BIG BEND STATION UNITS 1 AND 2 FLUE GAS DESULFURIZATION SYSTEM AIR CONSTRUCTION PERMIT APPLICATION

Prepared for:



Prepared by:



Environmental Consulting & Technology, Inc.

3701 Northwest 98th Street Gainesville, Florida 32606

ECT No. 98102-0200

June 1998 3

Revision 2, 10/31/98

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Signatures

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:

Name: Gregory M. Nelson, P.E.

Title: Manager - Environmental Planning

2. Owner/Authorized Representative or Responsible Official Mailing Address:

Organization/Firm:

Tampa Electric Company

Street Address:

6944 U.S. Highway 41 North

City:

Apollo Beach

State: FL

Zip Code: 33572-9200

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:

Telephone: (813) 641 - 5016

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.

Glegory M. When

11/10/98/

* Attach letter of authorization if not currently on file.

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.

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3.7	Signature	Date	-,	
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DEP Form No. 62-210.900(1) – Form

Effective: 3-21-96

DOCUMENT II.E.6

SUPPLEMENTAL INFORMATION FOR AIR CONSTRUCTION PERMIT APPLICATION

DOCUMENT II.E.6.2 DISPERSION MODELING DESCRIPTION

BIG BEND STATION UNITS 1 AND 2 FLUE GAS DESULFURIZATION SYSTEM AIR DISPERSION MODELING

Prepared for:



Prepared by:



Environmental Consulting & Technology, Inc.

3701 Northwest 98th Street Gainesville, Florida 32606

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TABLE OF CONTENTS

Section	<u>Page</u>
DISPERSION MODELING TECHNIQUES, INPUTS, AND RESULTS	1
MODEL SELECTION	1
POLLUTANT EMISSION RATES	2
STACK PARAMETERS	9
GOOD ENGINEERING PRACTICE/DOWNWASH	
<u>CONSIDERATIONS</u>	9
RECEPTOR LOCATIONS	16
METEOROLOGICAL DATA	22
DISPERSION MODELING RESULTS	24

APPENDIX A—DISPERSION MODEL OUTPUT FLOPPY DISKS

LIST OF TABLES

<u>Table</u>		Page
1	Big Bend Station - Combustion Units - Emission Rates for Dispersion Modeling - Scenario 1 - Units 1, 2, and 4 Scrubbed; Unit 3 Not Scrubbed	3
2	Big Bend Station - Combustion Units - Emission Rates for Dispersion Modeling - Scenario 2 - Units 1 and 4 Scrubbed; Units 2 and 3 Not Scrubbed	4
3	Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling - Scenario 3 - Units 1 through 4 Scrubbed	5
4	Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling - Scenario 4 - Units 1, 3, and 4 Scrubbed; Unit 2 Not Scrubbed	6
5	Big Bend Station - Noncombustion Emission Sources - PM ₁₀ Emission Rates for Dispersion Modeling	7
6	Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling - Scenario 1 - Units 1, 2, and 4 Scrubbed; Unit 3 Not Scrubbed	10
7	Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling - Scenario 2 - Units 1 and 4 Scrubbed; Units 2 and 3 Not Scrubbed	11
8	Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling - Scenario 3 - Units 1 through 4 Scrubbed	12
9	Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling - Scenario 4- Units 1, 3, and 4 Scrubbed; Unit 2 Not Scrubbed	13
10	Big Bend Station - Noncombustion Emission Sources - Emission Parameters for Dispersion Modeling	14
11	Big Bend Station - Stack and Structure Heights and Locations	17
12	Big Bend Station - Noncombustion Emission Source Locations	20

LIST OF TABLES (Continued, Page 2 of 2)

<u>Table</u>		Page
13	Big Bend Station - Modeled Ambient SO ₂ Impacts	25
14	Big Bend Station - Modeled Ambient NO _x Impacts	27
15	Big Bend Station - Modeled Ambient PM ₁₀ Impacts	28
16	Big Bend Station - Modeled Ambient CO Impacts	29

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	Big Bend Station Structure Locations for Downwash Analysis	19
2	Big Bend Station Nearby Ambient Receptor Locations for Dispersion Modeling	23

DISPERSION MODELING TECHNIQUES, INPUTS, AND RESULTS

MODEL SELECTION

The most recent regulatory version of the Industrial Source Complex Short-Term (ISCST3 Version 97363) dispersion model was used in the analyses of ambient sulfur dioxide (SO₂), nitrogen oxides (NO_x), respirable particulate matter (PM₁₀), and carbon monoxide (CO) impacts caused by emissions from Big Bend Station. ISCST3 is a refined model appropriate for use under the following conditions:

- Industrial source complexes (i.e., multiple emission sources).
- Rural or urban areas.
- Flat or rolling terrain.
- Pollutant transport distances less than 50 kilometers (km).
- Multiple averaging periods (i.e., 3-hour, 24-hour, and annual).

ISCST3 was selected because:

- The Big Bend Station analysis falls within the ISCST3 applicability criteria.
- Per Chapter 40, Code of Federal Regulation (CFR), Part 51, Appendix W, the U.S. Environmental Protection Agency (EPA) has designated ISCST3 a preferred model. This designation means that EPA has determined that ISCST3 performs better under the criteria stated above than any other dispersion model.
- The Florida Department of Environmental Protection (FDEP) is also using ISCST3 to model ambient SO₂ levels from Big Bend Station for Title V permitting purposes.

Previous dispersion modeling of Big Bend Station has been conducted using other models. For example, SO₂ emissions from Big Bend Station were modeled in 1991 to demonstrate compliance for the Unit Nos. 3 and 4 flue gas desulfurization (FGD) integration using an earlier version of ISCST. Several versions of the SCREEN model have also been applied to Big Bend Station emissions. However, these older models were not used

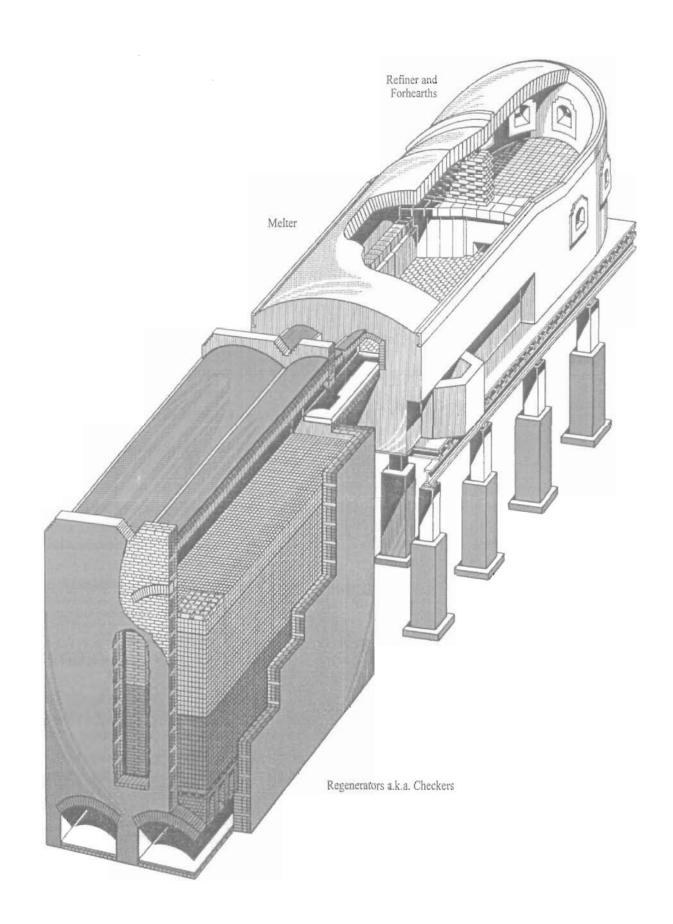
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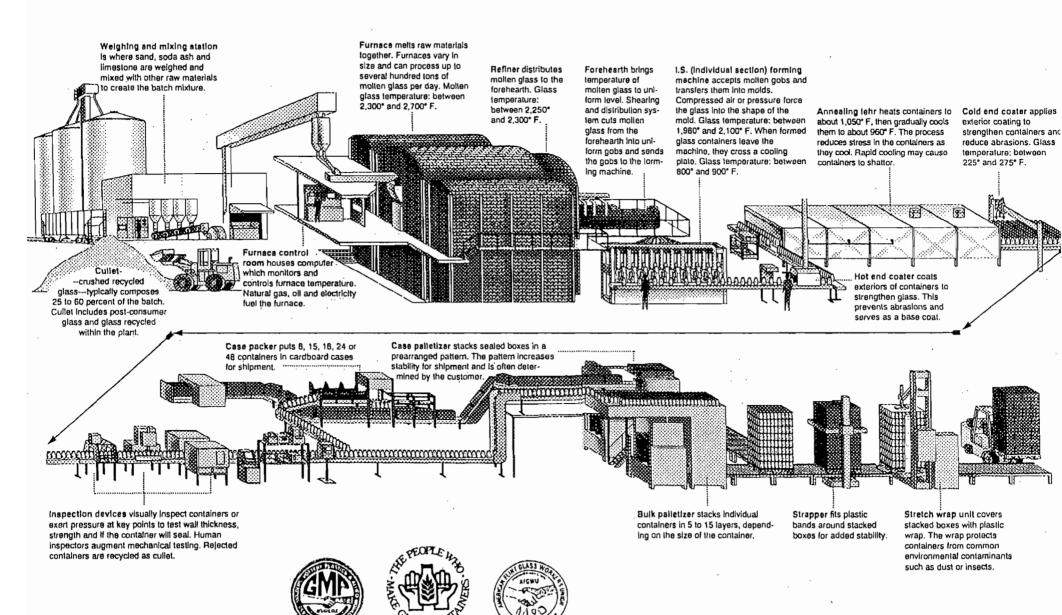
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					FU	EL	PERMITTED EMISSION LIMIT (lb/ton glass)			MIT (lb/ton glas	COMMENTS		
COMPANY	STATE	DATE	TYPE FURNACE	CAPACITY	TYPE	RATE (mmBTU/hr)		SO2	PM10	voc	со	H2SO4	
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Cardinal	OK	3/18/2003	Flat Glass; Regen	650	Gas	200	1.0, 9.0,7.	2.00	1.50	0.10	10.00	0.058	3R Process for NOx Control, No Add-on Control
Cardinal	WI	10/23/1999	Flat Glass; Regen	650	Gas	160	14.77	0.65	0.94	NL	1.89	0.055	Low-NOx Burner; ESP; Dry Scrubber
Cardinal	NC	10/29/1998	Flat Glass; Regen	. 600	Gas	180	11.0,9.0,7.0	2.00	1.00	NL	BelowPSD	NL	3R Process for NOx (30-day avg), Salt Cake limit for SO2
Owens	IN	3/10/1998	Flat Glass; Regen	533			NL NL	2.00	1.00	NL			Formulization for SO2, No Add-on Control
Gardian	NY		Flat Glass; Regen	700	Gas	155	6.5	2.07	1.00	NL	0.75	0.170	3R for NOx, Formulization for SO2 & PM, ESPSD for CO
PPG	CA	2/15/1996	Flat Glass;Regen	525	Gas		11		0.88				ESP for PM
Owens	ĞA	11/15/1994	Container; Regen	229	Gas/Oil		5.5						RACT for NOx

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Inside a Typical Glass Container Plant



