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BIG BEND STATION
COAL YARD MODIFICATION
ADDENDUM AND RESPONSES TO INFORMATION REQUESTS

Prepared for:

TAMPA ELECTRIC
A TECO ENERGY COMPANY

Tampa, Florida

Prepared by:

ECT
Environmental Consulting & Technology, Inc.
Gainesville, Florida

ECT No. 92213-0100-1100

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1.0 OVERVIEW

In September 1992, Tampa Electric Company applied for a modification to the Big Bend Electric Generating Unit 4 Certification (No. PA7912) to install a coal loading facility in the southwest portion of the Big Bend Electric Generating Station coal yard in Ruskin, Florida. This additional facility will provide a cost-effective method of delivering coal to Tampa Electric Company's other facilities, including the Polk Power Station, as well as other users. As a result, Tampa Electric Company will be better able to minimize electric generation costs to the public's benefit.

On October 7 and November 4, 1992, the Florida Department of Environmental Regulation (FDER) requested additional information from Tampa Electric Company regarding the loading facility. In the interim, Tampa Electric Company has also incorporated several design changes into the loading facility. These changes include:

- Reducing the maximum annual additional coal throughput from 1,700,000 tons per year (tpy) to 1,428,030 tpy,
- Separate truck and railcar loadout stations,
- A gravity feed loadout hopper beneath the coal storage pile, and
- Direct loading from the coal storage pile via conveyor instead of from a loading storage silo.

This document details these changes and responds to FDER information requests.

Overall, the new coal loading facility will not cause any significant environmental impacts. The new loading facility will cause a modest increase in particulate matter (PM) emissions from the Big Bend Station. This PM emission increase does not trigger Prevention of Significant Deterioration (PSD) permitting because the contemporaneous emission increase of respirable particulate matter (PM_{10}) is less than 15 tpy and the contemporaneous emission increase of total suspended particulate matter (TSP) is less than 25 tpy. Further, dispersion modeling of the increased PM emissions demonstrates that the ambient impact of the project is not significant at any location.

2.0 PROFESSIONAL ENGINEER CERTIFICATION

This is to certify that the engineering features of this pollution control project have been 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: Thomas W. Davis

Thomas W. Davis
Name

Environmental Consulting & Technology, Inc.
Company Name

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

Florida Registration No. 36777 Date: 6/3/93 Telephone No. 904/332-0444

3.0 UPDATED FACILITY DESCRIPTION

3.1 PURPOSE

The purpose of the coal handling system modifications at Big Bend Station is to permit loading of trucks and railcars maximizing the use of the existing coal unloading and storage facilities for delivery to offsite facilities. Up to 1,428,030 tons of coal will be transloaded annually.

3.2 PROCESS FLOW PATH

The process flow path is as follows.

Coal is unloaded from barges and transported by existing conveyor to the existing radial stacker conveyor. A stock pile of approximately 60,000 tons (80,000 ton maximum) will be maintained. Coal will be reclaimed from the pile using gravity to feed into a hopper located beneath the stock pile. Mobile equipment will move the coal to maintain gravity feed into the reclaim hopper which in turn will feed coal onto an enclosed conveyor belt. The new conveyor belt system will deliver the coal to the truck and rail loadout facilities.

Loading of trucks and railcars will be accomplished by an automated delivery system which is initiated via a pushbutton station. The operator is instructed to position and/or advance the truck or railcar via a signal light system. The location and arrangement of the truck and rail loading facilities are shown on drawing number 6492-E-104 (Attachment 1).

Each loadout system consists of a receiving/discharge bin, weight scale and associated controls for pre-measuring the amount of coal to be delivered to the truck or railcar, and a telescopic chute for delivery of the coal from the weight bin to the truck or railcar.

3.3 CODES AND STANDARDS

The following codes and standards will be considered an integral part of the system design requirements. The latest edition of these codes and standards and other tests and specifications incorporated therein as applicable, in effect or promulgated at the time of Purchase Order award, will apply.

All materials will be in accordance with ASTM specifications where such exist, or with other recognized standards such as SAE or manufacturer's standards. Proprietary materials, or others, for which no generally recognized standards exist, will be used only by agreement with the Purchaser.

The following codes and standards will apply, including but not necessarily limited to:

- AFBMA - Anti-Friction Bearing Manufacturer's Association
- AGMA - American Gear Manufacturer's Association
- AISC - American Institute of Steel Construction
- AISI - American Iron and Steel Institute
- AMCA - Air Moving and Conditioning Association
- ANSI - American National Standards Institute
- ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
- ASME - American Society of Mechanical Engineers
- ASTM - American Society of Testing and Materials
- AWS - American Welding Society
- CEMA - Conveyor Equipment Manufacturer's Association
- IEEE - Institute of Electrical and Electronics Engineers
- IPCEA - Insulated Power Cable Engineers Association
- ISA - Instrumentation Society of America
- JIC - Joint Industrial Conference
- MSS - Manufacturer's Standardization Society
- NEC - Nation Electrical Code

- NEMA - National Electrical Manufacturer's Association
- NFPA - National Fire Protection Association
- NPTA - National Power Transmission Association
- OSHA - Occupational Safety and Health Administration
- RMA - Rubber Manufacturer's Association
- SMACNA - Sheet Metal and Air Conditioning Contractors Association
- UBC - Uniform Building Code
- USBM - United States Bureau of Mines
- UL - Underwriter's Laboratories

3.4 DESIGN CRITERIA

- The truck loadout system will be designed and sized to support loading approximately one hundred sixty-five 28-ton trucks per day based on three shifts of operation per day. However, the current anticipation is loading trucks on only two shifts per day.
- The railcar loadout system will be designed and sized to support loading approximately fifty 100-ton railcars per day based on three shifts of operation per day.
- Truck loading and railcar loading will not occur simultaneously.
- The coal storage pile and equipment will use the existing storage capacity of 60,000 tons of coal. The existing radial stacker in combination with mobile equipment will be capable of building the 60,000 ton storage pile.
- A gravity feed hopper located beneath the storage pile will feed a belt conveyor system designed for a capacity of 225 TPH of coal.
- Control of fugitive dust emissions will be achieved by combination of prior surfactant dust suppression and equipment enclosures. A surfactant dust suppression system, employing chemical or foam coating agents, will be employed upstream of the stock pile to suppress dust on the stockpile. The conveyor will be enclosed to contain dust and to minimize emissions to the atmosphere.

