#### Emission Source/Operating Scenario Data

Coal Crusher/Conveyor Building

# nomin we wently a charmed are				
(All permitted, Insignificant and/or I	Non-per	mitted Sour	<b>005</b> )	
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	( a. )	
Pacility Name:		Liniversity of No

orth Carolina at Chapel Hill

Facility ID #:	6800043		
Permit #:	3069T17		
County:	Orange		
D40 D	DDA	_	

North	Carolina	Department of	Environment	and Natural	Resources

#### **Division of Air Quality**

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

1. Emission Source ID No. (same as in permit - Use	"U" prefix for non-	permitted and '	'I" for insignifican	Ŋ		ES-010A	
2. Emission Source Description		Coal Crusher / Conveyor Building					
3. Operating Scenario Description		N/A					
4. Maximum Permitted Operating Rate		•		6	0 tons/hr		
With Units (Ex. gal/hr, mmBtu/hr)					V 10113/111		
5. Throughput in CY (e.g. production or fuel use)			115	.120		tons/yr	
With Units (Ex. lbs/yr, gal/yr)				,120			
6. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash	N/A	Heat Content (Bts/lb or mmCF)		N/A

If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you.

-		1000/
	7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack)	100%
	7. Capture Efficiency (% Emissions from Emission Source vertex to Control Device of States)	<u> </u>

#### 8. Control Device Information, if none, write "none"

	Control Device ID #  (as listed in permit)	Control Device Description	
i. (nearest stack)	CD-013	Bagfilter	
ii.	N/A	N/A	
iii.	N/A	N/A	
iv.	N/A	N/A	

#### 9. Stack Information (sources vented to more than one stack use additional entry lines)

	Height	Diameter (feet)	Temperature	Velocity	Volume Flow Rate	Release Point Description	
Stack ID#	(in whole feet)	Circle (enter #), Rectangle (L#, W#)  (in 0.1 feet)	<b>(F)</b>	(feet/sec)	(acfm)	(Fugitive, Vertical, Vertical w/ cap, Horizontal, Downwai see Instructions)	
EP-12-053	47	1.8	Ambient	44	6,500	Vertical	
					•••		
			***				

#### 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

Hours/Day	6	Days/Week	7	Weeks/Year	52	Hours/Year	1,919
	& End Times in C	Y:		Start:	N/A	End:	N/A

#### 11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%)

									1
ĺ	Jan-Feb, 2002 + Dec, 2002	31.91%	Mar-May	22.84%	June-Aug	24.29%	Sept-Nov	20.97%	

#### Emission Source/Operating Scenario Data Page 2 of 2

If Rmiss	ion Source has multiple Operating Somerice, complete one form for each.	Permit #:	3069T17
	(All permitted, lesignificant and/or Non-permitted Sources)	County:	Orange
acility Name:	University of North Carolina at Chapel Hill	DAQ Region:	RRO

#### North Carolina Department of Environment and Natural Resources **Division of Air Quality**

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

Emissions: Attach calculations and documentation of emission factors or other estimation methods used.

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

ES-010A

Facility ID #:

Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	СО	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM	0.82	2	99.80%
PM-2.5	PM-2.5	0.78	2	97.90%
PM-10	PM-10	0.82	2	99.60%
SO2	SO2	N/A	N/A	N/A
VOC	VOC	N/A	N/A	N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
			<del></del>	
	·			
			· ··	
				, , , , , , , , , , , , , , , , , , , ,

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

2004 Annual Emissions Inventory

# Emissions from the Conveyor/Crusher Building (ES-010A)

Assume that the total amount of coal conveyed to the crusher is equal to the total amount of coal combusted in 2004.

Boiler #6	58,243	Tons/yr
Boiler #7	56,878	Tons/yr
Total	115,120	Tons/yr

The conveyor transfer points and crushers in the Coal Crusher Building are controlled by a vacuum dust pick-up system ducted to a baghouse. The air flow rate through the baghouse is 6,650 acfm. Emissions from the baghouse are conservatively estimated at 0.015 gr/acfm.

60 ton/hr, conveying rate 1,918,7 hrs/yr, conveying time

lb/yr = (6,650 acfm) (60 min/hr) (hr/yr) (0.015 gr/acfm) (1/7000 lb/gr)

	11,483,265	gr/yr
Total Emissions from the Crusher	1,640	lb/yr
	0.82	ton/yr

100% of these emissions are PM-10 95% of these emissions are PM-2.5

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

Ash Silo with Loadout (ES-030)

#### Emission Source/Operating Scenario Data Page 1 of 2

Ash Silo with Loadout

Femission Source has multiple Operating Scenarios, complete one form for each.