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                       24
                           ALL
                                      93031424
                                                      (277.13321)
                                                                  0.000
   EVENTLOC TH240012 XR=
                            366414.28100 YR= 3078917.75000
                                                                             0.000
                                                                   Hi 9/
   EVENTPER TH240013
                       24
                           ALL
                                       93031424
                                                       275.38150
   EVENTLOC TH240013 XR=
                            366605.78100 YR=
                                               3079078.50000
                                                                             0.000
                                                                  0.00/0
   EVENTPER TH240014
                       24
                               93031924
                                                       299.79819
   EVENTLOC TH240014 XR=
                            361218.00000 YR=
                                               3074461.00000
                                                                             0.000
```

ent impact analysis because EPA and FDEP do not recognize superseded models as valid analytical tools.

POLLUTANT EMISSION RATES

The pollutant emission rates for the Big Bend Station combustion units used in the modeling analysis for Big Bend Station are presented in Tables 1 through 4. Three potential FGD operating scenarios were modeled, as follows:

- Scenario 1—Unit Nos. 1, 2, and 4 scrubbed; Unit No. 3 not scrubbed.
- Scenario 2—Unit Nos. 1 and 4 scrubbed; Unit Nos. 2 and 3 not scrubbed.
- Scenario 3—Unit Nos. 1 through 4 scrubbed.
- Scenario 4—Unit No. 2 not scrubbed; Unit Nos. 1, 3, and 4 scrubbed.

The noncombustion emission sources PM₁₀ emission rates are presented in Table 5.

A scenario of Unit Nos. 2 and 4 scrubbed and Unit Nos. 1 and 3 not scrubbed was not modeled because this scenario is virtually identical to Scenario 2. A scenario of Unit No. 1 unscrubbed and Unit Nos. 2, 3, and 4 scrubbed was not modeled for the same reason. The existing base case of Unit Nos. 1 and 2 not scrubbed, Unit No. 3 scrubbed or not scrubbed, and Unit No. 4 scrubbed was not modeled because recently completed SO₂ modeling for Title V permit application purposes indicated the base case does not cause an exceedance of the national or Florida ambient air quality standards (AAQS). Because the modeling analysis must evaluate the potential worst-case conditions, all emission rates are based on the maximum permitted rate for the appropriate time period, as noted in the tables.

The SO₂ dispersion modeling to determine the highest second-highest 24-hour modeled concentration also included emission sources not located at Big Bend Station. This offsite emissions inventory has was provided by FDEP to ensure reasonable assurance of compliance.

Table 1. Big Bend Station - Combustion Units - Emission Rates for Dispersion Modeling Scenario 1 - Units 1, 2, and 4 Scrubbed; Unit 3 Not Scrubbed

Emissions Unit	Emission Rate								
	SO ₂		NO) _x	PM	10	CC	0	
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	
								-	
Unit 1	0.82	417.1	1.545	785.9	0.1	50.9	0.023	11.7	
Unit 2	0.82	412.9,	1.545	777.9	0.1	50.3	0.023	11.6	
Unit 3	3.6	1,866.6	0.70	362.9	0.1	51.8	0.023	11.9	
Unit 4	0.82	447.4	0.60	327.3	0.03	16.4	0.029	15.8	
CT 1	0.51	11.1	0.698	15.2	0.038	0.8	0.048	1.0	
CT 2	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7	
CT 3	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7	

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All emission rates based on maximum permitted operation.

Units 1 and 2 SO₂ emission rates based on design information.

Units 1 and 2 PM₁₀ emission rates based on draft Title V operation permit conditions.

Units 1 and 2 NO_x and CO emission rates based on AP-42 emission factors.

Unit 3 SO₂ emission rate based on reducing draft Title V operation permit condition from 6.5 to 3.6 lb/MMBtu.

Unit 3 NO_x and PM₁₀ emission rates based on draft Title V operation permit conditions.

Unit 3 CO emission rate based on AP-42 emission factor.

Unit 4 SO₂, NO_x, PM₁₀, and CO emission rates based on draft Title V operation permit conditions.

Table 2. Big Bend Station - Combustion Units - Emission Rates for Dispersion Modeling Scenario 2 - Units 1 and 4 Scrubbed; Units 2 and 3 Not Scrubbed

Emissions Unit	Emission Rate								
	SC)2	NO _x		PM ₁₀		CO		
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(lb/MMBtu) (g/sec) (l		(g/sec)	(lb/MMBtu)	(g/sec)	
Unit 1	0.82	417.1	1.545	785.9	0.1	50.9	0.023	<u>1</u> 1.7	
Unit 2	2.4	1,208.4	1.545	777.9	0.1	50.3	0.023	11.6	
Unit 3	2.4	1,244.4	0.70	362.9	0.1	51.8	0.023	11.9	
Unit 4	0.82	447.4	0.60	327.3	0.03	16.4	0.029	15.8	
CT 1	0.51	11.1	0.698	15.2	0.038	0.8	0.048	1.0	
CT 2	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7	
CT 3	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7	

All emission rates based on maximum permitted operation.

Unit 1 SO₂ emission rate based on design information.

Unit 2 SO₂ emission rate based on reducing draft Title V operation permit condition from 6.5 to 2.4 lb/MMBtu.

Units 1 and 2 PM₁₀ emission rates based on draft Title V operation permit conditions.

Units 1 and 2 NO_x and CO emission rates based on AP-42 emission factors.

Unit 3 SO₂ emission rate based on reducing draft Title V operation permit condition from 6.5 to 2.4 lb/MMBtu.

Unit 3 NO_x and PM₁₀ emission rates based on draft Title V operation permit conditions.

Unit 3 CO emission rate based on AP-42 emission factor.

Unit 4 SO₂, NO_x, PM₁₀, and CO emission rates based on draft Title V operation permit conditions.

Table 3. Big Bend Station - Combustion Units - Emission Rates for Dispersion Modeling Scenario 3 - Units 1 Through 4 Scrubbed

Emissions Unit	Emission Rate									
	SO	2	NO _x		PM ₁₀		СО			
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)		
Unit 1	0.82	417.1	1.545	785.9	0.1	50.9	0.023	11.7		
Unit 2	0.82	412.9	1.545	777.9	0.1	50.3	0.023	11.6		
Unit 3	0.82	425.2	0.60	311.1	0.1	51.8	0.023	11.9		
Unit 4	0.82	447.4	0.60	327.3	0.03	16.4	0.029	15.8		
CT 1	0.51	11.1	0.698	15.2	0.038	0.8	0.048	1.0		
CT 2	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7		
CT 3	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7		

All emission rates based on maximum permitted operation.

Units 1 and 2 SO₂ emission rates based on design information.

Units 1 and 2 PM₁₀ emission rates based on draft Title V operation permit conditions.

Units 1 and 2 NO_x and CO emission rates based on AP-42 emission factors.

Unit 3 SO₂, NO_x, and PM₁₀ emission rates based on draft Title V operation permit conditions.

Unit 3 CO emission rate based on AP-42 emission factor.

Unit 4 SO₂, NO_x, PM₁₀, and CO emission rates based on draft Title V operation permit conditions.

Table 4. Big Bend Station - Combustion Units - Emission Rates for Dispersion Modeling Scenario 4 - Units 1, 3, and 4 Scrubbed; Unit 2 Not Scrubbed

Emissions	missions Emission Rate							
	SO ₂		N.	NO _x PM		110	СО	
	(lb/MMBtu	(g/sec)	(lb/MMBtu	(g/sec)	(lb/MMBtu	(g/sec)	(lb/MMBtu	(g/sec)
Unit 1	0.82	417.1	1.545	785.9	0.1	50.9	0.023	11.7
Unit 2	2.9	1460.1	1.545	777.9	0.1	50.3	0.023	11.6
Unit 3	0.82	425.2	0.60	311.1	0.1	51.8	0.023	11.9
Unit 4	0.82	447.4	0.60	327.3	0.03	16.4	0.029	15.8
CT 1	0.51	11.1	0.698	15.2	0.038	0.8	0.048	1.0
CT 2	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7
CT 3	0.51	61.0	0.698	83.6	0.038	4.5	0.048	5.7

All emission rates based on maximum permitted operation.

Unit 1 SO₂ emission rate based on design information.

Unit 2 SO₂ emission rate based on reducing draft Title V operation permit condition from 6.5 to 2.9 lb/MMBtu.

Units 1 and 2 PM₁₀ emission rates based on draft Title V operation permit conditions.

Units 1 and 2 NO_x and CO emission rates based on AP-42 emission factors.

Unit 3 SO₂, NO_x, and PM₁₀ emission rates based on draft Title V operation permit conditions.

Unit 3 CO emission rate based on AP-42 emission factor.

Unit 4 SO₂, NO_x, PM₁₀, and CO emission rates based on draft Title V operation permit conditions.

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Table 5. Big Bend Station - Noncombustion Emission Sources PM_{10} Emission Rates for Dispersion Modeling

Process Area	Emission Source	Emission Source	PM ₁₀ Em	ission Rate
		ID	(lb/hr)	(g/sec)
Fuelyard	Paras Clamphall to Company D1	EH 001	0.17	0 00
ruciyalu	Barge Clamshell to Conveyor D1 Barge Bucket Elevator to Conveyor A1	FH-001 FH-002	0.17	0.02
	Conveyor A1 to Conveyor B1	FH-002	0.17	0.02
	Conveyor B1 to Conveyor D1	FH-003	0.17	0.02
	Self-Unloading Barge to Conveyor D1	FH-005	0.17	0.02
٠	Conveyor D1 to Conveyor E1	FH-005	0.17	0.02
	Conveyor E1 to Conveyor Y or F1	FH-007	0.17	0.02
	Conveyor Y to Conveyor Z	FH-008a	0.17	0.02
	Conveyor Z to West Emergency Storage Pile	FH-008b	0.51	0.02
	West Emergency Storage Pile Maintenance	FH-009	0.95	0.11
	West Emergency Storage Pile Storage	FH-010	1.10	0.11
	West Emergency Storage Pile Reclaim	FH-011a	0.26	0.03
	Portable Conveyor to Conveyor F1	FH-011b	0.17	0.02
	Conveyor Z to Conveyor P	FH-012	0.17	0.02
	Conveyor P to Intermediate Conveyor	FH-013	0.17	0.02
	Intermediate Conveyor to North Stacker	FH-014	0.17	0.02
	North Stacker to North/Center Storage Piles	FH-015	0.51	0.06
	Bucket Elevator Reclaim to North Stacker	FH-016	0.26	0.03
	North Stacker to Conveyor P	FH-017	0.17	0.02
	North Storage Pile Maintenance	FH-018	0.95	0.02
	North Storage Pile Storage	FH-019	27.05	3.15
	Center Storage Pile Maintenance	FH-020	0.95	0.11
	Center Storage Pile Storage	FH-021	21.30	2.48
	Conveyor F1 to South Stacker	FH-022	0.17	0.02
	South Stacker to South/Center Storage Piles	FH-023	0.51	0.06
	South Reclaimer to South Reclaimer Conveyor	FH-024	0.26	0.03
	South Reclaimer Conveyor to Conveyor F1	FH-025	0.17	0.02
	South Storage Pile Maintenance	FH-026	0.95	0.11
	South Storage Pile Storage	FH-027	22.20	2.58
	Conveyor P to Conveyor J2	FH-028	0.17	0.02
	Conveyor J2 to Conveyor Q2	FH-029	0.17	0.02
	Conveyor F1 to Conveyor J1	FH-030	0.17	0.02
	Conveyor J1 to Conveyor Q1	FH-031	0.17	0.02
	Conveyors Q1 and Q2 to Blending Bins	FH-032 - FH-035	0.20	0.02
	Blending Bins to Conveyors T1 and T2	FH-036 - FH-047	0.34	0.04
	Conveyor T1 to Crusher 1	FH-048	0.10	0.04
	Conveyor T2 to Crusher 2	FH-049	0.10	0.01
	Crusher to Conveyor W1	FH-049	0.17	0.01
	Crusher to Conveyor W1 Crusher to Conveyor W2	FH-050	0.17	0.02
	Conveyor U to East Emergency Storage Pile	FH-051 FH-052	0.17	0.02
				0.06
	East Emergency Storage Pile Maintenance	FH-053	0.95	0.11
	East Emergency Storage Pile Storage Conveyor W1 to Conveyor L1	FH-054	0.40 0.17	0.03
	Conveyor W1 to Conveyor L1 Conveyor W2 to Conveyor L2	FH-055	0.17	0.02
	Conveyor W 2 to Conveyor L2	FH-056	U.1/	0.02

G-TEC98.3/BB-V5.XLS.1-10/5/98

Table 5. Big Bend Station - Noncombustion Emission Sources PM₁₀ Emission Rates for Dispersion Modeling (Page 2 of 2)

Process Area	Emission Source	Emission Source	PM ₁₀ Em	ission Rate
		ID	(lb/hr)	(g/sec)
-				
Fuelyard	East Emergency Storage Pile Reclaim to "K" Feeders	FH-057	0.26	0.03
(Cont.)	"K" Feeders to Conveyors L1 or L2	FH-058	0.17	0.02
, ,	Conveyors L1 and L2 to Fuel Bunkers	FH-059 - FH-062	0.20	0.02
	Transloading Storage Pile Maintenance	FH-063	0.51	0.06
	Transloading Storage Pile Reclaim to Loadout Conveyor	FH-064	0.02	0.002
	Transloading Loadout Conveyor to Rail Loading Conveyor	FH-065	0.01	0.001
	Transloading Railcar Loading	FH-066	0.03	0.003
	Non-TEC Fuel Storage Pile Reclaim to Loadout Conveyor	FH-067	0.02	0.002