4.0 CONTEMPORANEOUS PM EMISSION CHANGES

Contemporaneous emission changes are all emission changes (positive and negative) which have occurred at a particular facility over the past 5 years. If the total contemporaneous emission change for a criteria pollutant is greater than the established major modification significant emission rate for that pollutant, a PSD permit is required. The major modification significant emission rates for PM_{10} and TSP are 15 and 25 tpy, respectively. The Big Bend Station contemporaneous emission rate changes for PM_{10} and TSP, as presented in Table 1, demonstrate that facility modifications, including the coal transloading facility, are not subject to PSD permitting.

The emission rates presented in Table 1 for the ash silo and the coal bunker roto-clones are based on the existing FDER permitted rates. The PM_{10} and TSP emission calculations for transloading of coal at Big Bend Station are summarized in Tables 2 and 3, respectively. The calculation details are provided in Attachments 2 and 3 for PM_{10} and TSP, respectively. These calculations are based on the appropriate AP-42 emission factors using specific inputs for PM_{10} and TSP.

Table 1. Contemporaneous PM_{10} and TSP Emission Changes at the Big Bend Station

Specific Facility	Change in PM_{10} (tpy)	Change in TSP (tpy)
Ash silo	+10.07	+10.07
Coal bunker roto-clones	+0.62	+0.62
Coal transloading	+0.69	+1.50
TOTAL	**+11.38**	**+12.19**

Source: ECT, 1993.

Table 2. Big Bend Station PM_{10} Emission Summary for Coal Transloading Sources

change only

Model I.D.	Source Name	Emission Factor (lb/ton)	Control Efficiency	Maximum Hourly Emission: Coal Through-put (ton/hr)	Maximum Hourly Emission: PM Emission (lb/hr)	Maximum Hourly Emission: PM Emission (g/sec)	Annualized Emission: Coal Through-put (tpy)	Annualized Emission: Emission (tpy)	Annualized Emission: PM Emission (g/sec)
C2	Transfer from barge to conveyor A-1	0.000392	0.95	4,000	0.0784	0.0099	1,428,030	0.0140	0.000403
C3	Transfer from conveyor A-1 to conveyor B-1	0.000392	0.90	4,000	0.1568	0.0198	1,428,030	0.0280	0.000805
C4	Transfer from conveyor B-1 to conveyor C-1	0.000392	0.90	4,000	0.1568	0.0198	1,428,030	0.0280	0.000805
C5	Transfer from conveyor C-1 to conveyor D-1	0.000392	0.90	4,000	0.1568	0.0198	1,428,030	0.0280	0.000805
C1	Alternate clamshell transfer to conveyor D-1	0.000392	0.85	4,000	0.2352	0.0296	1,428,030	0.0420	0.001208
C6	Transfer from conveyor D-1 to conveyor E-1	0.000392	0.90	4,000	0.1568	0.0198	1,428,030	0.0280	0.000805
C7	Transfer from conveyor E-1 to conveyor Y	0.000392	0.90	4,000	0.1568	0.0198	1,428,030	0.0280	0.000805
C8	Transfer from conveyor Y to conveyor Z	0.000392	0.90	4,000	0.1568	0.0198	1,428,030	0.0280	0.000805
C9	Transfer from conveyor Z to stockpile	0.000392	0.85	4,000	0.2352	0.0296	1,428,030	0.0420	0.001208

Table 2. Big Bend Station PM_{10} Emission Summary for Coal Transloading Sources (Continued, Page 2 of 2)

				Maximum Hourly Emission			Annualized Emission		
Model I.D.	Source Name	Emission Factor (lb/ton)	Control Efficiency	Coal Through-put (ton/hr)	PM Emission (lb/hr)	PM Emission (g/sec)	Coal Through-put (tpy)	Emission (tpy)	PM Emission (g/sec)
NC10	Mobile equipment operations	0.7648 lb/VMT	0.90	2.5 MPH	0.1912	0.0241	1,428,030	0.3140	0.009034
NC11	Transfer from stock-pile to loadout conveyor	0.000392	0.85	225	0.0088	0.0011	1,428,030	0.0280	0.000805
NC12	Coal loading into truck	0.000392	0.85	225	0.0132	0.0017	1,428,030	0.0420	0.001208
NC13	Transfer from load-out conveyor to rail conveyor	0.000392	0.85	225	0.0132	0.0017	1,428,030	0.0420	0.001208
NC14	Coal loading into railcars	0.000392	0.85	225	0.0132	0.0017	1,428,030	0.0420	0.001208
	TOTAL EMISSION (Truck)				**1.4676**	**0.1852**		**0.6080**	**0.017488**
	TOTAL EMISSION (Rail)				**1.4940**	**0.1886**		**0.6920**	**0.019904**

Note: VMT = vehicle miles travelled.
MPH = miles per hour.

Source: ECT, 1993.

Table 3. Big Bend Station TSP Emission Summary for Coal Transloading Sources

Model I.D.	Source Name	Emission Factor (lb/ton)	Control Efficiency	Annualized Emission: Coal Throughput (tpy)	Annualized Emission: Emission (tpy)
C1	Alternate clamshell transfer to conveyor D-1	0.000830	0.85	1,428,030	0.0889
C2	Transfer from barge to conveyor A-1	0.000830	0.95	1,428,030	0.0296
C3	Transfer from conveyor A-1 to conveyor B-1	0.000830	0.90	1,428,030	0.0593
C4	Transfer from conveyor B-1 to conveyor C-1	0.000830	0.90	1,428,030	0.0593
C5	Transfer from conveyor C-1 to conveyor D-1	0.000830	0.90	1,428,030	0.0593
C6	Transfer from conveyor D-1 to conveyor E-1	0.000830	0.90	1,428,030	0.0593
C7	Transfer from conveyor E-1 to conveyor Y	0.000830	0.90	1,428,030	0.0593
C8	Transfer from conveyor Y to conveyor Z	0.000830	0.90	1,428,030	0.0593
C9	Transfer from conveyor Z to stockpile	0.000830	0.85	1,428,030	0.0889
NC10	Mobile equipment operations	1.6996 lb/VMT	0.90	1,428,030	0.6979
NC11	Transfer from stock-pile to loadout conveyor	0.000830	0.85	1,428,030	0.0593
NC12	Coal loading into truck	0.000830	0.85	1,428,030	0.0889
NC13	Transfer from load-out conveyor to rail conveyor	0.000830	0.85	1,428,030	0.0889
NC14	Coal loading into railcars	0.000830	0.85	1,428,030	0.0889
TOTAL EMISSION (Truck)					**1.3204**
TOTAL EMISSION (Rail)					**1.4982**

Source: ECT, 1993.