(All permitted, Insignificant and/or Non-normitted Sources)

Facility	Name:	

Facility ID #:	6800043	
Permit #:	3069T17	
County:	Orange	-
DAO Region:	DDO	

# North Carolina Department of Environment and Natural Resources Division of Air Quality

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

1. Emission Source ID No. (same as in permit - Use	"U" prefix for non-	permitted and	"I" for insignificat	1t <i>)</i>	1	ES-030
2. Emission Source Description		Ash Silo with Loadout				
3. Operating Scenario Description		N/A				
4. Maximum Permitted Operating Rate						
With Units (Ex. gal/hr, mmBtu/hr)		16 tons/hr				
5. Throughput in CY (e.g. production or fuel use)	1	***********				
With Units (Ex. lbs/yr, gal/yr)			24,	314		tons/yr
6. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash	N/A	Heat Content (Btu/lb or stamCF)	N/A

If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you.

	7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack)	1000/
- 1	Captai C Differency (N Emissions from Emission Source Vented to Control Device of Stack)	100%
•		

#### 8. Control Device Information, if none, write "none"

	Control Device ID #  (as listed in permit)	Control Device Description	
i. (nearest stack)	CD-031	Bagfilter	· · · · · · · · · · · · · · · · · · ·
ii.	N/A	N/A	<del></del>
iii.	N/A	N/A	
iv.	N/A	N/A	

#### 9. Stack Information (sources vented to more than one stack use additional entry lines)

	Height Diameter (feet) Tempera		Temperature	Velocity	Volume Flow Rate	Release Point Description  (Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward- see instructions)	
Stack ID#	(in whole feet)	Circle (enter #), Rectangle (L#, W#)  (in 0.1 feet)	(F) (feet/sec)		(acfm)		
	Fugitive						
			·				
					••		

#### 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

Hours/Day	10	Days/Week	7	Weeks/Year	52	Hours/Year	4,544
Typical Start	& End Times in CY:		·	Start:	N/A	End:	N/A

#### 11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%)

Jan-Feb, 2002 + Dec, 2002 31.91% Mar-May	22.84%	June-Aug	24.29%	Sept-Nov	20.97%
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#### Emission Source/Operating Scenario Data Page 2 of 2

Ash Silo with Loadout

If Emission Source has multiple Operating Scenarios, complete one form for each
(All cormitted Lusignificant and/or Non-normitted Sources)

Facility ID #:	6800043
Permit #:	3069T17
County:	Orange
DAQ Region:	RRO

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University of North Carolina at Chapel Hill

North Carolina Department of Environment and Natural Resources
Division of Air Quality

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

Emissions: Attach calculations and documentation of emission factors or other estimation methods used.

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

ES-030

		•		
Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	со	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM	1.63	2	99.80%
PM-2.5	PM-2.5	1.55	2	97.90%
PM-10	PM-10	1.63	2	99.60%
SO2	SO2	N/A	N/A	N/A
VOC	VOC	N/A	N/A	N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
				·
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		<del>                                     </del>		All the second s
<b>_</b>				
<u> </u>				

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

2004 Annual Emissions Inventory

# Ash Silo with Loadout (ES-030)

Ash is conveyed to the silo and loaded into trucks for off-site transport. The ash is pneumatically conveyed to the silo with the conveying air filtered through a baghouse (CD-031) prior to discharge. The ash loadout to the transfer trucks is via a pipe within a pipe configuration. The annular space between the internal and external pipes is under a vacuum. This vacuum system collects the dust generated during truck loading and ducts it to the baghouse (CD-031). Ash is composed of coal flyash and CaCO<sub>3</sub> / CaSO<sub>3</sub> from desulfurization. Ash is similar to flyash used in concrete batching operations.

24,314.00 ton/yr, ash loaded in 2003

#### 1. Uncaptured Truck Loading Fugitives

Truck loading operations are in an enclosure with discharge into an enclosed truck bed. The vacuum at the ash discharge point and enclosures should insure a minimum of 95% capture. Uncontrolled emissions based on conservatively high estimated 0.5 lb/ton emission factor (0.02 lb/ton AP-42 for batch truck loading at concrete plants).

