data Collected by:	A. Trbovich	Date:	08/07/97
Evaluated by:	A. Trbovich	Date:	08/07/97
Data Entered by:	A. Trbovich	Date:	08/07/97
Reviewed by:		Date:	