5.0 AMBIENT IMPACTS DUE TO COAL TRANSLOADING EMISSION SOURCES

The Industrial Source Complex (ISC2) dispersion model was used to determine the ambient impacts due to the coal transloading PM_{10} emission sources at Big Bend Station:

1. The long-term version (ISCLT2) was used to determine annual averages, and
2. The short-term version (ISCST2) was used to determine 24-hour averages.

Modeling results for the area surrounding Big Bend Station are presented in Tables 4 and 5. Modeling results for the nearby Hillsborough County Air Quality Maintenance Area are presented in Tables 6 and 7. In all cases, the PM_{10} ambient impacts were less than significant for the 24-hour and annual averaging periods.

Dispersion modeling for 5 years (1982 to 1986) was conducted for both the railcar loading and the truck loading scenarios. The facility arrangements are presented in Drawings 6492-E-104 (Attachment 1). The PM_{10} emissions inventories for the two options are presented in Table 2. Separate modeling was performed because the railcar loadout scenario includes two additional emission sources as compared to the truck loading scenario. All modeling was conducted using the regulatory default option and the rural mode. One floppy disk containing the model output files is being provided to FDER.

Dispersion modeling for the annual average period was based on PM_{10} emissions from all sources transloading the new coal. The new coal is additional coal being processed through some existing and some new emission points. Because the new coal is additional (i.e., above and beyond the amount of coal being processed for Big Bend Station use), all new coal emission points must be included in the annual (long term) evaluation if a thorough significant impact analysis is to be completed. Thus, for the annual average period, all existing and new coal transloading emission points that handle the new coal were included in the modeling.

Table 4. Summary of Maximum PM_{10} Impacts in the Area Surrounding Big Bend Station Due to Coal Transloading Facilities (Railcar Loading)

Period	Year 1982	1983	1984	1985	1986	Significance Level
Annual ($\mu g/m^3$)	0.62	0.60	0.67	0.59	0.65	1.0
24-Hour highest ($\mu g/m^3$)	2.37	2.21	2.80	2.37	2.85	5.0
24-Hour highest second-highest ($\mu g/m^3$)	1.71	1.94	2.46	2.02	2.63	NA

Note: NA = not applicable.

Source: ECT, 1993.

Table 5. Summary of Maximum PM_{10} Impacts in the Area Surrounding Big Bend Station Due to Coal Transloading Facilities (Truck Loading)

Period	Year 1982	1983	1984	1985	1986	Significance Level
Annual ($\mu g/m^3$)	0.58	0.57	0.64	0.56	0.61	1.0
24-Hour highest ($\mu g/m^3$)	2.37	2.15	2.80	2.37	2.84	5.0
24-Hour highest second-highest ($\mu g/m^3$)	1.65	1.94	2.46	2.01	2.59	NA

Note: NA = not applicable.

Source: ECT, 1993.

Table 6. Summary of Maximum PM_{10} Impacts in the Hillsborough County Air Quality Maintenance Area Due to Coal Transloading Facilities (Railcar Loading)

	Year					Significance
Period	1982	1983	1984	1985	1986	Level
Annual ($\mu g/m^3$)	0.00	0.00	0.00	0.00	0.00	1.0
24-Hour highest ($\mu g/m^3$)	0.04	0.05	0.05	0.06	0.05	5.0
24-Hour highest second-highest ($\mu g/m^3$)	0.03	0.04	0.04	0.04	0.04	NA

Note: NA = not applicable.

Source: ECT, 1993.

Table 7. Summary of Maximum PM_{10} Impacts in the Hillsborough County Air Quality Maintenance Area Due to Coal Transloading Facilities (Truck Loading)

Period	Year 1982	1983	1984	1985	1986	Significance Level
Annual ($\mu g/m^3$)	0.00	0.00	0.00	0.00	0.00	1.0
24-Hour highest ($\mu g/m^3$)	0.03	0.05	0.04	0.05	0.05	5.0
24-Hour highest second-highest ($\mu g/m^3$)	0.02	0.03	0.03	0.03	0.03	NA

Note: NA = not applicable.

Source: ECT, 1993.

Dispersion modeling for the 24-hour average period was based on PM_{10} emissions for only new sources processing the new coal. While the new coal is additional coal being processed through some existing emission points, these existing points are currently permitted to handle coal at any time of the year. Maximum 24-hour coal throughput rates for these existing emission points will remain unchanged. On a short-term basis, handling the new coal through the existing emission points does not represent a change in permit conditions. Thus, emissions from existing points due to new coal handling were not included in the 24-hour average period modeling. Only emissions from new points handling new coal were included in the 24-hour average period modeling.

6.0 RESPONSE TO COAL TRANSLOADING FACILITY INFORMATION REQUEST OF OCTOBER 7, 1992

6.1 REQUEST

The Department of Environmental Regulation has initiated its review of your request for modification of the Big Bend Station's coal yard. Analysis of the air modeling revealed impacts that are well below the significant impact levels for particulate matter for both the annual and 24-hour averaging periods. However, upon reviewing the PSD analysis for Big Bend Unit 4, it was noticed that the predicted maximum annual average TSP concentration exceeded the new particulate matter annual standard for PM_{10} of 50 $\mu g/m^3$. There is some concern that the small increase in particulate matter emissions in conjunction with any contemporaneous increases may show violations of the ambient standard. There is also some concern regarding the 24-hour ambient standard. TECO should satisfy the Department that all particulate matter ambient air quality standards are met or that your sources do not significantly contribute to a violation of a standard. It is suggested that you submit a complete and detailed list of all contemporaneous particulate matter emission changes to help resolve this matter.