24,314	ton/yr, Ash Generated	
0.5	lb/ton, Emission Factor	
95%	Capture Efficiency	
607.9	lb/yr, Emissions	
0.30	ton/yr, Emissions	

#### Fugitives from the Enclosure:

0.016	ton/yr, Emissions

#### 2. Baghouse Emissions

The air flow rate through the baghouse is 4,490 acfm. Emissions from the baghouse are conservatively estimated at 0.015 gr/acfm.

lb/yr = (4,490 acfm) (60 min/hr) (hr/yr) (0.015 gr/acfm) (1/7000 lb/gr)

4,490	acfm, Baghouse Flow Rate
4,544	hrs/yr, Operating Hours
0.015	gr/acfm, Emission Factor from Baghouse
2,623	lb/yr, Emissions
1.31	ton/yr, Emissions

#### 3. Total Emissions

0.30	ton/yr, Emissions Truck Loading
0.016	ton/yr, Emissions, Truck Fugitives
1.31	ton/yr, Emissions, Baghouse
1.63	ton/yr, Total Emissions PM
1.63	ton/yr, Total Emissions PM-10
1.55	ton/yr, Total Emissions PM-2.5

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## **2004 Annual Emissions Inventory**

Wet Ash Loadout (ES-030A)

(This unit was not in operation during CY 2004)

£ sasi\$₹IVII	If Emission S	ource has multiple Oper	sh Loadout nting Scenarics, complet	age 1 of 1	L.			Facility ID # Permit #:		800043 169T17
W3 111. 3.1	(All permitted, Insignificant and/or Non-permitted Sources)				County:		range			
Facility N	ame:		University of North Carolina at Chapel Hill		****	DAQ Region	:	RRO		
			North Caro	lina Depa	rtment of	Environment	and Na	tural Resource	Ac	
					Division	of Air Quality ssions Inventor				
1. Emissio	n Source II	D No. (same as	in permit - Use "(	J" prefix for n	on-permitted a	nd "I" for insignifican	nt)	-	F	. 020 A
	n Source D			1		- I I I I I I I I I I I I I I I I I I I		Ash Loadout	E	5-030A
3. Operati	ng Scenario	Description		<del> </del>				N/A		
4. Maxim	ım Permitt	ed Operating	Rate		<del></del>			1012		
	s (Ex. gal/hr, n			1				N/A		
5. Through	hput in CY	(e.g. production of	or fuel use)	<del>-1</del>	T					
	ts (Ex. lbs/yr, g						)		to	on/yr
6. Fuel Inf	ormation ()	fuel used)	<del></del>	% Sulfur	N/A	% Ash	N/A	Heat Content of	Btu/lb or mmCF)	N/A
If you do not p	rovide annual t	hroughput/fuel us	e, your inventory	will be deeme	d incomplete a	nd returned to you.	1			1 NA
7. Capture	Efficiency	(% Emissions fro	m Emission Sourc	e Vented to C	ontrol Device	or Stack)			N/A	*
8. Control	Device Info	rmation, if n	one, write "non	ie"						
		Control	Device ID #			C	antral F	Device Description		
		(as listed	d in permit)				Uniti Oi L		)n 	
. (nearest stat	ck)	<del></del>	one					None		
ii.		<del> </del>	one					None		
iii.		<del> </del>	one					None		
iv.		l N	one			· · · · · · · · · · · · · · · · · · ·		None		
). Stack Info	ormation (so	urces vented to m	ore than one stack	use additiona	l entry lines)					
	Height	Diame	ter (feet)	Temp	erature	Velocity	Volu	me Flow Rate	Release Poin	t Description
Stack ID#	(in whole feet)		Rectangle (L#, W#)		(F)	(feet/sec)		(acfm)	(Fugitive, Vertical, Vertical w	
N/A	N/A		.1 feet)		Ī/A	N//A			ļ	ructions)
I	1072		-		•-	N/A		N/A	· · · · · · · · · · · · · · · · · · ·	/A
										-
				-		_1				<u> </u>
	***		ng Scenario that be	est characteriz	es calendar ye	ar)			-	
lours/Day		√A	Days/Week	N	/A	Weeks/Year		N/A	Hours/Year	N/A
ypical Start	& End Time	es in CY:		······································		Start:		N/A	End:	N/A
1. Seasonal	Periods Per	rcent Annual	Throughput (	for Emission :	Source in CY,	MUST total 100%)				