	Non-TEC Fuel Truck Loading	FH-068	0.03	0.003
	TEC Fuel Truck Loading	FH-069	0.02	0.002
	Long -Term Storage Pile	FH-070	3.95	0.46
	Long-Term Storage Pile Maintenance	FH-071	0.95	0.11
Fly Ash	Transfers into Silo 1	FA-001	5.16	0.60
	Dry Transfer from Silo 1 to Trucks	FA-002	0.03	0.003
	Wet Transfer from Silo 1 to Trucks	FA-003	0.01	0.001
	Transfer into Silo 2	FA-004	5.16	0.60
	Dry Transfer from Silo 2 to Trucks	FA-005	0.03	0.003
	Transfer into Silo 3	FA-006	0.20	0.02
	Dry Transfer from Silo 3 to Trucks	FA-007	0.03	0.003
	Wet Transfer from Silo 3 to Trucks	FA-008	0.01	0.001
Gypsum	Stacker to North Stackout Pile	GH-001	0.04	0.005
	North Stackout Pile	GH-002	0.33	0.04
	North Stackout Pile Maintenance	GH-003	1.07	0.12
	Transfer from North Stackout Pile to Loadout Conveyor	GH-004a	0.04	0.005
	Loadout Conveyor to Truck	GH-004b	0.04	0.005
	Conveyor GD to Conveyor GE	GH-007	0.01	0.001
	Conveyor GE to Conveyor GF	GH-008	0.01	0.001
	Conveyor GF to Radial Stacker	GH-009	0.01	0.001
	Radial Stacker to South Stackout Pile	GH-010	0.04	0.005
	South Stackout Pile	GH-011	0.31	0.04
	South Stackout Pile Maintenance	GH-012	1.07	0.12
	Long-Term Storage Pile Maintenance	GH-013	1.07	0.12
	Long-Term Storage Pile	GH-014	37.99	4.42
	Transfer from Long-Term Storage to Trucks	GH-015	0.04	0.005
Limestone	Railcar/Truck Unloading to Hoppers	LSH-001	0.58	2.52
	Conveyor LB to Conveyor LC	LSH-002	0.01	0.06
	Conveyor LD to Conveyor LE	LSH-003	0.01	0.06
	Conveyor LE to Conveyor LF and Silo A	LSH-004/005	0.02	0.08
	Conveyor LF toConveyor LG and Silo B	LSH-006/007	0.02	0.08
	Conveyor LG to Silo C	LSH-008	0.01	0.02

STACK PARAMETERS

The stack parameters for the Big Bend Station combustion units used in the modeling

analysis for Big Bend Station are presented in Tables 6 through 9. With the exception of

Unit Nos. 1 and 2 operations with the FGD system, the stack heights, diameters, and exit

temperatures of the boilers were obtained from the appropriate Title V Air Operation

Permit application. Stack exit velocities for the boilers were calculated from continuous

emissions monitoring system (CEMS) volumetric flow measurements taken in 1995, as

summarized in Table 3. CEMS volumetric flow data from 1995 was used because 1995

was the last full year of nonintegrated operation for Units 3 and 4. Stack parameters for

the operation of Unit Nos. 1 and 2 with the FGD system were obtained from design data.

All of the combustion turbine stack parameters were obtained from Big Bend Station.

The stack parameters for the noncombustion PM₁₀ emission sources are presented in Ta-

ble 10.

GOOD ENGINEERING PRACTICE/DOWNWASH CONSIDERATIONS

The 1977 Clean Air Act Amendments require that the degree of emission limitation re-

quired for control of any pollutant not be affected by a stack height that exceeds good en-

gineering practice (GEP) or any other dispersion technique. On July 8, 1985, EPA prom-

ulgated final stack height regulations (40 CFR 51), in which GEP stack height is defined

as the higher of 65 meters, or a height established by applying the formula:

Hg = H + 1.5 L

where:

Hg = GEP stack height.

H = height of the structure or nearby structure.

L = lesser dimension (height or projected width) of the nearby structure.

9

G-TEC98.3/A:\BB-MODEL.DOC---100598

Revision 2, 10/31/98

Table 6. Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling Scenario 1 - Units 1, 2, and 4 Scrubbed; Unit 3 Not Scrubbed

Emissions Unit	Stack Height		Stack Gas Temperature		Stack Gas Velocity		Stack Diameter	
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)
		_						
Unit 1	490	149.4	127	326	3,600	18.29	29	8.8
Unit 2	490	149.4	127	326	3,600	18.29	29	8.8
Unit 3	490	149.4	308	426	3,072	15.61	24	7.3
Unit 4	490	149.4	127	326	4,698	23.87	24	7.3
CT 1	35	10.7	1011	817	5,510	28.00	11	3.4
CT 2	75	22.9	928	771	6,967	35.40	17	5.1
CT 3	75	22.9	928	771	6,967	35.40	17	5.1

Units 1 and 2 share one stack. Stack data represents both units operating at maximum capacity.

Units 1 and 2 stack parameters based on design information.

Table 7. Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling Scenario 2 - Units 1 and 4 Scrubbed; Units 2 and 3 Not Scrubbed

Emissions Unit	Stack	Stack Height		Stack Gas Temperature		Stack Gas Velocity		Diameter
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)
Unit 1	490	149.4	127	326	1,800	9.15	29	8.8
Unit 2	490	149.4	294	419	3,478	17.67	24	7.3
Unit 3	490	149.4	308	426	3,072	15.61	24	7.3
Unit 4	490	149.4	127	326	4,698	23.87	24	7.3
CT 1	35	10.7	1011	817	5,510	28.00	11	3.4
CT 2	75	22.9	928	771	6,967	35.40	17	5.1
CT 3	75	22.9	928	771	6,967	35.40	17	5.1

Units 1 stack parameters based on design information.

Table 8. Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling Scenario 3 - Units 1 Through 4 Scrubbed

Emissions Unit	Stack Height		Stack Gas 7	Stack Gas Temperature		Stack Gas Velocity		Stack Diameter	
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)	
Unit 1	490	149.4	127	326	3,600	18.29	. 29	8.8	
Unit 2	490	149.4	127	326	3,600	18.29	29	8.8	
Unit 3	490	149.4	127	326	3,072	15.61	24	7.3	
Unit 4	490	149.4	127	326	4,698	23.87	24	7.3	
CT 1	35	10.7	1011	817	5,510	28.00	11	3.4	
CT 2	75	22.9	928	771	6,967	35.40	17	5.1	
CT 3	75	22.9	928	771	6,967	35.40	17	5.1	

Units 1 and 2 share one stack. Stack data represents both units operating at maximum capacity.

Units 1 and 2 stack parameters based on design information.

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Table 9. Big Bend Station - Combustion Units - Stack Parameters for Dispersion Modeling Scenario 4 - Units 1, 3, and 4 Scrubbed; Unit 2 Not Scrubbed

Emissions Unit	Stack	Height	Stack Gas 7	Stack Gas Temperature		s Velocity Stack I		Diameter	
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)	
	-						_		
Unit 1	490	149.4	127	326	1,800	9.15	29	8.8	
Unit 2	490	149.4	294	419	3,487	17.72	24	7.3	
Unit 3	490	149.4	127	326	3,072	15.61	24	7.3	
Unit 4	490	149.4	127	326	4,698	23.87	24	7.3	
CT 1	35	10.7	1011	817	5,510	28.00	11	3.4	
CT 2	75	22.9	928	771	6,967	35.40	17	5.1	
CT 3	75	22.9	928	771	6,967	35.40	17	5.1	

Unit 1 stack parameters based on design information.

Table 10. Big Bend Station - Noncombustion Emission Sources Emission Parameters for Dispersion Modeling

Process Area	Emission Source	Source Type	Exit	Exit	Exit	Exit
	ID		Height	Temperature*	Veolcity†	Diameter
			(m)	(K)	(m/s)	(m)
Fuelyard	FH-001	Fugitive	13.8	Ambient	0.001	1 00
ruciyaru	FH-002	Fugitive	13.8			1.00
	FH-002		13.5	Ambient	0.001	1.00
	FH-004	Fugitive Fugitive	16.8	Ambient Ambient	0.001	1.00
	FH-005	Fugitive	4.6	Ambient		1.00
	FH-006	Fugitive	7.3	Ambient	0.001	1.00
	FH-007	Fugitive	11.4	Ambient	0.001	
	FH-008a	Fugitive	7.0	Ambient	0.001	1.00
	FH-008b	Fugitive	18.3	Ambient	0.001	1.00
	FH-009		_	45.0	45.0	1.00
	FH-010	Area	8.0	45.0	45.0	N/A N/A
		Area	1.8	Ambient	0.001	
	FH-011a	Fugitive				1.00
	FH-011b	Fugitive	1.8	Ambient	0.001	1.00
	FH-012 FH-013	Fugitive	9.6	Ambient	0.001	1.00
		Fugitive	9.6	Ambient	0.001	1.00
	FH-014	Fugitive	16.4	Ambient	0.001	1.00
	FH-015	Fugitive		Ambient		1.00
	FH-016	Fugitive	1.5	Ambient	0.001	1.00
	FH-017	Fugitive	4.9	Ambient	0.001	1.00
	FH-018	Area	7.6	396.0	84.0	N/A
	FH-019	Агеа	7.6	396.0	84.0	N/A
	FH-020	Area	7.6	350.0	61.0	N/A
	FH-021	Area	7.6	350.0	61.0	N/A
	FH-022	Fugitive	9.6	Ambient	0.001	1.00
	FH-023	Fugitive	16.4	Ambient	0.001	1.00
	FH-024	Fugitive	4.6	Ambient	0.001	1.00
	FH-025	Fugitive	9.6	Ambient	0.001	1.00
	FH-026	Area	7.6	366.0	61.0	N/A
	FH-027	Area	7.6	366.0	61.0	N/A
	FH-028	Fugitive	7.4	Ambient	0.001	1.00
	FH-029	Fugitive	14.4	Ambient	0.001	1.00
	FH-030	Fugitive	7.4	Ambient	0.001	1.00
	FH-031	Fugitive	14.4	Ambient	0.001	1.00
	FH-032 - FH-035	Point	7.6	Ambient	21.89	0.51
	FH-036 - FH-047	Fugitive	1.8	Ambient	0.001	1.00
	FH-048	Point	21.8	Ambient	21.89	1.00
	FH-049	Point	21.8	Ambient	21.89	1.00
	FH-050	Fugitive	3.0	Ambient	0.001	1.00
	FH-051	Fugitive	3.0	Ambient	0.001	1.00
	FH-052	Fugitive	12.0	Ambient	0.001	1.00
	FH-053	Агеа	6.1	18.0	18.0	N/A
	FH-054	Агеа	6.1	18.0	18.0	N/A
	FH-055	Fugitive	13.0	Ambient	0.001	1.00
	FH-056	Fugitive	13.0	Ambient	0.001	1.00

^{*}East-west length of area source in meters.

[†]North-south length of area source in meters.

Table 10. Big Bend Station - Noncombustion Emission Sources Emission Parameters for Dispersion Modeling (Page 2 of 2)

Process Area	Emission Source	Source Type	Exit	Exit	Exit	Exit
	ID		Height	Temperature*	Veolcity†	Diameter
			(m)	(K)	(m/s)	(m)
Fuelyard	FH-057	Fugitive	6.0	Ambient	0.001	1.00
(Cont.)	FH-058	Fugitive	6.0	Ambient	0.001	1.00
	FH-059 - FH-062	Point	57.9	Ambient	21.89	1.00
	FH-063	Area	8.0	45.0	45.0	N/A
	FH-064	Fugitive	1.8	Ambient	0.001	1.00
	FH-065	Fugitive	6.0	Ambient	0.001	1.00
	FH-066	Fugitive	1.8	Ambient	0.001	1.00
	FH-067	Fugitive	6.0	Ambient	0.001	1.00
	FH-068	Fugitive	6.0	Ambient	0.001	1.00
	FH-069	Fugitive	6.0	Ambient	0.001	1.00
	FH-070	Area	7.6	122.0	46.0	N/A
	FH-071	Area	7.6	122.0	46.0	N/A
Fly Ash	FA-001	Point	31.1	394.0	15.85	0.76
	FA-002	Fugitive	3.0	Ambient	0.001	1.00
	FA-003	Fugitive	3.0	Ambient	0.001	1.00
	FA-004	Point	31.1	394.0	15.85	0.76
	FA-005	Fugitive	3.0	Ambient	0.001	1.00
	FA-006	Point	34.4	394	15.58	0.27
	FA-007	Fugitive	3.0	Ambient	0.001	1.00
	FA-008	Fugitive	3.0	Ambient	0.001	1.00
Gypsum	GH-001	Fugitive	10.9	Ambient	0.001	1.00
	GH-002	Area	6.1	38.0	38.0	N/A
	GH-003	Area	6.1	38.0	38.0	N/A
	GH-004a	Fugitive	3.0	Ambient	0.001	1.00
l	GH-004b	Fugitive	3.0	Ambient	0.001	1.00
	GH-007	Fugitive	4.2	Ambient	0.001	1.00
	GH-008	Fugitive	4.2	Ambient	0.001	1.00
	GH-009	Fugitive	11. <u>9</u>	Ambient	0.001	1.00
	GH-010	Fugitive	13.9	Ambient	0.001	1.00
	GH-011	Area	6.1	38.0	38.0	N/A
	GH-012	Area	6.1	38.0	38.0	N/A
	GH-013	Area	6.1	244.0	122.0	N/A
	GH-014	Area	6.1	244.0	122.0	N/A
	GH-015	Fugitive	3.0	Ambient	0.001	1.00
Limestone	LSH-001	Point	3.0	Ambient	21.73	0.30
	LSH-002	Point	13.9	Ambient	20.70	0.15
	LSH-003	Point	13.9	Ambient	20.70	0.15
	LSH-004/005	Point	30.8	Ambient	14.29	0.15
	LSH-006/007	Point	30.8	Ambient	14.29	0.15
	LSH-008	Point	30.8	Ambient	7.76	0.15

^{*}East-west length of area source in meters.

[†]North-south length of area source in meters.

Nearby is defined as a distance up to five times the lesser of the height or width dimension of a structure or terrain feature, but not greater than 800 meters. While GEP stack height regulations require that a stack height used in modeling for determining compliance with AAQS and prevention of significant deterioration (PSD) increments not exceed the GEP stack height, the actual stack height may be greater.

The EPA guidelines for application of the stack height regulations were followed in determining the GEP stack height for each stack.

The complex downwash analysis was performed using the Building Profile Input program (BPIP, version 95086) to determine the appropriate downwash parameters for ISCST3. The Big Bend Station structure locations and heights are provided in Table 11 and are presented in Figure 1. Combustion source stack locations and heights are also provided in this table and figure. Emission locations and heights for the noncombustion PM₁₀ emission sources are provided in Table 12.

RECEPTOR LOCATIONS

Receptors were placed at locations considered to be ambient air, which is defined at 40 CFR 50.1(e) as that portion of the atmosphere, external to buildings, to which the general public has access. Those portions of Big Bend Station with restricted access were not considered ambient air.

Receptor locations were selected consistent with the definition of ambient air. Discrete receptors were placed on the restricted area boundaries and in the accessible open water that is within TEC's property boundary. Additional discrete receptors were placed at 10 degree (°) increments, beginning at 10° on rings at 1,000, 1,250, 1,500, and 1,750 meters if the specific point was an ambient air location. Complete rings with receptors located at 10° increments, beginning at 10°, were located at 250 meter increments from 2,000 to 7,000 meters, and at 8,000, 9,000, 10,000, 12,000, 15,000, and 20,000 meters. This