RESPONSE

The requested contemporaneous particulate matter (PM) emission changes inventory for respirable particulate matter (PM_{10}) and total particulate matter (TSP) is provided in Table 1. The inventories demonstrate that the contemporaneous changes do not trigger a Prevention of Significant Deterioration (PSD) review.

Dispersion modeling of the coal transloading facility demonstrates that a significant ambient impact is not expected at any location (see Tables 4 through 7). Because the coal yard modification does not cause a significant impact, additional ambient analysis is not needed.

7.0 RESPONSE TO COAL TRANSLOADING FACILITY INFORMATION REQUEST OF NOVEMBER 4, 1992

7.1 REQUEST 1

For each operation that the potential pollution emissions were calculated in Attachment 4, provide the basis (i.e., lab results, etc.) for the moisture content used (i.e., 15%). In accordance with the literature, the value of 15% is very high and would affect the potential emissions because it is in the denominator of the equation used to estimate the emissions. Since the range for coal moisture is 0.25 - 4.8 (see Table 11.2.3-3, AP-42 Emission Factors), with a mean of 2.3, then the highest acceptable value that should be used 2.3 (note: worst case would be represented by using 0.25). Therefore, please recalculate the potential pollutant emissions and edit the appropriate table.

RESPONSE

Based on available coal source information and Tampa Electric Company's extensive experience in receiving and using coal at its other existing power plant stations, the minimum moisture content of the coal is expected to be approximately 7 percent. The assumed maximum content of the coal of 15 percent is also based on available information on the characteristics of coals under consideration for the project. Therefore, the moisture content of coal to be delivered and handled at the Polk Power Station is expected to range from 7 to 15 percent.

To provide a more conservative analysis of potential PM impacts, estimates and modeling analyses of the PM emissions from coal handling sources are based on the expected 7-percent minimum moisture content of the coal.

7.2 REQUEST 2

For each operation that the potential pollution emissions were calculated in Attachment 4, provide and qualify the basis (i.e., vendor specs., test results, use of dust suppressants, etc.) for the dust collection/suppression efficiencies used (i.e., 50 - 85%). If it is determined that the projected efficiency is not justifiable, then state and qualify the new value and recalculate the potential pollutant emissions and edit the appropriate table.

RESPONSE

A control efficiency factor of 0.95 was used for the existing bucket elevator unloader with chemical spray for dust control. This factor is provided by the Electric Power Research Institute (EPRI) in *Fugitive Emissions from Coal-Fired Power Plants* (page 3-36, 1984), but was originally derived and reported by Cascino and Cowherd in *Fugitive Emissions from Integrated Iron and Steel Plants* (Midwest Research Institute [MRI], 1978; U.S. Environmental Protection Agency [EPA] 600/2-78-050).

A control efficiency factor of 0.85 was used for open transfers. This factor is also provided by EPRI in *Fugitive Emissions from Coal Fired Power Plants* (page 3-48, 1984), but was originally derived and reported by T. Tistinic of the Colorado Department of Health (1981).

A control efficiency factor of 0.90 was used for enclosed transfers. This factor is provided by EPRI in *Fugitive Emissions from Coal Fired Power Plants* (page 3-48, 1984) but was originally reported and derived by Szabo in *Environmental Assessment of Coal Transportation* (PEDCO Environmental, Inc., 1978). A control factor of 0.99 for enclosed transfers with water spray is also provided on page 3-48 of the EPRI report. However, the more conservative 0.90 factor was used in calculating emissions.

The emissions have been calculated using the cited control efficiencies. The calculations are provided in Attachments 2 and 3.

7.3 REQUEST 3

In Attachment 4, Particulate Matter Emission Calculations, the aerodynamic particle size multiplier that was used is 0.74, which represents an aerodynamic particle size of <30 μm (see Table 11.2.3-3, AP-42 Emission Factors). Because of the significant rates for particulate matter (PM) and PM_{10}, please calculate the potential pollutant emissions for both PM and PM_{10}.

RESPONSE

Emissions have been calculated for TSP and PM_{10}. The PM_{10} emission calculations are provided in Attachment 2 of the revised air quality permit application. The TSP emission calculations are provided in Attachment 3 of the revised air quality permit application.

7.4 REQUEST 4

In Attachment 4, Mobile Equipment Operations on Stockpile, the calculations for potential pollutant emissions used an aerodynamic particle size multiplier of 0.80. Referencing #3 above and the calculations in Attachment 4, please explains why this value was used and the discrepancy between the other value (i.e., 0.74) that was used for all other calculations.

RESPONSE

PM emissions from the coal transfer points within the transloading facility were calculated using the appropriated algorithm from AP-42, Section 11.2.3, Aggregate Handling and Storage. However, the appropriate algorithm to calculate PM emissions caused by mobile equipment operations on the stockpile is from AP-42, Section 11.2.1, Unpaved Roads. Both of the algorithms were empirically derived using actual field measurements. Both algorithms provide separate listings of appropriate aerodynamic particle size multipliers to be used exclusively with the specific algorithm. The 0.80 aerodynamic particle size multiplier applied to the mobile equipment operation emission calculation is the AP-42 recommended value. This value is different from the EPA-recommended 0.74 aerodynamic particle size multiplier applied to the other emission calculations.

7.5 REQUEST 5

The introduction states that the operations might be handling limestone material also. Please calculate the potential pollutant emissions expected from the handling and processing of this material; also, include all assumptions, calculations and reference material, used in the projection of the potential pollutant emissions.

RESPONSE

The transloading facility will not be handling limestone.

7.6 REQUEST 6

For the coal silo baghouse control system, it appears that the applicant is requesting a more restrictive emission limiting standard (i.e., 0.02 gr/dscf) than allowed by rule (i.e., F.A.C. Rule 17-2.650(2)(c)11.b.ii.: 0.03 (gr/dscf). Please acknowledge if this is correct. Note, the vendor will guarantee 0.01 gr/dscf.

RESPONSE

The coal silo is no longer a part of the transloading facility. Therefore, this baghouse has been eliminated and the cited emission listing standard is not applicable.