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

Three Enclosed Railcar Dump Pits (ES-010)

#### Emission Source/Operating Scenario Data Page 1 of 2 Facility ID #: 6800043 Railcar Dump Pits Permit #: 3069T17 County: Orange Facility Name: University of North Carolina at Chapel Hill DAQ Region: **RRO** North Carolina Department of Environment and Natural Resources **Division of Air Quality** Air Pollutant Point Source Emissions Inventory - Calendar Year 2004 1. Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant) ES-010 **Emission Source Description** Three Enclosed Railcar Dump Pits 3. Operating Scenario Description N/A 4. Maximum Permitted Operating Rate 350 tons/hr With Units (Ex. gal/hr, mmBtu/hr) 5. Throughput in CY (e.g. production or fuel use) 115,120 With Units (Ex. lbs/yr, gal/yr) tons/yr 6. Fuel Information (if fuel used) % Sulfur N/A % Ash Heat Content (Btu/lb or munCF) N/A N/A If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you. 7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack) N/A 8. Control Device Information, if none, write "none" Control Device ID# **Control Device Description** (as listed in permit) (nearest stack) N/A **Enclosed Dump Pits** ii. **CD-018** Wet Spray Dust Suppression System iii. N/A N/A iv. N/A N/A 9. Stack Information (sources vented to more than one stack use additional entry lines) Height Diameter (feet) Temperature Velocity Volume Flow Rate Release Point Description Stack ID# Circle (enter #), Rectangle (L#, W#) (in whole feet) (Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward **(F)** (feet/sec) (acfm) (in 0.1 feet) **Fugitive** 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year) Hours/Day Days/Week 5 Weeks/Year **52** Hours/Year 390

22.84%

Start:

June-Aug

N/A

24.29%

End:

Sept-Nov

N/A

20.97%

Typical Start & End Times in CY:

Jan-Feb, 2002

+ Dec, 2002

11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%)

Mar-May

31.91%

#### **Emission Source/Operating Scenario Data**

Page 2 of 2

If Emission Source has (All permits	Railcar Dump Pits multiple Operating Scenarios, complete one form for each. d, lesignificant and/or Non-permitted Sources)	Permit #: County:	3069T17	
Facility Name: University of North Carolina at Chapel Hill		DAQ Region:	Orange RRO	
•				
	North Carolina Department of Environment and Natura	Resources		
	Division of Air Quality			
·······	Air Pollutant Point Source Emissions Inventory - Calenda	ır Year 2004		
Emissions: Attach calcul	ations and documentation of emission factors or other estimation method	s need		

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

ES-010

6800043

Facility ID #:

	, , , , , , , ,	production from	mod and 1 for marginificant)	E5-010
Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	со	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM ·	7.60E-03	2	67%
PM-2.5	PM-2.5	1.13E-03	2	40%
PM-10	PM-10	3.60E-03	2	63%
SO2	SO2	N/A	N/A	05 % N/A
voc	VOC	N/A	N/A	N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
	· · · · · · · · · · · · · · · · · · ·			

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

2004 Annual Emissions Inventory

# Fugitive Losses from the unloading of coal from railcars into a dump pit. (ES-010)

Assume that the total amount of coal unloaded is equal to the total amount of coal combusted in 2004.

Boiler #6	58,243	Tons/yr
Boiler #7	56,878	Tons/yr
Total	115,120	Tons/yr

From section 13.2.4 of the AP-42, coal handling is well approximated by aggregate handling operations. The following equation represents the particulate emissions generated by the dropping of coal into the dump pit.

$$E = k (0.0032) (u/5)^{1.3}$$

E = Emission Factor (lb/ton)

 $(m/2)^{1.4}$ 

k = Particle Size Multiplier

u = Mean Wind Speed (mph)

m = Material Moisture Content (%)

k Value	Particulate Size	Emission Factor (lb/ton)
0.74	PM	1.32E-04
0.35	PM-10	6.25E-05
0.11	PM-2.5	1.96E-05

Average moisture content of coal is 4.5%

The dump area is fully enclosed, therefore the minimum wind speed of 1.3 mph was used.