Table 11. Big Bend Station - Stack and Structure Heights and Locations

Stack/Structure		Stack /Structi	re Location*	Stack/ Structure		Stack /Struct	ure Location*
Name	Height	East/West	North/South	Name	Height	East/West	North/South
	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)
							Ī
Unit 1/2 Stack (Old)	490	-335	-4	Loft Structure	168	-15	298
Unit 1/2 Stack (New)	490	-335	-254			-49	298
Unit 3 Stack	490	0	0			-49	284
Unit 4 Stack	490	0	-83	1		-88	284
CT 1 Stack	35	-448	564			-88	298
CT 2 Stack	75	-695	1,814			-197	298
CT 3 Stack	75	-613	1,814			-197	284
Boiler 4 Structure	265	7 1	155			-236	284
		-38	155			-236	298
		-38	298			-345	298
		-15	298			-345	284
		-15	332			-384	284
		229	332		i	-384	298
		229	290			-444	298
		214	290			-444	292
		214	277			-473	292
		195	277			-473	338
		195	176			-444	338
		206	176			-444	332
		206	144		,	-384	332
		71	144	٠		-384	349
Steam Turbine	110	229	332			-345	349
Structure		-49	332			-345	332
		-49	249			-236	332
		-88	349			-236	349
		-88	332			-197	349
		-197	332			-197	332
		-197	349		l ſ	-88	332
		-236	349			-88	349
		-236	332			-49	349
		-345	332			-49	332
		-345	349			-15	332
		-384	349		ľ		
		-384	332				
		-444	332	•			
		-444	338				
		-473	338				
		-473	495				
		-434	495				
		-434	480				
		229	480				

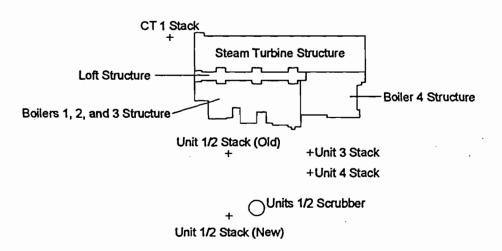
^{*}Locations are relative to the Unit 3 stack. Positive directions are east and north. Negative directions are west and south.

Table 11. Big Bend Station - Stack and Structure Heights and Locations (Page 2 of 2)

Stack or Structure			Stack or Structure	-	Stack /Struct	ure Location*	
Name	Height	East/West	North/South	Name	Height	East/West	North/South
	(ft)	(ft)	(ft)	1 111111	(ft)	(ft)	(ft)
					()	(-7	1
Boilers 1, 2, and 3	192	-38	105	Units 1/2 Scrubber†	156	-220	-224
Structure		-61	105				
		-61	96				
		-76	96				
		-76	105				
		-91	105]			
		-91	113				
		-153	113				
		-153	122				
		-179	122				
	ļ	-179	167				
		-217	167				1
		-217	122	1			
		-285	122				
		-285	184				
		-317	184				
		-317	143				
		-343	143				
		-343	139				
		-418	139				
		-418	214				
		-473	214				
		-473	292				
		-444	292				
		-444	298				
		-384	298				
		-384	284				
		-345	284				
		-345	298				
		-236	298				
		-236	284				
		-197	284				
		-197	298				
		-88	298				
		-88	284				
		-49	284				
		-49	298				
		-38	298				

^{*}Locations are relative to the Unit 3 stack. Positive directions are east and north. Negative directions are west and south. †Cited location is the center point of a cylindrical scrubber 60 feet in diameter.

CT 2 Stack + + CT 3 Stack



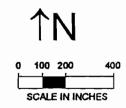


FIGURE 1.

BIG BEND STATION STRUCTURE LOCATIONS FOR DOWNWASH ANALYSIS

Source: ECT, 1998.



Table 12. Big Bend Station - Noncombustion Emission Source Locations

Process Area	Emission Source	Location Relativ	e to Unit 3 Stack	UTM Co	ordinates
	ID	East-West (ft)	North-South (ft)	Easting (m)	Northing (m)
Fuelyard	FH-001	-3,066	673	360883	3075266
	FH-002	-3,059	595	360885	3075242
	FH-003	-3,059	595	360885	3075242
	FH-004	<u>-3</u> ,051	502	360888	3075214
	FH-005	-3,041	381	360891	3075177
	FH-006	-3,028	306	360895	3075154
	FH-007	-2,857	307	360947	3075155
	FH-008a	-2,860	338	360946	3075164
	FH-008b	-2,691	385	360998	3075178
	FH-009	-2,691	385	360998	3075178
	FH-010	-2,691	385	360998	3075178
	FH-011a	-2,765	307	360975	3075155
	FH-011b	-2,765	307	360975	3075155
	FH-012	-2,838	605	360953	3075245
	FH-013	-2,104	612	361177	3075248
	FH-014	-2,077	612	361185	3075248
	FH-015	-2,071	523	361187	3075220
	FH-016	-2,071	523	361187	3075220
	FH-017	-2,044	612	361195	3075248
	FH-018	-2,626	665	361017	3075264
	FH-019	-2,626	665	361017	3075264
	FH-020	-2,511	360	361052	3075171
	FH-021	-2,511	360	361052	3075171
	FH-022	-2,074	320	361186	3075159
	FH-023	-2,073	241	361186	3075134
	FH-024	-2,073	241	361186	3075134
	FH-025	-2,048	321	361194	3075159
	FH-026	-2,519	66	361050	3075081
	FH-027	-2,519	66	361050	3075081
	FH-028	-1,210	610	361449	3075247
	FH-029	-1,215	469	361448	3075204
	_FH-030	-1,216	310	361447	3075156
	FH-031	-1,215	452	361448	3075199
	FH-032	-871	680	361552	3075268
	FH-033	-871	610	361552	3075247
	FH-034	-871	541	361552	3075226
	FH-035	-871	464	361552	3075202
	FH-036 - FH-047	-910	583	361541	3075239
	FH-048	-909	59	361541	3075079
	FH-049	-878	58	361550	3075079
	FH-050	-909	89	361541	3075088
	FH-051	-878	89	361550	3075088
	FH-052	-991	90	361516	3075088
	FH-053	-1,017	66	361508	3075081
	FH-054	-1,017	66	361508	3075081
	FH-055	-1,000	305	361513	3075154
	FH-056	-975	317	361521	3075158

Note: UTM coordinates for Unit 3 stack in meters are Zone 17, 361818 E., 3075061 N.

Table 12. Big Bend Station - Noncombustion Emission Source Locations (Page 2 of 2)

Process Area	Emission Source	Location Delativ	re to Unit 3 Stack	UTM Coordinates			
Flocess Alea	ID	East-West (ft)	North-South (ft)				
	ID	East-West (II)	Norm-South (II)	Easting (m)	Northing (m)		
Fuelyard	FH-057	-1,041	305	361501	3075154		
(Cont.)	FH-058	-1,041	322	361501	3075159		
(Com.)	FH-059	-358	333	361709	3075163		
	FH-060	-209	336	361754	3075163		
	FH-061	-62	338	361799	3075164		
	FH-062	127	338	361857	3075164		
	FH-063	-2,691	385	360998	3075178		
	FH-064	-2,622	406	361019	3075185		
	FH-065	-2,508	-246	361053	3074986		
	FH-066	-2,192	-235	361150	3074989		
	FH-067	-1,082	182	361488	3075116		
	FH-068	-1,082	182	361488	3075116		
	FH-069	-1,267	560	361432	3075232		
	FH-070	-2,474	-209	361064	3074997		
	FH-071	-2,472	-209	361064	3074997		
Fly Ash	FA-001	-343	-147	361713	3075016		
rly Asii	FA-001	-327	-147	361718	3075016		
	FA-002	-327	-147	361718	3075016		
	FA-003	-59	-145	361800	3075017		
	FA-005	-46	-154	361804	3075014		
	FA-005	478	157	361964	3075109		
	FA-007	475	132	361963	3075101		
	FA-007	475	132	361963	3075101		
Gypsum	GH-001	1,033	48	362133	3075076		
Сурѕиш	GH-002	967	-10	362113	3075058		
	GH-003	967	-10	362113	3075058		
	GH-004a	1,095	-14	362152	3075057		
	GH-004a	1,095	-14	362152	3075057		
	GH-0040	860	-600	362080	3074878		
	GH-008	860	-5,600	362080	3073354		
	GH-009	2,360	-5,700	362538	3073334		
	GH-010	2,360	-5,700	362538	3073323		
		2,360					
	GH-011		-5,825	362538 362538	3073285		
	GH-012	2,360	-5,825	362538	3073285		
	GH-013	2,360	-5,825		3073285		
	GH-014	2,360	-5,825	362538	3073285		
a a t a	GH-015	2,360	-5,700	362538	3073323		
Limestone	LSH-001	715	-305	362036	3074968		
	LSH-002	1,289	-267	362211	3074980		
	LSH-003	1,245	-137	362198	3075019		
	LSH-004/005	790	-106	362059	3075029		
	LSH-006/007	790	-134	362059	3075020		
	LSH-008	790	-159	362059	3075013		

Note: UTM coordinates for Unit 3 stack in meters are Zone 17, 361818 E., 3075061 N.

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receptor grid was selected to be consistent with the grid used in the FDEP dispersion modeling. An aerial photograph depicting the close-in receptors is provided in Figure 2.

METEOROLOGICAL DATA

EPA dispersion modeling guidance recommends that modeling be conducted using one year of onsite meteorological, if available. Otherwise, the guidance recommends that modeling be conducted using the most recently available five years of meteorological data collected at a nearby observation station. Following this guidance, the selected meteorological data set included St. Petersburg/Clearwater International Airport (SPG) surface observations and mixing heights derived from SPG surface data and Ruskin (RUS) upper air observations. These data were obtained from the National Climatic Data Center (NCDC) for January 1, 1992, through December 31, 1996. Missing data were replaced following EPA guidance. The data were then prepared for use in ISCST3 using the RAMMET preprocessor. These same data were previously used for the Big Bend Station Title V dispersion modeling analysis.

Two other surface weather observation stations were evaluated for possible use in ISCST but were subsequently rejected. Surface data from Tampa International Airport (TPA) are available through 1994. In 1995, the TPA observation station was automated and sky cover observations were terminated. Because sky cover is a required element for ISCST3, the post-1994 TPA data are unsuitable for use. Surface data from McDill Air Force Base is available through 1992. After 1992, surface observations become more sporadic and no longer meet EPA criteria for data recovery. Because SPG appropriate data are available through 1996, SPG surface data were selected for use over TPA and MAC surface data, consistent with EPA guidance.

FIGURE 2.
BIG BEND STATION NEARBY AMBIENT
RECEPTOR LOCATIONS FOR
DISPERSION MODELING

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DISPERSION MODELING RESULTS

The Big Bend Station dispersion modeling results are presented in Tables 13 through 16. During the period January 1, 1992 through December 31, 1996, no modeled exceedances of the national or Florida AAQS were recorded. Supplemental SO₂ dispersion modeling using Big Bend Station and offsite emission sources also demonstrates that Big Bend Station SO₂ emissions do not cause or contribute to any modeled exceedances of the 24-hour Florida AAQS for SO₂. The dispersion model input and output files are provided in electronic format on the enclosed floppy disks.

Table 13. Big Bend Station - Modeled Ambient SO₂ Impacts

Scenario	Averaging		Modeled A	mbient Imp	act (μg/m³)		Ambie	ent Air
	Period	1992	1993	1994	1995	1996	Quality Stan	dard (µg/m³)
							National	Florida
Scenario 1	Annua1	13.1	14.4	14.0	12.8	13.5	80	60
	H24	246.9	259.1	296.3	189.1	298.1	None	None
	H2H24*1	210.6	206.0	202.3	185.5	230.5	365	260
	Н3	699.8	717.5	596.7	942.7	849.2	None	None
	Н2Н3	583.6	584.5	526.6	553.4	595.3	1,300	1,300
Scenario 2	Annual Annual	15.2	12.2	15.9	14.9	13.9	80	60
	H24	238.9	268.7	289.4	206.7	320.7	None	None
	H2H24*2	205.2	188.0	217.3	202.5	226.5	365	260
	Н3	568.5	582.6	569.0	872.5	873.7	None	None
	Н2Н3	566.8	518.5	557.1	559.2	569.8	1,300	1,300
Scenario 3	Annua1	10.1	11.3	10.5	10.1	9.3	80	60
	H24	163.4	183.9	210.9	142.4	221.2	None	None
	H2H24	147.3	134.7	155.5	141.7	162.2	365	260
	Н3	448.4	472.4	424.0	803.0	585.0	None	None
	Н2Н3	392.5	381.3	407.7	411.7	421.0	1,300	1,300
Scenario 4	Annual	15.2	11.3	15.7	15.1	13.8	80	60
	H24	226.6	251.7	265.4	206.8	294.5	None	None
	H2H24*3	204.0	191.0	214.0	198.0	225.3	365	260
	Н3	585.5	538.1	540.1	866.4	766.9	None	None
	H2H3	510.4	526.3	518.8	536.0	556.8	1,300	1,300

Notes: H24 = Highest 24-hour average.

H2H24 = Highest second-highest 24-hour average.

H3 = Highest 3-hour average.

Table 13. Big Bend Station - Modeled Ambient SO₂ Impacts (Continued, Page 2 of 2)

¹Includes Big Bend Station emission sources only. Additional dispersion modeling using Big Bend Station and off-site emission sources demonstrates the highest second-highest 24-hour modeled ambient SO_2 average to which Big Bend Station makes a significant (>5.0 μ g/m³)contribution is 246.4 μ g/m³, with one exception. This exception is a modeled exceedence in 1994 caused by emissions from F.J. Gannon Station to which emissions from Big bend Station make a small but significant contribution. This modeled exceedence will be eliminated by the SO_2 compliance plan being developed as part of the Title V Air Operation Permit for F.J. Gannon Station.