7.7 REQUEST 7

The applicant has stated that the visible emission standard for the coal silo baghouse control system should be in accordance with F.A.C. Rule 17-2.610(2)(a), which is "less than 20% opacity" (see Section III.C of the application). However, the appropriate standard is in accordance with F.A.C. Rule 17-2.650(2)(c)11.b.i, which is "no visible emissions (5% opacity)." Please acknowledge agreement with this or provide an explanation if there is a disagreement.

RESPONSE

The coal silo is no longer a part of the transloading facility. Therefore, this baghouse has been eliminated and the cited opacity limiting standard is not applicable.

ATTACHMENT 2

RESPIRABLE PARTICULATE MATTER (PM_{10}) EMISSION CALCULATIONS FOR COAL TRANSLOADING SOURCES

ECT
Environmental Consulting & Technology, Inc.

ATTACHMENT 2
RESPIRABLE PARTICULATE MATTER (PM_{10}) EMISSION CALCULATIONS FOR COAL TRANSLOADING SOURCES

TRANSFER FROM BARGE TO CONVEYOR A-1 (MODEL ID C2)

Coal will be transferred from a barge to the coal delivery transfer sub-system using a bucket conveyor. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000392 \ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \ x \ (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.95.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \ lb/t \times 4{,}000 \ t/hr \ x \ (1 - 0.95);$$
$$A_s = 0.0784 \ lb/hr; \ and$$
$$A_s = 0.0099 \ g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.95; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.95) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0140\ tpy;\ and$$
$$A_L = 0.000403\ g/\text{sec}.$$

TRANSFER FROM CONVEYOR A-1 TO CONVEYOR B-1 (MODEL ID C3)

Coal will be transferred from conveyor A-1 to conveyor B-1 within the delivery transfer sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] / (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] / (7/2)^{1.4};$$
$$E = 0.000392\ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392\ lb/t \times 4{,}000\ t/hr\ (1 - 0.90);$$
$$A_s = 0.1568\ lb/hr;\ and$$
$$A_s = 0.0198\ g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0280\ tpy;\ and$$
$$A_L = 0.000805\ g/sec.$$

TRANSFER FROM CONVEYOR B-1 TO CONVEYOR C-1 (MODEL ID C4)

Coal will be transferred from conveyor B-1 to conveyor C-1 within the delivery transfer sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}]\ /\ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \; / \; (7/2)^{1.4};$$
$$E = 0.000392 \; lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \; lb/t \times 4{,}000 \; t/hr \; (1 - 0.90);$$
$$A_s = 0.1568 \; lb/hr; \; and$$
$$A_s = 0.0198 \; g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0280\ tpy;\ and$$
$$A_L = 0.000805\ g/\text{sec}.$$

TRANSFER FROM CONVEYOR C-1 TO CONVEYOR D-1 (MODEL ID C5)

Coal will be transferred from conveyor C-1 to conveyor D-1 within the delivery transfer sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}]\ /\ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}]\ /\ (7/2)^{1.4};$$
$$E = 0.000392\ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392\ lb/t \times 4{,}000\ t/hr\ (1 - 0.90);$$
$$A_s = 0.1568\ lb/hr;\ and$$
$$A_s = 0.0198\ g/\text{sec}.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0280\ tpy;\ and$$
$$A_L = 0.000805\ g/sec.$$

ALTERNATE CLAMSHELL TRANSFER FROM BARGE TO CONVEYOR D-1 (MODEL ID C1)

As an alternative unloading system, coal may be transferred from a barge directly to conveyor D-1 within the coal delivery transfer sub-system using a clamshell bucket. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000392\ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.85.

Substituting, the short-term emissions are:

$$A_s = 0.000392\ lb/t \times 4{,}000\ t/hr \times (1 - 0.85);$$
$$A_s = 0.2352\ lb/hr;\ and$$
$$A_s = 0.0296\ g/\text{sec}.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.85) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0420\ tpy;\ and$$
$$A_L = 0.001208\ g/\text{sec}.$$

<u>TRANSFER FROM CONVEYOR D-1 TO CONVEYOR E-1 (MODEL ID C6)</u>

Coal will be transferred from conveyor D-1 to conveyor E-1 in existing transfer house 1. This transfer, which will be enclosed, is the transition point between the delivery transfer sub-system and the handling and stockpiling sub-system. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \;/\; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \;/\; (7/2)^{1.4};$$
$$E = 0.000392 \; lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \; lb/t \times 4{,}000 \; t/hr \; (1 - 0.90);$$
$$A_s = 0.1568 \; lb/hr; \; and$$
$$A_s = 0.0198 \; g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0280\ tpy;\ and$$
$$A_L = 0.000805\ g/\text{sec.}$$

TRANSFER FROM CONVEYOR E-1 TO CONVEYOR Y (MODEL ID C7)

Coal will be transferred from conveyor E-1 to conveyor Y in existing transfer house 2. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}]\ /\ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}]\ /\ (7/2)^{1.4};$$
$$E = 0.000392\ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392\ lb/t \times 4{,}000\ t/hr\ (1 - 0.90);$$
$$A_s = 0.1568\ lb/hr;\ and$$
$$A_s = 0.0198\ g/\text{sec.}$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0280\ tpy;\ and$$
$$A_L = 0.000805\ g/sec.$$

<u>**TRANSFER FROM CONVEYOR Y TO CONVEYOR Z (MODEL ID C8)**</u>

Coal will be transferred from conveyor Y to conveyor Z within the coal handling and stockpiling sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] / (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] / (7/2)^{1.4};$$
$$E = 0.000392\ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392\ lb/t \times 4{,}000\ t/hr\ (1 - 0.90);$$
$$A_s = 0.1568\ lb/hr;\ and$$
$$A_s = 0.0198\ g/\text{sec}.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0280\ tpy;\ and$$
$$A_L = 0.000805\ g/\text{sec}.$$

TRANSFER FROM CONVEYOR Z TO STOCKPILE (MODEL ID C9)

Coal will be transferred from conveyor Z to the loadout stockpile within the coal handling and stockpiling sub-system. This stockpile was formerly named the emergency stackout pile. This transfer will be in the open. A prior application of dust suppressant system will provide fugitive dust control. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000392 \ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 4,000 t/hr; and
c_1 = dust control efficiency factor = 0.85.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \ lb/t \times 4{,}000 \ t/hr \ (1 - 0.85);$$
$$A_s = 0.2352 \ lb/hr; \ and$$
$$A_s = 0.0296 \ g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

A_L = 0.000392 *lb/t* × 1,428,030 *tpy* × (1 - 0.85) × 1 *t*/2,000 *lb*;
A_L = 0.0420 *tpy; and*
A_L = 0.001208 *g*/sec.