**Total Coal** 

115,120 tons/yr

Emissions from the unloading of coal:

Emission		Emissions	Emissions
	Factor (lb/ton)	(lb/yr)	(ton/yr)
PM	1.32E-04	15.20	7.60E-03
PM-10	6.25E-05	7.19	3.60E-03
PM-2.5	1.96E-05	2.26	1.13E-03

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## **2004 Annual Emissions Inventory**

Coal Silos (ES-1, ES-2)

#### **Emission Source/Operating Scenario Data** Page 1 of 2 Facility ID #: 6800043 Permit #: 3069T17 County: Orange Facility Name: University of North Carolina at Chapel Hill **DAQ Region:** RRO North Carolina Department of Environment and Natural Resources **Division of Air Quality** Air Pollutant Point Source Emissions Inventory - Calendar Year 2004 1. Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant) ES-1 and ES-2 2. Emission Source Description Two Coal Storage Silos **Operating Scenario Description** N/A 4. Maximum Permitted Operating Rate 350 tons/hr With Units (Ex. gal/hr, mmBtu/hr) 5. Throughput in CY (e.g. production or fuel use) 115,120 tons/yr With Units (Ex. lbs/yr, gal/yr) 6. Fuel Information (if fuel used) % Sulfur % Ash N/A N/A Heat Content (Btu/lb or mtmCF) N/A If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you. 7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack) 100% 8. Control Device Information, if none, write "none" Control Device ID # **Control Device Description** (as listed in permit) CD-011 (nearest stack) Bagfilter Installed on Silo ES-1 ii. CD-012 Bagfilter Installed on Silo ES-2 iii. N/A N/A iv. N/A N/A 9. Stack Information (sources vented to more than one stack use additional entry lines) Height Diameter (feet) Temperature Velocity Volume Flow Rate Release Point Description Stack ID# Circle (enter #), Rectangle (L#, W#) (Fugitive, Vertical, Vertical w/ cap, Horiz (in whole feet) (F) (feet/sec) (acfm) (in 0.1 feet) see instructions) EP-12-028 140 0.9 Ambient 61 2,500 Horizontal EP-12-036 140 0.9 Ambient 61 2,500 Horizontal 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year) Hours/Day 1.5 Days/Week 5 Weeks/Year 52 Hours/Year 390 Typical Start & End Times in CY: Start: N/A End: N/A 11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%) Jan-Feb, 2002 31.91% Mar-May 22.84% June-Aug 24.29% 20.97% Sept-Nov + Dec, 2002

Emission Source/Opera  If Emission Source In (AR perm	Facility ID #: Permit #: County:	6800043 3069T17 Orange	
Facility Name:	University of North Carolina at Chapel Hill	DAQ Region:	RRO
	North Carolina Department of Environment and Natural Re	sources	· · · · · · · · · · · · · · · · · · ·
	Division of Air Quality		
	Air Pollutant Point Source Emissions Inventory - Calendar Y	ear 2004	
Emissions: Attach calcu	ulations and documentation of emission factors or other estimation methods us	ed.	
Emission Source ID No.	(same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)	ES-1 aı	ıd ES-2

Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	CO	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM	5.25E-03	2	99.80%
PM-2.5	PM-2.5	4.99E-03	2	97.90%
PM-10	PM-10	5.25E-03	2	99.60%
SO2	SO2	N/A	N/A	N/A
VOC	VOC	N/A	N/A	N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
	*			
			·	
	· · · · · · · · · · · · · · · · · · ·			
-				
·	**************************************			

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

2004 Annual Emissions Inventory

# Emissions from the loading of 2 coal storage silos.

(ES-1, ES-2)

Assume that the total amount of coal fed to the silos is equal to the total amount of coal combusted in 2004.

Boiler #6	58,243	Tons/yr
Boiler #7	56,878	Tons/yr
Total	115,120	Tons/yr

The bulk density of coal is 47 lb/ft<sup>3</sup>

Total volume of coal combusted is =  $4,898,743 \text{ ft}^3/\text{yr}$ (Volume of coal combusted = volume of displaced air through bin filter)

These emissions are routed through bin filters (baghouses). Emissions from the bin filters are conservatively estimated at 0.015 gr/acfm (displaced air through bin filters).