 2 Includes Big Bend Station emission sources only. Additional dispersion modeling using Big Bend Station and off-site emission sources demonstrates the highest second-highest 24-hour modeled ambient SO_2 average to which Big Bend Station makes a significant (>5.0 μ g/m³)contribution is 246.6 μ g/m³, with one exception. This exception is a modeled exceedence in 1994 caused by emissions from F.J. Gannon Station to which emissions from Big bend Station make a small but significant contribution. This modeled exceedence will be eliminated by the SO_2 compliance plan being developed as part of the Title V Air Operation Permit for F.J. Gannon Station.

³Includes Big Bend Station emission sources only. Additional dispersion modeling using Big Bend Station and off-site emission sources demonstrates the highest second-highest 24-hour modeled ambient SO_2 average to which Big Bend Station makes a significant (>5.0 μ g/m³)contribution is less than 246.0 μ g/m³, with one exception. This exception is a modeled exceedence in 1994 caused by emissions from F.J. Gannon Station to which emissions from Big bend Station make a small but significant contribution. This modeled exceedence will be eliminated by the SO_2 compliance plan being developed as part of the Title V Air Operation Permit for F.J. Gannon Station.

Table 14. Big Bend Station - Modeled Ambient NO_x Impacts

Scenario	Averaging		Modeled A	mbient Imp	act (µg/m ³)		Ambient Air		
	Period	1992	1993	1994	1995	1996	Quality Stan	dard (µg/m³)	
							National National	Florida	
Scenario 1	Annual	10.8	10.9	11.5	10.8	9.8	100	100	
Scenario 2	Annual	14.8	10.9	15.2	14.9	13.2	100	100	
Scenario 3	Annual	12.3	12.3	12.9	12.3	11.0	100	100	
Scenario 4	Annual	16.2	12.3	16.6	16.4	14.4	100	100	

Notes:

H24 = Highest 24-hour average.

H2H24 = Highest second-highest 24-hour average.

H3 = Highest 3-hour average.

Table 15. Big Bend Station - Modeled Ambient PM_{10} Impacts

Scenario	Averaging		Modeled A	mbient Imp	act (μg/m ³)		Ambie	ent Air
	Period	1992	1993	1994	1995	1996	Quality Stan	dard (μg/m³)
							National National	Florida
Scenario 1	Annual	12.9	14.8	16.6	13.5	14.6	50	50
	H24	120.0	108.4	107.4	81.2	129.3	None	None
	H2H24	64.1	76.6	101.0	59.6	77.1	150	150
Scenario 2	Annual	12.9	14.8	16.6	13.5	14.6	50	50
	H24	120.0	108.4	107.4	81.2	129.3	None	None
	H2H24	64.1	76.7	101.0	59.6	77.1	150	150
Scenario 3	Annual	12.9	14.8	16.6	13.5	14.6	50	50
	H24	120.0	108.4	107.6	81.2	129.3	None	None
	H2H24	64.1	76.9	101.2	59.7	77.1	150	150
Scenario 4	Annual	12.9	14.8	16.6	13.5	14.7	50	50
	H24	120.0	108.4	107.6	81.2	129.3	None	None
	H2H24	64.1	76.9	101.2	59.8	77.1	150	150

Notes:

H24 = Highest 24-hour average.

H2H24 = Highest second-highest 24-hour average.

H3 = Highest 3-hour average.

Table 16. Big Bend Station - Modeled Ambient CO Impacts

Scenario	Averaging		Modeled A	mbient Imp	act (μg/m³)		Ambio	ent Air
	Period	1992	1993	1994	1995	1996	Quality Stan	dard (µg/m³)
							National	Florida
Scenario 1	Н8	9.8	9.4	10.1	9.3	8.3	None	None
	H2H8	7.5	8.9	7.7	7.6	6.8	10,000	10,000
	H1	30.4	30.1	30.0	31.0	31.1	None	None
	H2H1	29.3	29.7	27.7	27.3	30.4	40,000	40,000
					_			
Scenario 2	Н8	10.2	9.4	10.1	9.3	8.3	None	None
	H2H8	8.1	8.9	7.9	8.3	6.8	10,000	10,000
	H1	30.4	30.1	30.0	31.0	31.1	None	None
	H2H1	29.3	29.7	27.7	27.3	30.4	40,000	40,000
Scenario 3	Н8	11.3	10.5	10.8	10.2	10.3	None	None
	H2H8	8.6	9.5	8.8	9.1	8.1	10,000	10,000
	H1	34.4	35.2	34.4	36.5	35.7	None	None
	H2H1	30.5	33.9	32.3	32.0	34,4	40,000	40,000
Scenario 4	H8	11.8	10.5	10.8	10.1	10.3	None	None
	H2H8	9.4	9.5	9.3	9.8	8.1	10,000	10,000
	H1	34.4	34.2	34.7	36.5	35.7	None	None
	H2H1	30.5	33.9	32.3	32.0	34.4	40,000	40,000

Notes:

H24 = Highest 24-hour average.

H2H24 = Highest second-highest 24-hour average.

H3 = Highest 3-hour average.

APPENDIX EMISSION CALCULATIONS

EMISSION INVENTORY WORKSHEET Tampa Electric Company - Big Bend Station CS-001a EMISSION SOURCE TYPE **COAL COMBUSTION - CRITERIA POLLUTANTS** Figure: FACILITY AND SOURCE DESCRIPTION **Emission Source Description:** Unit No. 1, Pulverized Fuel - Wet Bottom Emission Control Method(s)/ID No.(s): Electrostatic Precipitator (ESP), Flue Gas Conditioning **Emission Point ID:** CS-001a EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Heat Input (MMBtu/hr) x Pollutant Emission Rate (lb/MMBtu) Emission (tpy) = Heat Input (MMBtu/hr) x Pollutant Emission rate (lb/MMBtu) x Operating Period (hr/yr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS **Operating Hours:** 24 Hrs/Day 7 Days/Wk 8,760 Hrs/Yr Criteria **Pollutant Pollutant** Maximum **Pollutant Emission Factor Emission Rate** Heat Input (MMBtu/hr) (lb/MMBtu) (lb/hr) (tpy) SO₂⁴ 4,037 6.500 26,240.5 114,933.4 NO_x 4,037 1.545 6,239.0 27,326.8 PM/PM₁₀¹ 4,037 0.300 1,211.1 2,210.3 CO 4,037 0.023 91.8 401.9 VOC2 4,037 0.00182 7.3 32.1 SOURCES OF INPUT DATA Variable **Data Source Operating Hours** TEC, 1998. TEC, 1998. Maximum Heat Input Emission Factors: SO₂, NO_x, and CO³ Table 1.1-3., Section 1.1, AP-42, January 1995. Emission Factor: PM/PM₁₀ TEC, 1998. Design data. Emission Factor: VOC³ Table 1.1-18., Section 1.1, AP-42, January 1995. NOTES AND OBSERVATIONS Annual PM/PM₁₀ emission rate based on 0.3 lb/MMBtu for 3 hr/day (soot blowing) and 0.1 lb/MMBtu for 21 hr/day. VOC emission rate represents non-methane total organic compounds (NMTOC). Emission factors based on coal heat content of 11,000 Btu/lb. Emission rate is applicable when Units 1 and 2 FGD system is not in use. DATA CONTROL Data Collected by: T. Davis Date: 10/31/98 10/31/98 T. Davis Date: Evaluated by:

T. Davis

G. Nelson

10/31/98

10/31/98

Date:

Date:

Data Entered by:

Reviewed by:

	EMISSION	INVENTORY	WORKSH	EET		
	Tampa Elec	tric Company - 1	Big Bend Sta	ition		CS-001a
			SOURCE TYP	E		
C	OAL COMBUSTIO				Figure:	
		FACILITY AND SO	<u>antinine a a a d</u> a albania a apalaja a atria a a antinin <mark>a</mark> atria kilonda	and the second s		
Emission Source De		Unit No. 1, Pulver				
Emission Control M Emission Point ID:	lethod(s)/ID No.(s):	Electrostatic Prec	ipitator (ESP),	Flue Gas Condit	ioning	
Emission Point ID:		CS-001a	ALTION FOR	en voxyo		_
		EMISSION ESTIM	IATION EQUA	ITIONS		
Emission (lb/hr) = H	eat Innut (MMRtu/h	r) v Pollutant Emiss	sion Data (lb/M	[MP+1)		
Emission (tpy) = Hea					Period (hr/yr	x (1 ton/2,000 l
					(444.)	<u> </u>
Source: ECT, 1995.				_		_
_	INP	UT DATA AND EM	ISSIONS CAL	CULATIONS		
Operating Hours:		4 Hrs/Day		7 Days/Wk	8,760	Hrs/Yr
		•	-	•		
Criteria	Maximum	Pollutant	Poli	lutant		
Pollutant	Heat Input	Emission Factor	Emiss]		
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tpy)		
- 4						
SO ₂ ⁴	4,037	2.400	9,688.8	42,436.9	1	
NO _x	4,037	1.545	6,239.0	27,326.8	4	
PM/PM ₁₀ ¹	4,037	0.300	1,211.1	2,210.3]	
CO	4,037	0.023	91.8	401.9		
VOC²	4,037	0.00182	7.3	32.1	_	
				 	_	
		SOURCES O	F INPUT DAT		I	
Var	iable			Data Source		
Operating Hours		TEC, 1998.				
Maximum Heat Inp	ut	TEC, 1998.			_	
Emission Factors: SC	O ₂ , NO _x , and CO ³	Table 1.1-3., Sec	tion 1.1, AP-42	, January 1995.	-	
Emission Factor: PN	M/PM ₁₀	TEC, 1998. Desi	gn data.			
Emission Factor: VC)C ₃	Table 1.1-18., Sec	tion 1.1, AP-42	2, January 1995.		
			OBSERVATIO			
Annual PM/PM ₁₀ er	nission rate based or	0.3 lb/MMBtu for	3 hr/day (soot)	blowing) and 0.1	lb/MMBtu for	21 hr/day.
VOC emission rate	represents non-meth	ane total organic co	mpounds (NM	TOC).		
Emission factors ba	sed on coal heat cont	tent of 11,000 Btu/lb) .			
Emission rate is apr	olicable when Units 2	2 and 4 are scrubbed	l, and when Un	its 1 and 3 are no	ot scrubbed.	
		DATA	CONTROL			
Data Collected l	by:	T. Davis			Date:	10/31/98
Evaluated by:		T. Davis			Date:	10/31/98
		T. Davis			Date:	10/31/98
Data Entered by	y:	1. Davis			Date.	10/31/90

	EMISSION		WORKSH	EET				
		ric Company -]				CS-001a		
	Tampa Dice		SOURCE TYPE			C5-001a		
C	OAL COMBUSTION	0.000000000000000000000000000000000000	la a elektrologiska a elektrologiska a elektrologiska a elektrologiska a elektrologiska elektrol		Figure:			
		FACILITY AND SO	OURCE DESCR	IPTION				
Emission Source De		Unit No. 1, Pulver						
Emission Control M	lethod(s)/ID No.(s):	Electrostatic Prec	cipitator (ESP),	Flue Gas Condit	ioning			
Emission Point ID:	_	CS-001a						
		EMISSION ESTIN	MATION EQUA	110NS				
Emission (lb/hr) = Ho	eat Innut (MMRtu/hr	Y Pollutant Emiss	sion Rate (lh/M	MRm)				
	t Input (MMBtu/hr)				Period (hr/yr)	x (1 ton/2,000 lb)		
Source: ECT, 1995.					···· -·· -			
	INPL	IT DATA AND EM	ISSIONS CALC	ULATIONS				
Operating Hours:	24	Hrs/Day	7	Days/Wk	8,760	Hrs/Yr		
Contract.	N f	Dalludand	D. II.	-44				
Criteria Pollutant	Maximum Heat Input	Pollutant Pollutant Emission Factor Emission Rate						
ronutant	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	Emission Rate (lb/hr) (tpy)				
		((220, 222)	(-1237				
SO ₂ ⁴	4,037	2.900	11,707.3	51,278.0				
NO _x	4,037	1.545	6,239.0	27,326.8	1			
PM/PM ₁₀ ¹	4,037	0.300	1,211.1	2,210.3				
CO	4,037	0.023	91.8	401.9)			
VOC²	4,037	0.00182	7.3	32.1				
								
		SOURCES	F INPUT DAT	<u> </u> 				
Vari	iable		T THE CT DAY	Data Source				
Operating Hours		TEC, 1998.			*			
Maximum Heat Inpu		TEC, 1998.						
Emission Factors: SC	O ₂ , NO _x , and CO ³	Table 1.1-3., Sect	tion 1.1, AP-42,	January 1995.				
Emission Factor: PM		TEC, 1998. Desi	gn data.					
Emission Factor: VO	C,	Table 1.1-18., Sec	tion 1.1, AP-42,	January 1995.				
			On the second of	17				
1			OBSERVATIO					
	nission rate based on				Ib/MMBtu for 2	21 hr/day.		
	represents non-metha	<u>v</u>		COC).				
	sed on coal heat conte							
Emission rate is app	licable when Units 2,	3, and 4 are scrub	bed, and when	Unit 1 is not scru	ıbbed.			
		DATA	CONTROL					
Data Collected b		T. Davis	COMMUL		Date:	10/31/98		
Evaluated by:	· y •	T. Davis			Date:	10/31/98		
Data Entered by		T. Davis			Date:	10/31/98		
	<u> </u>	G. Nelson			Date:	10/31/98		
Reviewed by:		G. Meisoli			Date.	10/31/70		

	EMISSION	INVENTORY	WORKSH	EET	_	Τ
	Tampa Elec	tric Company -]	Big Bend Sta	tion		CS-001b
		EMISSION	SOURCE TYPE	E		
C	OAL COMBUSTIO	N - CRITERIA PO	LLUTANTS		Figure	
		FACILITY AND SO	OURCE DESCR	IPTION		
Emission Source De		Unit No. 1, Pulver				_
Emission Control M	lethod(s)/ID No.(s):	Electrostatic Prec	<u>ipitator (ESP),</u>	Flue Gas Desulf	urization (FG)	D)
Emission Point ID:		CS-001b	ATTONE TO U	TIONS		
		EMISSION ESTIM	IATION EQUA	110NS	_	
Emission (lb/hr) = Ho	eat Input (MMBtu/h	r) x Pollutant Emiss	sion Rate (lb/M	MBtu)		
Emission (tpy) = Hea	t Input (MMBtu/hr)	x Pollutant Emission	on rate (lb/MM	Btu) x Operatin	g Period (hr/yı	r) x (1 ton/2,000 lb)
Source: ECT, 1995.			_			
	INP	UT DATA AND EM	ISSIONS CAL	CULATIONS		
Operating Hours:		4 Hrs/Day		Days/Wk	8.76	0 Hrs/Yr
Operating Hours.				Daysivik]	o man
Criteria	Maximum	Pollutant	Poli	lutant	1	
Pollutant	Heat Input	Emission Factor				
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tpy)		
20.4						
SO ₂ ⁴	4,037	0.82	3,310.3	14,499.3	4	
NO _x	4,037	1.545	6,239.0	27,326.8	4	
PM/PM ₁₀ ¹	4,037	0.300	1,211.1	2,210.3	1	
CO	4,037	0.023	91.8	401.9	4	
VOC²	4,037	0.00182	7.3	32.1	-	
		1		1	1	
		SOURCES O	F INPUT DAT	Ä		
Var	iable			Data Source		
Operating Hours		TEC, 1998.				
Maximum Heat Inpu		TEC, 1998.	-			
Emission Factors: No	O _x and CO ³	Table 1.1-3., Sect	ion 1.1, AP-42,	January 1995.		
Emission Factor: SC)2	TEC, 1998. Desi	gn data.			
Emission Factor: PN	M/PM ₁₀	TEC, 1998. Desi	gn data.		-	
Emission Factor: VO)C³	Table 1.1-18., Sec	tion 1.1, AP-42	January 1995.		
		NOTES AND	OBSERVATIO	NS		
¹ Annual PM/PM ₁₀ en	nission rate based on	0.3 lb/MMBtu for	3 hr/day (soot l	plowing) and 0.1	lb/MMBtu for	21 hr/day.
² VOC emission rate	represents non-meth	ane total organic co	mpounds (NM'	TOC).		
³ Emission factors bas	sed on coal heat cont	ent of 11,000 Btu/lb	•			
⁴ Emission rate is app	licable when Units 1	and 2 FGD system	is in use.			
				-		
		DATA	CONTROL			
Data Collected b	oy:	T. Davis			Date:	10/31/98
Evaluated by:		T. Davis			Date:	10/31/98
Data Entered by	7:	T. Davis			Date:	10/31/98
Reviewed by:		G. Nelson			Date:	10/31/98

	EMISSION	INVENTORY	WORKSH	EET		<u> </u>
		ctric Company - B				CS-001a
		EMISSION S	SOURCE TYPE			