MOBILE EQUIPMENT OPERATIONS ON STOCKPILE (MODEL ID NC10)

As necessary, mobile equipment will move coal into the loadout hopper and will occasionally redistribute coal within the stockpile. The emission factor for mobile equipment operations, from AP-42, Section 11.2.1, Unpaved Roads (EPA, 1991), is:

$$E = 5.9 \times k \times (s/12) \times (S/30) \times (W/3)^{0.7} \times (w/4)^{0.5} \times [(365 - P)/365]$$

where: E = emission factor [pound per vehicle mile travelled (lb/VMT)];
k = particulate size coefficient (dimensionless) = 0.36;
s = material silt content (%) = 8.6%;
S = average vehicle speed (mph) = 2.5 mph;
W = vehicle weight (t) = 48 t;
w = number of vehicle wheels (dimensionless) = 6 (assumes a rubber tire dozer); and
P = annual number of days with rain (dimensionless) = 107 (NWS meteorological data for Tampa).

Substituting, the emission factor is:

$$E = 5.9 \times 0.36 \times (8.6/12) \times (2.5/30) \times (48/3)^{0.7} \times (6/4)^{0.5} \times [(365 - 107)/365];$$
$$E = 0.7648\ lb/VMT.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times S$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.7648 lb/VMT; and
S = average vehicle speed (mph) = 2.5 mph.

Substituting, the short-term emissions are (with 90 percent control by dust suppression):

$$A_s = 0.7648\ lb/VMT \times 2.5\ mph \times 0.1;$$
$$A_s = 0.1912\ lb/hr;\ and$$
$$A_s = 0.0241\ g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times S \times H_1 \times D_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.7648 lb/VMT;
S = average vehicle speed (mph) = 2.5 mph;
H_1 = daily operating time (hr/day) = 9 hr/day;
D_1 = annual operating days (day/yr) = 365 day/yr;
c_2 = conversion constant = 1 t/2,000 lb;

Substituting, the annual emissions are:

$$A_L = 0.1 \times 0.7648\ lb/VMT \times 2.5\ mph \times 9\ hr/day \times 365\ day/yr \times 1\ t/2{,}000\ lb];$$
$$A_L = 0.3140\ tpy;\ and$$
$$A_L = 0.009034\ g/sec.$$

TRANSFER FROM STOCKPILE TO LOADOUT CONVEYOR (MODEL ID NC11)

Coal will be transferred from loadout stockpile to the loadout conveyor using gravity and mobile equipment to place the coal into a hopper. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}]\ /\ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \; / \; (7/2)^{1.4};$$
$$E = 0.000392 \; lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 225 t/hr; and
c_1 = dust control efficiency factor = 0.90.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \; lb/t \times 225 \; t/hr \; (1 - 0.90);$$
$$A_s = 0.0088 \; lb/hr; \; and$$
$$A_s = 0.0011 \; g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392 \; lb/t \times 1{,}428{,}030 \; tpy \times (1 - 0.90) \times 1 \; t/2{,}000 \; lb;$$
$$A_L = 0.0280 \; tpy; \; and$$
$$A_L = 0.000805 \; g/sec.$$

TRUCK LOADING (MODEL ID NC12)

Coal will be transferred from the loadout conveyor to coal hauling trucks through a receiving and distribution bin. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000392 \ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \ x \ (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 225 t/hr; and
c_1 = dust control efficiency factor = 0.85.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \ lb/t \times 225 \ t/hr \ x \ (1 - 0.85);$$
$$A_s = 0.0132 \ lb/hr; \ and$$
$$A_s = 0.001667 \ g/\text{sec}.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.85) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0420\ tpy;\ and$$
$$A_L = 0.001208\ g/\text{sec}.$$

<u>TRANSFER FROM LOADOUT CONVEYOR TO RAIL TRANSFER CONVEYOR (MODEL ID NC13)</u>

Coal will be transferred from the loadout conveyor to the rail transfer conveyor within the loadout system. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000392\ lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \times (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 225 t/hr; and
c_1 = dust control efficiency factor = 0.85.

Substituting, the short-term emissions are:

$$A_s = 0.000392\ lb/t \times 225\ t/hr \times (1 - 0.85);$$
$$A_s = 0.0132\ lb/hr;\ and$$
$$A_s = 0.001667\ g/sec.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.85) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0420\ tpy;\ and$$
$$A_L = 0.001208\ g/sec.$$

RAIL CAR LOADING (MODEL ID NC14)

Coal will be transferred from the rail transfer conveyor to rail cars through a receiving and distribution bin. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \;/\; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.35;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.35 \times (8.6/5)^{1.3}] \;/\; (7/2)^{1.4};$$
$$E = 0.000392 \; lb/t.$$

The short-term emissions are calculated using the equation:

$$A_s = E \times H \; x \; (1 - c_1)$$

where: A_S = short-term emissions (lb/hr);
E = emission factor = 0.000392 lb/t;
H = hourly coal transfer = 225 t/hr; and
c_1 = dust control efficiency factor = 0.85.

Substituting, the short-term emissions are:

$$A_s = 0.000392 \; lb/t \times 225 \; t/hr \; x \; (1 - 0.85);$$
$$A_s = 0.0132 \; lb/hr; \; and$$
$$A_s = 0.001667 \; g/\text{sec}.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000392 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000392\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.85) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0420\ tpy; \text{ and}$$
$$A_L = 0.001208\ g/sec.$$

ATTACHMENT 3

TOTAL SUSPENDED PARTICULATE MATTER (TSP) EMISSION CALCULATIONS FOR COAL TRANSLOADING SOURCES

ECT
Environmental Consulting & Technology, Inc.