 $lb/yr = (volume of coal, ft^3/yr) (0.015 gr/acf) (1/7000 lb/gr)$ 

Total Emissions from the silos	73,481	gr/yr
	10.497	lb/yr
	0.005	ton/yr

100% of these emissions are PM-10 95% of these emissions are PM-2.5

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

Silo Feed Conveyors (ES-3)

#### Emission Source/Operating Scenario Data Page 1 of 2

Silo Feed Conveyors

If Emission Source has multiple Operating Sources, complete one form for each
(All nemitted, Instendiguest and/or Non-nemitted Sources)

Facili	tv N	ame.
PACIL	14 TA	ziile:

University of North Carolina at Chapel Hill

Facility ID #:	6800043	
Permit #:	3069T17	
County:	Orange	-

**DAQ Region:** 

RRO

North	Carolina	Department of	Environment a	nd Natural	Resources
		Division	of Air Quality		

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

1. Emission Source ID No. (same as in permit - Use	"U" prefix for non-	renx for non-permitted and "1" for insignificant/				ES-3
2. Emission Source Description		Silo Feed Conveyors				
3. Operating Scenario Description		N/A				
4. Maximum Permitted Operating Rate						
With Units (Ex. gal/hr, mmBtu/hr)		700 tons/hr				
. Throughput in CY (e.g. production or fuel use)			110	120		
With Units (Ex. lbs/yr, gal/yr)			115	,120		tons/yr
6. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash	N/A	Heat Content (Btu/lb or mmCF)	N/A

If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you.

7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack)	100%

#### 8. Control Device Information, if none, write "none"

	Control Device ID #  (as listed in permit)  Control Device Description		
i. (nearest stack)	CD-019	Bagfilter	
ii.	N/A	N/A	
iii.	N/A	N/A	
iv.	N/A	N/A	

#### 9. Stack Information (sources vented to more than one stack use additional entry lines)

	Height	Diameter (feet)	Temperature	Velocity	Volume Flow Rate	Release Point Description
Stack ID #	(in whole feet)	Circle (enter #), Rectangle (L#, W#)  (in 0.1 feet)	<b>(F)</b>	(feet/sec)	(acfm)	(Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)
EP-12-6901	200	2	Ambient	45	8,500	Vertical
		••				
	-					

#### 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

Hours/Day	N/A	Days/Week	N/A	Weeks/Year	N/A	Hours/Year	N/A
Typical Start & End Times in CY:			Start:	N/A	End:	N/A	

#### 11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%)

	Jan-Feb, 2002 + Dec, 2002	25.00%	Mar-May	25.00%	June-Aug	25.00%	Sept-Nov	25.00%
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#### Emission Source/Operating Scenario Data Page 2 of 2 Silo Feed Conveyors

If Bmiss	If Emission Source has multiple Operating Scenarios, complete one form for each.		3069117
	(All permitted, Insignificant and/or Non-permitted Sources)	County:	Orange
lity Name:	University of North Carolina at Chapel Hili	DAQ Region:	RRO

#### North Carolina Department of Environment and Natural Resources **Division of Air Quality**

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

Emissions: Attach calculations and documentation of emission factors or other estimation methods used.

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

ES-03

Facility ID #:

Emission Soute ID No.		promittor non por		ES-03		
Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)		
Carbon Monoxide	СО	N/A	N/A	N/A		
NOx	NOx	N/A	N/A	N/A		
PM Total	PM	5.25E-03	2	99.80%		
PM-2.5	PM-2.5	4.99E-03	2	97.90%		
PM-10	PM-10	5.25E-03	2	99.60%		
SO2	SO2	N/A	N/A	93.0076 N/A		
voc	VOC	N/A	N/A	N/A		
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)		
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Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

2004 Annual Emissions Inventory

#### Emissions from silo feed conveyors.

(ES-3)

Assume that the total amount of coal fed to the silos is equal to the total amount of coal combusted in 2004.

Boiler #6	58,243	Tons/yr
Boiler #7	56,878	Tons/yr
Total	115,120	Tons/yr

The bulk density of coal is 47 lb/ft<sup>3</sup>

Total volume of coal combusted is = 4,898,743 ft<sup>3</sup>/yr (Volume of coal combusted = volume of displaced air through bin filter)

These emissions are routed through bin filters (baghouses). Emissions from the bin filters are conservatively estimated at 0.015 gr/acfm (displaced air through bin filters).

 $lb/yr = (volume of coal, ft^3/yr) (0.015 gr/acf) (1/7000 lb/gr)$ 

	73,481	gr/yr
Total Emissions from the conveyors	10.497	lb/yr
	0.005	ton/yr

100% of these emissions are PM-10 95% of these emissions are PM-2.5

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

Enclosed Sorbent Railcar Dump Pit (Insignificant Source) IS-53

Only 1,390.3 tons of sorbent delivered by rail in 2004. The remainder of the sorbent used was delivered by truck. There are no emission sources associated with truck delivery.