C	OAL COMBUSTIC	N - CRITERIA POI			Figure:	
		FACILITY AND SO	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	******************************		
Emission Source De		Unit No. 2, Pulveri				
Emission Control M Emission Point ID:		Electrostatic Preci	pitator (ESP),	Flue Gas Condit	tioning+C34	
Emission Fount ID:	_	EMISSION ESTIM	ATION FOUA	TIONS		
		LIMISTON ESTIM	ATION LOUA	110/13		
Emission (lb/hr) = He	eat Input (MMBtu/h	r) x Pollutant Emissi	on Rate (lb/M	(MBtv)		
Emission (tpy) = Hea					g Period (hr/yr)	x (1 ton/2,000 lb
Source: ECT, 1995.						
	TAU.	NATIONAL AND THE	(001/01/08/08/18/	CITI ATLANO		
Operating Hours:		<i>PUT DATA AND EMI</i> 4 Hrs/Day		Days/Wk	Q 74A	Hrs/Yr
Operating nours:		- III SIDAY		Daysi WK	8,760	nrs/ Y r
Criteria	Maximum	Pollutant	Poli	lutant		
Pollutant	Heat Input	Emission Factor		ion Rate		
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tpy)		
SO ₂ ⁴	2.006	(500	25 074 0	112 766 1		
NO _x	3,996	6.500 1.545	25,974.0 6,175.6	113,766.1 27,049.3	-	
		+		 	-	
PM/PM ₁₀ ¹	3,996	0.300	1,198.8	2,187.8	-	
CO	3,996	0.023	90.8	397.8	4	
VOC²	3,996	0.00182	7.3	31.8	-	
	_					
Vari	iable	SOURCES O	F INPUT DAT	A Data Source		
Operating Hours		TEC, 1998.				
Maximum Heat Inpi	ut	TEC, 1998.	_		-	
Emission Factors: SC		Table 1.1-3., Secti	on 1.1, AP-42,	January 1995.		
Emission Factor: PM	1/PM ₁₀	TEC, 1998. Desig		•		
Emission Factor: VO		Table 1.1-18., Sect	,	. January 1995.		
			,	,		
		NOTES AND	OBSERVATIO	NS		
Annual PM/PM ₁₀ en	nission rate based or	n 0.3 lb/MMBtu for 3	hr/day (soot l	blowing) and 0.1	lb/MMBtu for	21 hr/day.
	_	nane total organic con				¥
		tent of 11,000 Btu/lb.				
		1 and 2 FGD system			_	
Emission rate is app	- Cable when Onits	and 21 OD system	D HOU IN USC			
		n 4774 4	CONTROL			
Data Collected b)v:	T. Davis	CONTROL		Date:	10/31/98
Evaluated by:		T. Davis Date:				10/31/98
Data Entered by		T. Davis		-	Date:	10/31/98
		G. Nelson			Date:	10/31/98
Reviewed by:		G. Meisuli			Date.	10/31/30

	FMISSION	INVENTORY	WORKSH	FFT		
		tric Company - 1				CS-001a
	Tampa Elec		SOURCE TYPE			C5-001a
C	COAL COMBUSTIO	**************************************		<u>-</u>	Figure:	
		FACILITY AND SO	OURCE DESCR	IPTION		
Emission Source De	escription:	Unit No. 2, Pulver	ized Fuel - We	t Bottom		
	1ethod(s)/ID No.(s):	Electrostatic Prec	ipitator (ESP),	Flue Gas Condit	ioning+C34	
Emission Point ID:		CS-001a				
	<u>-</u>	EMISSION ESTIM	IATION EQUA	TIONS		
Emission (lh/hr) = H	eat Input (MMBtu/hi	r) v Pollutant Emiss	ion Pate (lh/M	MRtu)		
	at Input (MMBtu/hr)				Period (hr/yr)	x (1 ton/2,000 lb)
Source: ECT, 1995.						
- · · · · · · · · · · · · · · · · · · ·		UT DATA AND EM			0.840	
Operating Hours:	24	Hrs/Day	7	Days/Wk	8,760	Hrs/Yr_
Criteria	Maximum	Pollutant	Dall	utant		
Pollutant	Heat Input	Emission Factor		on Rate		
7 Ollusum	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tpy)	1	
				\		
SO ₂ ⁴	3,996	2.400	9,590.4	42,006.0		
NO _x	3,996	1.545	6,175.6	27,049.3	1	
PM/PM ₁₀ ¹	3,996	0.300	1,198.8	2,187.8	1	
CO	3,996	0.023	90.8	397.8	1	
VOC²	3,996	0.00182	7,3	31.8	Ì	
]	
V)-	·	SOURCES O	F INPUT DAT			
	iable	TEC 1000		Data Source		
Operating Hours Maximum Heat Inp	.	TEC, 1998.				
Emission Factors: SC		Table 1.1-3., Sect	ion 1 1 AD 42	Ianuam 1005		
Emission Factors: St		TEC, 1998. Design		January 1995.		
Emission Factor: VO		†		Ionus -: 1005		
Emission Factor: VC	<i>.</i>	Table 1.1-18., Sec	110fi 1.1, AP-42	, January 1995.		
		NOTES AND	OBSERVATIO	NS		
¹ Annual PM/PM ₁₀ er	nission rate based on				lb/MMBtu for 2	1 hr/day.
	represents non-metha					
_	sed on coal heat conto					
	olicable when Units 1			its 2 and 3 are no	ot scrubbed.	
таке 15 ар	The state of the s					
			CONTROL			
Data Collected I	by:	T. Davis			Date:	10/31/98
Evaluated by:		T. Davis			Date:	10/31/98
Data Entered by	y:	T. Davis	_		Date:	10/31/98
Reviewed by:		G. Nelson			Date:	10/31/98

	EMISSION	INVENTORY	WODVCII	EET	-	
		INVENTORY etric Company - 1				CS-001a
			SOURCE TYPE	3		
C	OAL COMBUSTIO			<u>= :</u>	Figure:	_
	*****************	FACILITY AND SO		er er en de de en de de de en		
Emission Source De		Unit No. 2, Pulver				
Emission Control M	lethod(s)/ID No.(s):	Electrostatic Prec	ipitator (ESP),	Flue Gas Condi	tioning+C34	
Emission Point ID:		CS-001a EMISSION ESTIM	ZATION TOTAL	TIANG		
		EMISSIUN ESTAN	TATION EQUA	11UNS		
Emission (lb/hr) = He	eat Innut (MMRtu/h	er) v Pollutant Emise	sion Rate (lb/M	MR _{fu})		
Emission (tpy) = Hea					o Period (hr/vr)	x (1 ton/2.000 lb)
(45)	the state of the s		711 · m·c (-2	Diay a operation	S T OT TOU (TIEST) - Y	A (A tom a good and
Source: ECT, 1995.						
		PUT DATA AND EM		The same of the sa		
Operating Hours:		4 Hrs/Day	7	Days/Wk	8,760	Hrs/Yr
Criteria	Marimum	Pollutant	Dall	utant		
Pollutant	Maximum Heat Input	Emission Factor		on Rate		
I Ullutant	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tpy)	1	
_	(47441444 4117 117)	(10/1/12/12/14/14/14/14/14/14/14/14/14/14/14/14/14/	(**************************************	Cran		
SO ₂ ⁴	3,996	2.900	11,588.4	50,757.2		
NO _x	3,996	1.545	6,175.6	27,049.3	1	
PM/PM ₁₀ ¹	3,996	0,300	1,198.8	2,187.8	1	
CO	3,996	0.023	90.8	397.8	†	
VOC ²	3,996	0.00182	7.3	31.8	†	
- 100	3, 2,20	0,00102	,. <u>.</u>	31. 0	-	
		+			1	
		SOURCES O	F INPUT DAT	Ä		
Vari	iable			Data Source		
Operating Hours		TEC, 1998.				
Maximum Heat Inpu	ıt	TEC, 1998.				
Emission Factors: SO	O_2 , NO_x , and CO^3	Table 1.1-3., Sect	tion 1.1, AP-42,	January 1995.		
Emission Factor: PM		TEC, 1998. Design	gn data.			
Emission Factor: VO	C_3	Table 1.1-18., Sec	tion 1.1, AP-42	January 1995.		
_			· · · · · · · · · · · · · · · · · · ·	, <u>-</u>		
		NOTES AND	OBSERVATIO	NS		
¹ Annual PM/PM ₁₀ em	nission rate based on	0.3 lb/MMBtu for	3 hr/day (soot b	lowing) and 0.1	lb/MMBtu for 2	21 hr/day.
² VOC emission rate r				-		-
³ Emission factors base						
Emission rate is appl				Mait 2 is not som	hhad	
Emission rate is appr	Heavie When Units 1	, 5, and 4 are serum	Deu, and when	Unit 2 is not ser	ubbeu.	
						
		D4 T4	CONTROL			
Data Collected b		T. Davis	CUMINOL		Date:	10/31/98
Data Collected D	JV:	I. Davis			Date.	10/31/70

T. Davis

T. Davis

G. Nelson

10/31/98

10/31/98

10/31/98

Date:

Date:

Date:

Evaluated by:

Reviewed by:

Data Entered by:

	EMISSION	INVENTORY	WORKSH	EET		
	Tampa Elec	tric Company - 1	Big Bend Sta	tion		CS-001b
			SOURCE TYPE			
C	OAL COMBUSTIO	N - CRITERIA PO	LLUTANTS		Figure:	
		FACILITY AND SO	OURCE DESCR	IPTION		
Emission Source De		Unit No. 2, Pulver				
Emission Control M	lethod(s)/ID No.(s):	Electrostatic Pred	cipitator (ESP),	Flue Gas Desulfi	urization (FGD)
Emission Point ID:		CS-001b		TIONS	***************************************	
		EMISSION ESTIN	NATION EQUA	110NS		
Emission (lb/hr) = Ho	pat Innut (MMRtu/h	r) v Pollutant Emis	sion Pata (lh/M	MRtu)		
Emission (tpy) = Hea					Period (hr/yr)	x (1 ton/2.000 lb)
	(2101144114 21111001	011 Tale (15) 1121/2	o per uting	<u>, z er iou (iii, j i)</u>	2 (1 10122,000 15)
Source: ECT, 1995.						
		UT DATA AND EM	a produce a produce produce produce de la companie	enter de la company de la c		
Operating Hours:		4 Hrs/Day	7	Days/Wk	8,760	Hrs/Yr
Criteria	Maximum	Pollutant	Dall	utant		
Pollutant	Heat Input	Emission Factor		on Rate		
Tonutant	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tpy)		
				(47)		
SO ₂ ⁴	3,996	0.82	3,276.7	14,352.0		
NO _x	3,996	1.545	6,175.6	27,049.3	i	
PM/PM ₁₀ ¹	3,996	0,300	1,198.8	2,187.8	1	
CO	3,996	0,023	90.8	397.8		
VOC ²	3,996	0.00182	7.3	31.8	1	
700	3,770	0.00102		31.0	ł	
			; -		1	
		SOURCES C	F INPUT DAT	4	I	
Vari	able			Data Source		
Operating Hours		TEC, 1998.				
Maximum Heat Inpu	ıt	TEC, 1998.		_		
Emission Factors: NO	O _x and CO ³	Table 1.1-3., Sec	tion 1.1, AP-42,	January 1995.		_
Emission Factor: SO	2	TEC, 1998. Desi	gn data.	-		
Emission Factor: PM	I/PM ₁₀	TEC, 1998. Desi	gn data.			
Emission Factor: VO	C ³	Table 1.1-18., Sec	tion 1.1, AP-42.	January 1995.		
			OBSERVATIO			
¹ Annual PM/PM ₁₀ en	nission rate based on	0.3 lb/MMBtu for	3 hr/day (soot h	lowing) and 0.1	b/MMBtu for	21 hr/dav.
² VOC emission rate r						
³ Emission factors bas						
⁴ Emission rate is app	iicabie when Units 1	and 2 FGD system	is in use.			_
		 ከ 4π2	CONTROL			
Data Callerta J.			CONTROL		Deter	10/21/00
Data Collected b	y:	T. Davis			Date:	10/31/98
Evaluated by:		T. Davis			Date:	10/31/98
Data Entered by	<u> </u>	T. Davis			Date:	10/31/98
Reviewed by:		G. Nelson			Date:	10/31/98

EMISSION INVENTORY WORKSHEET LSH-001 Tampa Electric Company - Big Bend Station EMISSION SOURCE TYPE MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES Figure: FACILITY AND SOURCE DESCRIPTION **Emission Source Description:** Limestone Handling - Railcar/Truck Unloading Emission Control Method(s)/ID No.(s): Baghouse **Emission Point ID:** LSH-001 EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS 24 Hrs/Day 7 Days/Wk 8,760 Hrs/Yr **Operating Hours:** Transfer Exhaust Exit Grain Potential PM/PM₁₀ **Transfer Points Controlled** Point Flow Rate Loading **Emission Rates** By Common Control Device ID No. (scfm) (lb/hr) (gr/scf) (tpy) Railcar/Truck Unloading to Hoppers LS-T1 33,600 0.002 0.58 2.52 West Hopper to Conveyor LA1 LS-T2 East Hopper to Conveyor LA2 LS-T3 Conveyors LA1 and LA2 to Conveyor LA LS-T4 SOURCES OF INPUT DATA Data Source Variable **Operating Hours** TEC, 1998. **Exhaust Flow Rate** TEC, 1998. Exit Grain Loading ECT, 1998. Estimate based on high moisture content of limestone. NOTES AND OBSERVATIONS DATA CONTROL Date: 5/19/98 Data Collected by: A. Trbovich A. Trbovich Date: 5/19/98 Evaluated by: A. Trbovich Date: 5/19/98 Data Entered by: 6/12/98 G. Nelson Date: Reviewed by:

6/22/98

EMISSION INVENTORY WORKSHEET Tampa Electric Company - Big Bend Station LSH-002 EMISSION SOURCE TYPE MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES Figure: FACILITY AND SOURCE DESCRIPTION **Emission Source Description:** Limestone Handling - Conveyor LB to Conveyor LC Emission Control Method(s)/ID No.(s): Baghouse **Emission Point ID:** LSH-002 EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS **Operating Hours:** 24 Hrs/Day 7 Days/Wk 8,760 Hrs/Yr Potential PM/PM₁₀ Transfer Exhaust **Exit Grain Point Transfer Points Controlled** Flow Rate **Emission Rates** Loading **By Common Control Device** ID No. (scfm) (gr/scf) (lb/hr) (tpy) Conveyor LB to Conveyor LC LS-T5 800 0.002 0.01 0.06 (two pickup points on drop) SOURCES OF INPUT DATA Variable **Data Source** TEC, 1998. **Operating Hours** Exhaust Flow Rate TEC, 1998. ECT, 1998. Estimate based on high moisture content of limestone. Exit Grain Loading NOTES AND OBSERVATIONS DATA CONTROL 5/19/98 A. Trbovich Date: Data Collected by: A. Trbovich Date: 5/19/98 Evaluated by: A. Trbovich Date: 5/19/98 Data Entered by: 6/12/98 Date: Reviewed by: G. Nelson

EMISSION INVENTORY WORKSHEET LSH-003 Tampa Electric Company - Big Bend Station EMISSION SOURCE TYPE MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES Figure: FACILITY AND SOURCE DESCRIPTION **Emission Source Description:** Limestone Handling - Conveyor LD to Conveyor LE Emission Control Method(s)/ID No.(s): Baghouse **Emission Point ID:** LSH-003 EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS **Operating Hours:** 24 Hrs/Day 7 Days/Wk 8,760 Hrs/Yr Transfer **Exit Grain** Potential PM/PM₁₀ Exhaust **Transfer Points Controlled** Point Flow Rate **Emission Rates** Loading (gr/scf) (lb/hr) By Common Control Device ID No. (scfm) (tpy) 800 0.002 0.01 0.06 Conveyor LD to Conveyor LE LS-T8 (two pickup points on drop) SOURCES OF INPUT DATA Variable **Data Source Operating Hours** TEC, 1998. **Exhaust Flow Rate** TEC, 1998. ECT, 1998. Estimate based on high moisture content of limestone. Exit Grain Loading NOTES AND OBSERVATIONS DATA CONTROL 5/19/98 A. Trbovich Date: Data Collected by: Date: 5/19/98 Evaluated by: A. Trbovich A. Trbovich Date: 5/19/98 Data Entered by: 6/12/98 G. Nelson Date: Reviewed by:

6/22/98

EMISSION NTROLLED ET ELLITY AND SO Limestone Hand Baghouse LSH-004, 005	Big Bend Sta SOURCE TYPE MISSION SOUR DURCE DESCRIP			T CIT AA
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CILITY AND SO Limestone Hand Baghouse LSH-004, 005	OURCE DESCRI	CES		
Limestone Hand Baghouse LSH-004, 005			Figure:	
Baghouse LSH-004, 005	ling - Conveyor I	PTION		
SH-004, 005		LE to Conveyor L	F and Silo A	
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and the second s	IATION EQUAT	IONS		
00 grain) x (60 i	min/hr) x (1 ton/2	,000 lb)		
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Transfer	Exhaust	Exit Grain	Potential	PM/PM.
Point	Flow Rate	Loading		n Rates
ID No.		1 -	(lb/hr)	(tpy)
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LS-T9	1,104	0.002	0.02	0.08
LS-T10				
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SOURCES O	F INPUT DATA			
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TEC, 1998.				
ECT, 1998. Est	imate based on h	igh moisture con	tent of limestor	ie.
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NOTES AND	OBSERVATION	S		
	DO grain) x (60 miles) x (60 mi	Transfer Exhaust Flow Rate ID No. (scfm) LS-T9 1,104 LS-T10 SOURCES OF INPUT DATA TEC, 1998. TEC, 1998.	DO grain) x (60 min/hr) x (1 ton/2,000 lb) DATA AND EMISSIONS CALCULATIONS Hrs/Day Transfer Point Flow Rate Loading (gr/scf) LS-T9 LS-T9 LS-T10 SOURCES OF INPUT DATA Data Source TEC, 1998. TEC, 1998.	DO grain) x (60 min/hr) x (1 ton/2,000 lb) DATA AND EMISSIONS CALCULATIONS Hrs/Day Transfer Point Flow Rate Loading Emissic ID No. LS-T9 1,104 0.002 0.02 SOURCES OF INPUT DATA Data Source TEC, 1998.

6/22/98

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ctric Company -	Big Bend Sta	tion		LSH-007
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	ling - Conveyor I	LF to Conveyor L	G and Silo B	
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TEC, 1998.		<u>_</u>	_	
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A. Trbovich			Date:	5/19/98
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	EMISSION CONTROLLED EN FACILITY AND SO Limestone Hand Baghouse LSH-006, 007 EMISSION ESTIN Ib/7,000 grain) x (60 processed to the second to t	EMISSION SOURCE TYPE CONTROLLED EMISSION SOUR FACILITY AND SOURCE DESCRIF Limestone Handling - Conveyor I Baghouse LSH-006, 007 EMISSION ESTIMATION EQUAT [b/7,000 grain) x (60 min/hr) [b/7,000 grain) x (60 min/hr) x (1 ton/2) UT DATA AND EMISSIONS CALCE [24 Hrs/Day 7] Transfer Point Flow Rate ID No. (scfm) LS-T11 1,104 LS-T12 SOURCES OF INPUT DATA TEC, 1998. TEC, 1998. ECT, 1998. Estimate based on h	CONTROLLED EMISSION SOURCES FACILITY AND SOURCE DESCRIPTION Limestone Handling - Conveyor LF to Conveyor L Baghouse LSH-006, 007 EMISSION ESTIMATION EQUATIONS Ib/7,000 grain) x (60 min/hr) 107,000 grain) x (60 min/hr) x (1 ton/2,000 lb) UT DATA AND EMISSIONS CALCULATIONS 24 Hrs/Day Transfer Point Flow Rate Loading (gr/scf) LS-T11 1,104 0.002 LS-T12 SOURCES OF INPUT DATA Data Source TEC, 1998. ECT, 1998. Estimate based on high moisture con NOTES AND OBSERVATIONS	Extric Company - Big Bend Station EMISSION SOURCE TYPE CONTROLLED EMISSION SOURCES Figure: FACILITY AND SOURCE DESCRIPTION Limestone Handling - Conveyor LF to Conveyor LG and Silo B Baghouse LSH-006, 007 EMISSION ESTIMATION EQUATIONS Ib/7,000 grain) x (60 min/hr) 107,000 grain) x (60 min/hr) x (1 ton/2,000 lb) UT DATA AND EMISSIONS CALCULATIONS 24 Hrs/Day 7 Days/Wk 8,760 Transfer Exhaust Exit Grain Potential Point Flow Rate Loading Emissic (scfm) (gr/scf) (lb/hr) LS-T11 1,104 0.002 0.02 LS-T12 1,104 0.002 0.02 SOURCES OF INPUT DATA Data Source TEC, 1998. ECT, 1998. Estimate based on high moisture content of limestor NOTES AND OBSERVATIONS

### MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES #### FACILITY AND SOURCE DESCRIPTION Emission Source Description: Emission Control Method(s)/ID No.(s): Baghouse Emission Point ID: LImestone Handling - Conveyor LG to Silo C Emission Point ID: LSH-008 ##################################	### MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES Figure: FACILITY AND SOURCE DESCRIPTION	EMISSIO	N INVENTOR	Y WORKSH	EET		
### MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES ### FACILITY AND SOURCE DESCRIPTION Emission Source Description: Limestone Handling - Conveyor LG to Silo C Emission Control Method(s)/ID No.(s): Baghouse Emission Point ID: LSH-008 #### EMISSION ESTIMATION EQUATIONS ### Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) ### Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) ### Source: ECT, 1995. ### INPUT DATA AND EMISSIONS CALCULATIONS Operating Hours: 24 Hrs/Day 7 Days/Wk 8,760 Hrs/ Transfer Points Controlled Point Flow Rate By Common Control Device ID No. **Conveyor LG to Silo C** LS-T13 300 0.002 0.01 **SOURCES OF INPUT DATA** Variable Operating Hours TEC, 1998. Exhaust Flow Rate REC, 1998.	### MATERIAL TRANSFER - CONTROLLED EMISSION SOURCES Figure: FACILITY AND SOURCE DESCRIPTION	Tampa Ele	ectric Company -	Big Bend Sta	tion		LSH-008
Emission Source Description: Emission Control Method(s)/ID No.(s): Emission Control Method(s)/ID No.(s): Emission Point ID: Emission Point ID: Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS Operating Hours: 1 Transfer Points Controlled Point Flow Rate Loading Emission Rate By Common Control Device ID No. (scfm) (gr/scf) (lb/hr) Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Operating Hours TEC, 1998. Exhaust Flow Rate REC, 1998.	Source Description: Limestone Handling - Conveyor LG to Silo C	_	EMISSION	SOURCE TYPE			
Emission Source Description: Emission Control Method(s)/ID No.(s): Emission Point ID: LSH-008 EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS Operating Hours: 24 Hrs/Day 7 Days/Wk 8,760 Hrs/ Transfer Points Controlled Point Flow Rate By Common Control Device ID No. Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Operating Hours TEC, 1998. Exhaust Flow Rate SOURCES OF INPUT DATA Variable Operating Hours TEC, 1998.	Source Description: Limestone Handling - Conveyor LG to Silo C					Figure:	<u> </u>
Emission Control Method(s)/ID No.(s): Baghouse Emission Point ID: LSH-008 EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS Operating Hours: 24 Hrs/Day 7 Days/Wk 8,760 Hrs/ Transfer Points Controlled Point Flow Rate (scfm) Exhaust (scfm) (lb/hr) Emission Right (gr/scf) (lb/hr) Emission Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Data Source Operating Hours TEC, 1998. Exhaust Flow Rate REC, 1998.	Control Method(s)/ID No.(s): Baghouse Point ID:						
Emission Point ID: LSH-008 EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = Flow Rate (scfm) x (1 lb/7,000 grain) x (60 min/hr) Emission (tpy) = Flow Rate (scfm) x 1 lb/7,000 grain) x (60 min/hr) x (1 ton/2,000 lb) Source: ECT, 1995. INPUT DATA AND EMISSIONS CALCULATIONS Operating Hours: 24 Hrs/Day 7 Days/Wk 8,760 Hrs/ Transfer Points Controlled Point Flow Rate Loading Emission Rt (scfm) (gr/scf) (lb/hr) Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Operating Hours TEC, 1998. Exhaust Flow Rate REC, 1998.	Point ID:			ling - Conveyor I	LG to Silo C		
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INPUT DATA AND EMISSIONS CALCULATIONS Operating Hours: 24 Hrs/Day 7 Days/Wk 8,760 Hrs/ Transfer Exhaust Flow Rate Loading (gr/scf) (lb/hr) Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Data Source Operating Hours TEC, 1998. Exhaust Flow Rate (scfm) 0.002	INPUT DATA AND EMISSIONS CALCULATIONS g Hours: 24 Hrs/Day 7 Days/Wk 8,760 Hrs/Yr	incoren (ep.)	77,000 grain) 2 (00 i	(1 tol22			
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Transfer Points Controlled By Common Control Device ID No. (scfm) (gr/scf) (lb/hr) Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Data Source Operating Hours Exhaust Flow Rate Exit Grain Potential PM/Emission Rate Exit Grain Loading Emission Rate Emission R	Transfer Points Controlled Common Control Device ID No. (scfm) (gr/scf) (lb/hr) (tpy) LG to Silo C LS-T13 300 0.002 0.01 0.02 SOURCES OF INPUT DATA Variable TEC, 1998. Flow Rate REC, 1998.						
Transfer Points Controlled By Common Control Device ID No. LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Operating Hours Exhaust Flow Rate REC, 1998. Exhaust Flow Rate Loading (gr/scf) 0.002 0.01 Emission Rate (lb/hr) D.002 0.01	Ansfer Points Controlled Common Control Device ID No. LG to Silo C LS-T13 300 0.002 0.01 0.02 SOURCES OF INPUT DATA Variable Hours TEC, 1998. Flow Rate ID No. Flow Rate (scfm) (gr/scf) (lb/hr) (tpy) 0.01 0.02	Operating Hours:	24 Hrs/Day	7	Days/Wk	8,76	0 Hrs/Yr
Transfer Points Controlled By Common Control Device ID No. LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Operating Hours Exhaust Flow Rate REC, 1998. Point ID No. Flow Rate (scfm) (gr/scf) (lb/hr) 0.002 0.01	Ansfer Points Controlled Common Control Device ID No. Flow Rate (scfm) Control Device Emission Rates (lb/hr) (tpy) LG to Silo C LS-T13 300 0.002 0.01 0.02 SOURCES OF INPUT DATA Variable Data Source Hours TEC, 1998. TEC, 1998. TEC, 1998. Tech to the property of th		T- 6:	E-1 4	F-4.6	D-4: 4	1 D14/D14
By Common Control Device ID No. (scfm) (gr/scf) (lb/hr) Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Data Source Operating Hours TEC, 1998. Exhaust Flow Rate REC, 1998.	Common Control Device ID No. (scfm) (gr/scf) (lb/hr) (tpy) LG to Silo C LS-T13 300 0.002 0.01 0.02 SOURCES OF INPUT DATA Variable Data Source g Hours TEC, 1998. Flow Rate REC, 1998.	Two See Deines Comented					
Conveyor LG to Silo C LS-T13 300 0.002 0.01 SOURCES OF INPUT DATA Variable Data Source Operating Hours Exhaust Flow Rate REC, 1998.	LG to Silo C						
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Exhaust Flow Rate REC, 1998.	Flow Rate REC, 1998.	Variable			Data Source		
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Exit Crain Loading FCT 1998 Estimate based on high maisture content of limestone.	n I and line FOT 1000 Estimate Level on high maistern agreement of line arteries						
DAN CIGHT DOUGHE	a Loading EC1, 1998. Estimate based on high moisture content of timestone.	Exit Grain Loading	ECT, 1998. Est	timate based on b	nigh moisture cont	tent of limesto	one.
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DATA CONTROL Data Collected by: A. Trbovich Date:	DATA CONTROL Collected by: A. Trbovich Date: 5/25/98		A. Trbovich			Date:	5/25/98
Data Collected by: A. Trbovich Evaluated by: A. Trbovich Date:	DATA CONTROL Collected by: A. Trbovich Date: 5/25/98 ted by: A. Trbovich Date: 5/25/98	Evaluated by:					

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	Tampa E	<u>lectric</u> Company –				GH-001
		EMISSION	SOURCE TYP	E		
MA1	TERIAL TRANSFER	- FUGITIVE EMIS	SION SOURC	ES	Project:	
		FACILITY AND SC	OURCE DESCI	RIPTION		
Emission Source	Description:	Gypsum Handling - Sta	acker Conveyor t	o North Stackout I	Pile	
Emission Control	Method(s)/ID No.(s):	None_				
Emission Point ID	:	GH-001		Transfer Point ID(s):	
		EMISSION ESTIN	AATION EQUA	ATIONS		
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Source: Section 1	13.2.4 – Aggregate Ha	ndling and Storage Pile	s, AP-42, Fifth I	Edition, January 19	995.	
						
	141	DUTEDATA AND EN	ISSIANS CAL	CULATIONS		
	1N	PUT DATA AND EM	ISSIONS CAL Material	LULATIUNS		
Mean Wind	Act	tual	Moisture	Control	Actual	PM ₁₀
Speed	Quantity T	ransferred	Content	Efficiency	Emission Rates	
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	_(tpy)
8.6	160	1,353,000	10.0	0.0	0.04	0.16
		SOURCES	OF INPUT DA	TA		
Par	ameter			Data Source		
Mean Wind Speed		Tampa, FL, Climate of	the States, Third	Edition, 1985.		
Actual Quantity To Material Moisture		TEC, 1998. Average gypsum moisture content; TEC, 1998.				
Control Efficiency		N/A				
Como Emoioney	-			_	_	