ATTACHMENT 3
TOTAL SUSPENDED PARTICULATE MATTER (TSP) EMISSION CALCULATIONS FOR COAL TRANSLOADING SOURCES

TRANSFER FROM BARGE TO CONVEYOR A-1 (MODEL ID C2)

Coal will be transferred from a barge to the coal delivery transfer sub-system using a bucket conveyor. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \;/\; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \;/\; (7/2)^{1.4};$$
$$E = 0.000830 \; lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.95; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \; lb/t \times 1{,}428{,}030 \; tpy \times (1 - 0.95) \times 1 \; t/2{,}000 \; lb;$$
$$A_L = 0.0296 \; tpy.$$

TRANSFER FROM CONVEYOR A-1 TO CONVEYOR B-1 (MODEL ID C3)

Coal will be transferred from conveyor A-1 to conveyor B-1 within the delivery transfer sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000830 \ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \ lb/t \times 1{,}428{,}030 \ tpy \times (1 - 0.90) \times 1 \ t/2{,}000 \ lb;$$
$$A_L = 0.0593 \ tpy.$$

TRANSFER FROM CONVEYOR B-1 TO CONVEYOR C-1 (MODEL ID C4)

Coal will be transferred from conveyor B-1 to conveyor C-1 within the delivery transfer sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000830 \ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \ lb/t \times 1{,}428{,}030 \ tpy \times (1 - 0.90) \times 1 \ t/2{,}000 \ lb;$$
$$A_L = 0.0593 \ tpy.$$

TRANSFER FROM CONVEYOR C-1 TO CONVEYOR D-1 (MODEL ID C5)

Coal will be transferred from conveyor C-1 to conveyor D-1 within the delivery transfer sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \; / \; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \; / \; (7/2)^{1.4};$$
$$E = 0.000830 \; lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \; lb/t \times 1{,}428{,}030 \; tpy \times (1 - 0.90) \times 1 \; t/2{,}000 \; lb;$$
$$A_L = 0.0593 \; tpy.$$

ALTERNATE CLAMSHELL TRANSFER FROM BARGE TO CONVEYOR D-1 (MODEL ID C1)

As an alternative unloading system, coal may be transferred from a barge directly to conveyor D-1 within the coal delivery transfer sub-system using a clamshell bucket. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \; / \; (M/2)^{1.4}$$

where: E = emission factor (lb/t);

k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \; / \; (7/2)^{1.4};$$
$$E = 0.000830 \; lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \; lb/t \times 1{,}428{,}030 \; tpy \times (1 - 0.85) \times 1 \; t/2{,}000 \; lb;$$
$$A_L = 0.0889 \; tpy.$$

TRANSFER FROM CONVEYOR D-1 TO CONVEYOR E-1 (MODEL ID C6)

Coal will be transferred from conveyor D-1 to conveyor E-1 in existing transfer house 1. This transfer, which will be enclosed, is the transition point between the delivery transfer sub-system and the handling and stockpiling sub-system. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \; / \; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000830 \ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \ lb/t \times 1{,}428{,}030 \ tpy \times (1 - 0.90) \times 1 \ t/2{,}000 \ lb;$$
$$A_L = 0.0593 \ tpy.$$

<u>TRANSFER FROM CONVEYOR E-1 TO CONVEYOR Y (MODEL ID C7)</u>

Coal will be transferred from conveyor E-1 to conveyor Y in existing transfer house 2. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000830 \ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0593\ tpy.$$

TRANSFER FROM CONVEYOR Y TO CONVEYOR Z (MODEL ID C8)

Coal will be transferred from conveyor Y to conveyor Z within the coal handling and stockpiling sub-system. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \;/\; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \;/\; (7/2)^{1.4};$$
$$E = 0.000830\ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0593\ tpy.$$

TRANSFER FROM CONVEYOR Z TO STOCKPILE (MODEL ID C9)

Coal will be transferred from conveyor Z to the loadout stockpile within the coal handling and stockpiling sub-system. This stockpile was formerly named the emergency stackout pile. This transfer will be in the open. A prior application of dust suppressant system will provide fugitive dust control. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}]\ /\ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}]\ /\ (7/2)^{1.4};$$
$$E = 0.000830\ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.85; and

c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.85) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0889\ tpy.$$

MOBILE EQUIPMENT OPERATIONS ON STOCKPILE (MODEL ID NC10)

As necessary, mobile equipment will move coal into the loadout hopper and will occasionally redistribute coal within the stockpile. The emission factor for mobile equipment operations, from AP-42, Section 11.2.1, Unpaved Roads (EPA, 1991), is:

$$E = 5.9 \times k \times (s/12) \times (S/30) \times (W/3)^{0.7} \times (w/4)^{0.5} \times [(365 - P)/365]$$

where: E = emission factor [pound per vehicle mile travelled (lb/VMT)];
k = particulate size coefficient (dimensionless) = 0.80;
s = material silt content (%) = 8.6%;
S = average vehicle speed (mph) = 2.5 mph;
W = vehicle weight (t) = 48 t;
w = number of vehicle wheels (dimensionless) = 6 (assumes a rubber tire dozer); and
P = annual number of days with rain (dimensionless) = 107 (NWS meteorological data for Tampa).

Substituting, the emission factor is:

$$E = 5.9 \times 0.80 \times (8.6/12) \times (2.5/30) \times (48/3)^{0.7} \times (6/4)^{0.5} \times [(365 - 107)/365];$$
$$E = 1.6996\ lb/VMT.$$

The annual emissions are calculated using the equation:

$$A_L = E \times S \times H_1 \times D_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 1.6996 lb/VMT;
S = average vehicle speed (mph) = 2.5 mph;
H_1 = daily operating time (hr/day) = 9 hr/day;
D_1 = annual operating days (day/yr) = 365 day/yr;

c_2 = conversion constant = 1 t/2,000 lb;

Substituting, the annual emissions are:

$$A_L = 0.1 \times 1.6996\ lb/VMT \times 2.5\ mph \times 9\ hr/day \times 365\ day/yr \times 1\ t/2{,}000\ lb];$$
$$A_L = 0.6979\ tpy.$$

TRANSFER FROM STOCKPILE TO LOADOUT CONVEYOR (MODEL ID NC11)

Coal will be transferred from loadout stockpile to the loadout conveyor using gravity and mobile equipment to place the coal into a hopper. This transfer will be enclosed. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}]\ /\ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}]\ /\ (7/2)^{1.4};$$
$$E = 0.000830\ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times (1 - c_1) \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency factor = 0.90; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.90) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0593\ tpy.$$

TRUCK LOADING (MODEL ID NC12)