#### **Emission Source/Operating Scenario Data** Page 1 of 2

## **Enclosed Sorbent Railcar Dump Pit**

Facility Name:

University of North Carolina at Chapel Hill

Facility ID #:	6800043	
Permit #:	3069T17	-
County:	Orange	_
DAQ Region:	RRO	_

#### North Carolina Department of Environment and Natural Resources **Division of Air Quality**

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

1. Emission Source ID No. (same as in permit -	Use "U" prefix for non-	permitted and	"I" for insignificar	it)	"I"	"I" Insignificant - ID No. 020		
2. Emission Source Description		Enclosed Sorbent Railcar Dump Pit N/A						
3. Operating Scenario Description								
4. Maximum Permitted Operating Rate								
With Units (Ex. gal/hr, mmBtu/hr)					50 ton/hr			
5. Throughput in CY (e.g. production or fuel use)								
With Units (Ex. lbs/yr, gal/yr)		1,3	390		tons/yr			
5. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash	N/A	Heat Content (Btu/lb or mmC	F) N/A		

If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you.

7. Capture Efficiency (% Emissions from Emis	sion Source Vented to Control Device or Stack)	N/A	
	The state of the s	 	

#### 8. Control Device Information, if none, write "none"

·	Control Device ID #  (as listed in permit)	Control Device Description	
i. (nearest stack)	None	None	
ii.	None	None	
iii.	None	None	
iv.	None	None	···········

#### 9. Stack Information (sources vented to more than one stack use additional entry lines)

Stack ID#	Height Diameter (feet)		Temperature Velocity Volu		Volume Flow Rate	Release Point Description	
	(in whole feet)	Circle (enter #). Rectangle (L#, W#)  (in 0.1 feet)	(F)	(feet/sec) (acfm)		(Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)	
			Fu	gitive			
						-	
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#### 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

Hours/Day	1	Days/Week	3	Weeks/Year	52	Hours/Year	156
Typical Start & End Times in CY:			Start:	N/A	End:	N/A	

#### 11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%)

Jan-Feb, 2002 + Dec, 2002 31.91% Mar-May	22.84%	June-Aug	24.29%	Sept-Nov	20.97%	
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#### **Emission Source/Operating Scenario Data**

	chosen Sovoent Renticut During Pit c has multiple Operating Somarios, complete one form for each.	Permit #:	3069T17
	multied, Insignificant and/or Non-permitted Sources)	County:	Orange
ility Name:	University of North Carolina at Chapel Hill	DAQ Region:	RRO

#### North Carolina Department of Environment and Natural Resources **Division of Air Quality**

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

Emissions: Attach calculations and documentation of emission factors or other estimation methods used.

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

"I" Insignificant - ID No. 020

Facility ID #:

	1 Insignment - 1D [48, 020			
Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	СО	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM	1.24E-03	2	N/A
PM-2.5	PM-2.5	1.85E-04	2	N/A
PM-10	PM-10	5.88E-04	2	N/A
SO2	SO2	N/A	N/A	N/A
VOC	VOC	N/A	N/A	N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
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Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

2004 Annual Emissions Inventory

#### **Enclosed Sorbent (Aragonite) Railcar Dump Pit**

(Insignificant Source - ID No. 020)

Sorbent is transported from the railcar dump pit in enclosed conveyors to the storage area. Emissions can be best estimated using the drop equation.

From section 13.2.4 of the AP-42: The following equation represents the particulate emissions generated by the dropping of sorbent into the dump pit.

$$E = k \left( 0.0032 \right) \frac{\left( u_{5}^{\prime} \right)^{1.3}}{\left( m_{2}^{\prime} \right)^{1.4}}$$

E = Emission Factor (lb/ton)

k = Particle Size Multiplier

u = Mean Wind Speed (mph)

m = Material Moisture Content (%)

k Value	Particulate Size	Emission Factor (lb/ton)	
0.74	PM	1.787E-03	
0.35	PM-10	8.45E-04	
0.11	PM-2.5	2.66E-04	

Average moisture content of sorbent is 0.7%

The dump area is fully enclosed, therefore the minumum wind speed of 1.3 mph was used.