			···			
		NOTES AND	OBSERVATIO)NS		
						
	<u> </u>					
	_					
			_			
		ΠΔΤΔ	CONTROL			

Data Collected by:	A. Angelopulos	Date:	04/02/98
Evaluated by:	A. Trbovich	Date:	04/09/98
Data Entered by:	A. Trbovich	Date:	04/09/98
Reviewed by:	G. Nelson	Date:	06/12/98

	rampa E	lectric Company -				GH-004		
		<u>EMISSION</u>	SOURCE TYP	PE				
MAT	ERIAL TRANSFER	- FUGITIVE EMIS	SION SOURC	ES	Project:			
		FACILITY AND SO	URCE DESC	RIPTION				
Emission Source D	Description:	Gypsum Handling - Do	zer Transfer fro	m North Stackout P	lile to Leadout Co			
	, coonputiti	aypoon rianding - Do	Tallsler Ho	III NOI III OLECKOUL P	THE TO LOADOUT CO	mveyor		
Emission Control	Method(s)/ID No.(s):	None						
Emission Point ID:		GH-004a		Transfer Point ID(s	s):			
		EMISSION ESTIN	AATION EQU					
Emission (lb/hr) = 0.0	011 x material transferred	(ton/hr) x [(average wind spo	sed (mph)/5) ^{1.3} / (r	moisture content (%)/2	1.4] x (100—control)	(%]/100)		
Emission (tpy) = 0.00	11 x material transferred (t	py) x [(average wind speed ((mph)/5) ^{1.3} / (mois	ture content (%)/2)1.4]	x (100-control[%]/1	00) x (1/2000)		
Source: Section 1	3.2.4 - Aggregate Ha	ndling and Storage Pile	s AP-42 Fifth	Edition January 19	95			
OSCIONI DOCUMENT	O.E Aggregate Ha	and Otorage Fite	5, AI _ 42, I IIII	Edition, daridary 18				
	<u>IN</u>	<u>PUT DATA AND EM</u>		CULATIONS				
Mean Wind	Act	tual	Material Moisture	Control	Actual PM ₁₀			
Speed	Quantity T		Content	Efficiency	Emissio			
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(фу)		
8.6	160	1,353,000	10.0	0.0	0.04	0.1		
1	· ·	SOURCES (OF INPUT DA					
Para	<u>meter</u>			Data Source				
Mean Wind Speed		Tampa El Climata of	the States Thir	d Edition 1985				
Actual Quantity Tre		Tampa, FL, Climate of the States, Third Edition, 1985. TEC, 1998.						
Material Moisture		Average gypsum moist	ture content; TE	C, 1998.				
Control Efficiency		N/A						
		NOTES AND	OBSERVATION	ONS				
		,						
		DATA	CONTROL					
D-1-0-11-1-1			CONTINUE			04/00/00		
Data Collected	by:	A. Angelopulos		L	Date:	04/02/98		
Evaluated by:		A. Trbovich		[Date:	04/09/98		
Data Entered b	v.	A. Trbovich		ſ	Date:	04/09/98		
Reviewed by:		G. Nelson			Date:	06/12/98		

Tampa Electric Company - Big Bend Station

GH-004b

EMISSION SOURCE TYPE

MATERIAL TRANSFER - FUGITIVE EMISSION SOURCES

Project:

Emission Source Description: Gypsum Handling - Dozer Transfer from Loadout Conveyor to Truck

Emission Control Method(s)/ID No.(s): None

Emission Point ID:

GH-004b

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

FACILITY AND SOURCE DESCRIPTION

Emission (lb/hr) = 0.0011 x material transferred (ton/hr) x [(average wind speed (mph)/5)^{1.3} / (moisture content (%)/2)^{1.4}] x (100-control[%]/100) Emission (tpy) = 0.0011 x material transferred (tpy) x [(average wind speed (mph)/5) 1.3 / (moisture content (%)/2) 1.4] x (100-control[%]/100) x (1/2000)

Source: Section 13.2.4 - Aggregate Handling and Storage Piles, AP-42, Fifth Edition, January 1995.

	INI	PUT DATA AND EM	ISSIONS CAL	CULATIONS		
			Material			
Mean Wind	Act	ual	Moisture	Control	Actual	
Speed	Quantity T	ransferred	Content	Efficiency	Emissio	n Rates
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)_
8.6	160	1,353,000	10.0	0.0	0.04	0.16
		SOURCES (OF INPUT DA	TA		
Pai	rameter			Data Source		

Parameter	Data Source
Mean Wind Speed	Tampa, FL, Climate of the States, Third Edition, 1985.
Actual Quantity Transferred	TEC, 1998.
Material Moisture Content	Average gypsum moisture content; TEC, 1998.
Control Efficiency	N/A
· · · · · · · · · · · · · · · · · · ·	

NOTES AND OBSERVATIONS

	DATA CONTROL		
Data Collected by:	A. Angelopulos	Date:	04/02/98
Evaluated by:	A. Trbovich	Date:	04/09/98
Data Entered by:	A. Trbovich	Date:	04/09/98
Reviewed by:	G. Nelson	Date:	06/12/98

EMISSION INVENTORY WORKSHEET Tampa Flectric Company - Rig Bend Station

	i ampa E	iectric Company –	Big Bend Sta	ition		GH-00/
		EMISSION .	SOURCE TYP	PE .		
MATI	ERIAL TRANSFER	- FUGITIVE EMISS	SION SOURC	FS	Project:	
		FACILITY AND SO			i Tojeot.	
Emission Source D	escription:	Gypsum Handling – Co				
Emission Control N	lethod(s)/ID No.(s):					
- Emission Point ID:	```	GH-007		Transfer Point ID	(e)·	
Limsolon Folit ID.		EMISSION ESTIN	IATION EQU		(8).	
		(ton/hr) x [(average wind spe				
Emission (tpy) = 0.001	1 x material transferred (t	py) x [(average wind speed ((mph)/5) ^{1.3} / (mois	ture content (%)/2) ^{1.4}] x (100-control[%]/	100) x (1/2000)
Source: Section 1	9 2 4 — Aggregate Ha	ndling and Storage Pile	e AP_42 Fifth	Edition January 1	995	
Source, Section 1	S.2.7 - Aggregate na	numy and Storage File	s, AF -42, Filli	Edition, January I	333.	
	IN	PUT DATA AND EM		CULATIONS		
Mean Wind	Act	ual	Material Moisture	Control	Actual	PM ₁₀
Speed	Quantity T		Content	Efficiency		on Rates
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	160	1,353,000	10.0	90.0	<0.01	0.02
		SOURCES (OF INPUT DA	TA		
Para	meter			Data Source		
				<u> </u>		
Mean Wind Speed		Tampa, FL, Climate of	the States, Third	d Edition, 1985.		-
Actual Quantity Tra Material Moisture C		TEC, 1998. Average gypsum moist	ure content: TE			-
Control Efficiency Table 3-16, Fugitive Emission					Plants, EPRI, Jur	ne 1984.
		NOTES AND	OBSEDVATIO	ONIC		
		NUIES AND	UBSERVAII	JNS		
_						
-						
				-		_
_						
		DATA	CONTROL			
Data Collected	by:	A. Angelopulos			Date:	04/02/98
Evaluated by:		A. Trbovich			Date:	04/09/98
Data Entered b	y:	A. Trbovich			Date:	04/09/98
Reviewed by:		G Nelson			Date:	06/12/98

EMISSION INVENTORY WORKSHEET Tampa Flectric Company - Big Bond Station

	i ampa E	lectric Company –	RIG Reug Sta	ition		JGH-UUO J
		EMISSION	SOURCE TYP	Æ		
МАТ	FRIAI TRANSFER	- FUGITIVE EMIS	SION SOURC	ES	Project:	
MAI	LINAL INANOI LI	FACILITY AND SC			rioject.	
		AUILIM AND SC	ONCE DESC	niraniun		
Emission Source D	escription:	Gypsum Handling - Co	nveyor GE to Co	onveyor GF		
Emission Control N	dethod(s)/ID No.(š):	Enclosure	1			
	<u> </u>	1 1 4				
Emission Point ID:		GH-008		Transfer Point ID	(8):	
		EMISSION ESTIN	NATION EQU	ations		
		· · · · · · · · · · · · · · · · · · ·				
		(ton/hr) x [(average wind sp				
= mission (tpy) = 0.00	11 x material transferred (t	py) × [(average wind speed	(mph)/5) ' · · · / (mois	ture content (%)/2) ' · ¬] x (100~control[%]/	(100) x (1/2000)
Source: Section 1	9 2 4 - Angregate Ha	ndling and Storage Pile	e AP_42 Fifth	Edition lengery 1	905	 -
Jource. Oecuon i	O.Z.4 - Aggregate Ha	and otolage File	5, Ar - 42, 7 mm	Luidon, January I	333.	
	<u> </u>					
	IN	PUT DATA AND EM	ISSIONS CAL	CULATIONS		
			Material			
Mean Wind	Actual		Moisture	Control		I PM ₁₀
Speed	Quantity T		Content	Efficiency		on Rates
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	<u>(tpy)</u>
8.6	160	1,353,000	10.0	90.0	<0.01	0.02
		SOURCES (OF INPUT DA	TA		
Para	meter			Data Source		
Mean Wind Speed		Tampa, FL, Climate of	the States, Third	d Edition, 1985.		
Actual Quantity Tra		TEC, 1998.				
Material Moisture (Content	Average gypsum moist				4004
Control Efficiency		Table 3-16, Fugitive E	missions From	Coal—Fired Power	Plants, EPRI, Ju	ne 1984.
		NOTES AND	OBSERVATION	ONS		
			<u> </u>			
	***	· · · · · · · · · · · · · · · · · · ·				
					<u> </u>	
			CONTROL			
		UATA	CONTROL			
Data Collected	by:	A. Angelopulos			Date:	04/02/98
Created by	<u> </u>	A Trhaviah			Date:	04/09/98
Evaluated by:		A. Trbovich			Dale.	U-1/U3/30
Data Entered b	y:	A. Trbovich			Date:	04/09/98
Ossissad bu		C Nelson			Data	06/12/98
Reviewed by:		G. Nelson			Date:	VU 12/30

		<i>N INVENTOR</i>) lectric Company –				GH-009
			SOURCE TYP			1
MATE	ERIAL TRANSFER	- FUGITIVE EMIS	SION SOURCE	ES	Project:	
		FACILITY AND SC			,	
Emission Source De	escription:	Gypsum Handling – Co	nveyor GF to Ra	dial Stacker		
Emission Control M	ethod(s)/ID No.(s):	Enclosure			_	
Emission Point ID:		GH-009		Transfer Point ID(в):	
		EMISSION ESTIN	MATION EQUA	ATIONS		
Emission (tpy) = 0.001	1 x material transferred (t	(ton/hr) x [(average wind speed of the speed	(mph)/5) ^{1.3} / (moist	ure content (%)/2) ^{1.4}]	x (100-control[%]/	
	IN	PUT DATA AND EM	ISSIONS CAL	CUI ATIONS		
Mean Wind Speed	Act Quantity T	ual ransferred	Material Moisture Content	Control Efficiency	Emissic	I PM ₁₀ on Rates
(mph) 8.6	(ton/hr) 160	(ton/yr) 1,353,000	(pct) 10.0	(pct) 90.0	(lb/hr) <0.01	(tpy) 0.02
		SOURCES (OF INPUT DAT	TA		
Para	meter			Data Source		
Mean Wind Speed		Tampa, FL, Climate of	the States, Third	Edition, 1985.		
Actual Quantity Tra		TEC, 1998.				
Material Moisture C Control Efficiency	content	Average gypsum moist Table 3-16, Fugitive E			Plants, EPRI, Jui	ne 1984.
Control Emclericy		Table 6 10, 1 agrave E		1102.000	, m,	
		NOTES AND	OBSERVATIO	ONS		
				-		

	DATA CONTROL		
	DATA CONTROL		
Data Collected by:	A. Angelopulos	Da <u>te:</u>	04/02/98
Evaluated by:	A. Trbovich	Date:	04/09/98
Data Entered by:	A. Trbovich	Date:	04/09/98
Reviewed by:	G. Nelson	Date:	06/12/98

Tampa Electric Company - Big Bend Station

GH-010

EMISSION SOURCE TYPE

MATERIAL TRANSFER - FUGITIVE EMISSION SOURCES

Project:

Emission Source Description:

Gypsum Handling - Radial Stacker to South Stackout Pile

FACILITY AND SOURCE DESCRIPTION

Emission Control Method(s)/ID No.(s): None

Emission Point ID:

GH-010

Transfer Point ID(s):

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = 0.0011 x material transferred (ton/hr) x [(average wind speed (mph)/5)^{1.3} / (moisture content (%)/2)^{1.4}] x (100-control[%]/100) Emission (tpy) = 0.0011 x material transferred (tpy) x [(average wind speed (mph)/5) 1.3 / (moisture content (%)/2) 1.4 x (100-control[%]/100) x (1/2000)

Source: Section 13.2.4 - Aggregate Handling and Storage Piles, AP-42, Fifth Edition, January 1995.

	INI	PUT DATA AND EM	ISSIONS CAL	CULATIONS		
			Material			
Mean Wind	Act	ual	Moisture	Control	Actual	
Speed	Quantity T	ransferred	Content	Efficiency	Emissio	n Rates
(mph)	(ton/hr)	(ton/yr)	(pct)	(pct)	(lb/hr)	(tpy)
8.6	160	1,353,000	10.0	0.0	0.04	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, 1998.		
Material Moisture Content	Average gypsum moisture content; TEC, 1998.		
Control Efficiency	N/A		
			

NOTES AND OBSERVATIONS

	DATA CONTROL		
Data Collected by:	A. Angelopulos	Date:	04/02/98
Evaluated by:	A. Trbovich	Date:	04/09/98
Data Entered by:	A. Trbovich	Date:	04/09/98
Reviewed by:	G. Nelson	Date:	06/12/98

Tampa Electric Company - Big Bend Station

GH-015

EMISSION SOURCE TYPE MATERIAL TRANSFER - FUGITIVE EMISSION SOURCES Project: FACILITY AND SOURCE DESCRIPTION **Emission Source Description:** Gypsum Handling - Dozer Transfer from Long-Term Storage Pile to Trucks Emission Control Method(s)/ID No.(s): None **Emission Point ID:** GH-015 Transfer Point ID(s): EMISSION ESTIMATION EQUATIONS Emission (lb/hr) = 0.0011 x material transferred (ton/hr) x [(average wind speed (mph)/5) 1.3 / (moisture content (%)/2) 1.4] x (100-control[%]/100) Emission (tpy) = 0.0011 x material transferred (tpy) x [(average wind speed (mph)/5) 1.3 / (moisture content (%)/2) 1.4] x (100-control[%]/100) x (1/2000) Source: Section 13.2.4 – Aggregate Handling and Storage Piles, AP-42, Fifth Edition, January 1995. INPUT DATA AND EMISSIONS CALCULATIONS Material Mean Wind Actual Moisture Control Actual PM₁₀ **Emission Rates** Speed **Quantity Transferred** Content Efficiency (ton/yr) (lb/hr) (tpy) (mph) (ton/hr) (pct) (pct) 160 1,353,000 10.0 0.0 0.04 0.16 8.6 SOURCES OF INPUT DATA **Parameter** Data Source Mean Wind Speed Tampa, FL, Climate of the States, Third Edition, 1985. **Actual Quantity Transferred** TEC, 1998. **Material Moisture Content** Average gypsum moisture content; TEC, 1998. Control Efficiency NOTES AND OBSERVATIONS

Data Collected by:	A. Angelopulos	Date:	04/02/98
Evaluated by:	A. Trbovich	Date:	04/09/98
Data Entered by:	A. Trbovich	Date:	04/09/98
Reviewed by:	G. Nelson	Date:	06/12/98