Coal will be transferred from the loadout conveyor to the coal handling trucks through a receiving and distribution bin. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \ / \ (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \ / \ (7/2)^{1.4};$$
$$E = 0.000830\ lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830\ lb/t \times 1{,}428{,}030\ tpy \times (1 - 0.85) \times 1\ t/2{,}000\ lb;$$
$$A_L = 0.0889\ tpy.$$

TRANSFER FROM LOADOUT CONVEYOR TO RAIL TRANSFER CONVEYOR (MODEL ID NC13)

Coal will be transferred from the loadout conveyor to the rail transfer conveyor within the loadout sub-system. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \; / \; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \; / \; (7/2)^{1.4};$$
$$E = 0.000830 \; lb/t.$$

The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \; lb/t \times 1{,}428{,}030 \; tpy \times (1 - 0.85) \times 1 \; t/2{,}000 \; lb;$$
$$A_L = 0.0889 \; tpy.$$

RAIL CAR LOADING (MODEL ID NC14)

Coal will be transferred from the rail transfer conveyor to rail cars through a receiving and distribution bin. This transfer will be in the open. The emission factor for this operation, from AP-42, Section 11.2.3, Aggregate Handling and Storage (EPA, 1991), is:

$$E = [0.0032 \times k \times (u/5)^{1.3}] \;/\; (M/2)^{1.4}$$

where: E = emission factor (lb/t);
k = particulate size coefficient (dimensionless) = 0.74;
u = annual average windspeed (mph) = 8.6 mph (NWS meteorological data for Tampa); and
M = moisture content of the coal (%) = 7%.

Substituting, the emission factor is:

$$E = [0.0032 \times 0.74 \times (8.6/5)^{1.3}] \;/\; (7/2)^{1.4};$$
$$E = 0.000830 \; lb/t.$$

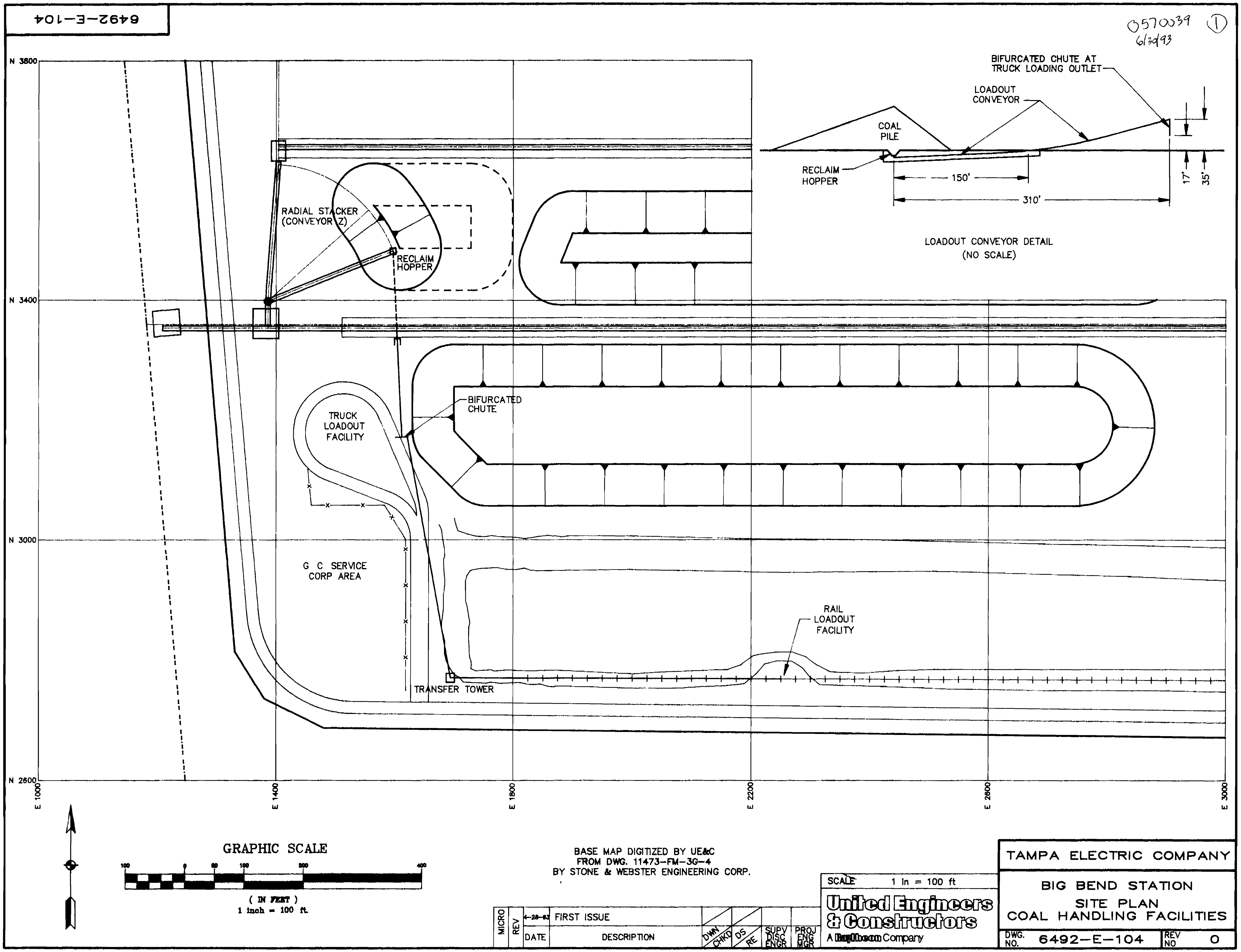
The annual emissions are calculated using the equation:

$$A_L = E \times T \times c_1 \times c_2$$

where: A_L = annual emissions (tpy);
E = emission factor = 0.000830 lb/t;
T = annual coal usage = 1,428,030 tpy;
c_1 = dust control efficiency = 0.85; and
c_2 = conversion constant = 1 t/2,000 lb.

Substituting, the annual emissions are:

$$A_L = 0.000830 \; lb/t \times 1{,}428{,}030 \; tpy \times (1 - 0.85) \times 1 \; t/2{,}000 \; lb;$$
$$A_L = 0.0889 \; tpy.$$



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