**Total Sorbent** 

1,390 tons/yr

Emissions from the unloading of sorbent into the dump pit:

	Emission Factor (lb/ton)	Emissions (lb/yr)	Emissions (ton/yr)
PM	1.32E-04	2.48	1.24E-03
PM-10	6.25E-05	1.18	5.88E-04
PM-2.5	1.96E-05	0.37	1.85E-04

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

**Fuel Oil Storage Tanks** 

(T-001 and T-002)

# Emission Source/Operating Scenario Data Page 1 of 2 Facility ID #: 6800043 Enclosed Sorbent Railcar Dump Pit If Emission Source has m County: Orange Facility Name: University of North Carolina at Chapel Hill DAQ Region: RRO

# North Carolina Department of Environment and Natural Resources Division of Air Quality

#### Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)						T001,T002	
2. Emission Source Description		Fuel Oil Storage Tanks					
Operating Scenario Description		N/A					
4. Maximum Permitted Operating Rate			,	· · · · · · · · · · ·			
With Units (Ex. gal/hr, mmBtu/hr)							
. Throughput in CY (e.g. production or fuel use)				046			
With Units (Ex. lbs/yr, gal/yr)			00,	846		gallon	
5. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash	N/A	Heat Content (Bts/lb or mmCF)		N/A

If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you.

7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack)	N/A

#### 8. Control Device Information, if none, write "none"

Control Device ID #  (as listed in permit)		Control Device Description	,
i. (nearest stack)	None	None	
ii.	None	None	
iii.	None	None	
iv.	None	None	

#### 9. Stack Information (sources vented to more than one stack use additional entry lines)

		Height	Diameter (feet)	Temperature	Velocity	Volume Flow Rate	Release Point Description		
	Stack ID#	(in whole feet)	Circle (enter #), Rectangle (L#, W#)	(F)	(feet/sec)	(acfm)	(Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)		
		<u> </u>	(in 0.1 feet)			(1)			
	Fugitive								
				·			· <del></del>		
•[			· ••						

#### 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

Hours/Day	NA	Days/Week	NA	Weeks/Year	NA.	Hours/Year	NA.
Typical Start & End Times in CY:			Start:	N/A	End:	N/A	

#### 11. Seasonal Periods Percent Annual Throughput (for Emission Source in CY, MUST total 100%)

Jan-Feb, 2002 + Dec, 2002	25.00%	Mar-May	25.00%	June-Aug	25.00%	Sept-Nov	25.00%
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Emissions: Attach calculations and documentation of emission factors or other estimation methods used.

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

"I" Insignificant - ID No. 020

Criteria (NAAQS) ∠Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	СО	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM	N/A	N/A	N/A
PM-2.5	PM-2.5	N/A	N/A	. N/A
PM-10	PM-10	N/A	N/A	N/A
SO2	SO2	· N/A	N/A	N/A
VOC	VOC	0.23	02	N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
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Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

No.1 - 2,000 kW Generator Cogeneration Facility

(ES-007)

This unit was not in operation during CY 2004.

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

#### 2004 Annual Emissions Inventory

No.2 - 2,000 kW Generator Cogeneration Facility

(ES-008)

This unit was not in operation during CY 2004.

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## **2004 Annual Emissions Inventory**

No.3 - 2,000 kW Generator Cogeneration Facility

(ES-009)

This unit was not in operation during CY 2004.

Chapel Hill, North Carolina
Orange County
Facility ID # 6800043
Permit # 03069T17

## 2004 Annual Emissions Inventory

Four Coal Bunkers (ES-01, 02, 03 and 04)

(These units do not discharge to the ambient air.)

#### Emission Source/Operating Scenario Data Page 1 of 2

Coal Storage Bunkers

Recility	Name:	

University of North Carolina at Chapel Hill

Facility ID #:	6800043	
Permit #:	3069T17	_
County:	Orange	
DAQ Region:	RRO	_

**DAQ Region:** 

North Carolina	Department of	Environment	and Natural	Resource
	Division	of Air Quality	y	

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

1. Emission Source ID No. (same as in permit - L	Jse "U" prefix for non-	permitted and	"I" for insignificar	ıt)		ES-01, 02, 03, 04
2. Emission Source Description		Four Coal Storage Bunkers				
3. Operating Scenario Description		N/A				
4. Maximum Permitted Operating Rate		60 tons/hr (each)				
With Units (Ex. gal/hr, mmBtu/hr)						
5. Throughput in CY (e.g. production or fuel use)				400		
With Units (Ex. lbs/yr, gal/yr)			115	,120		tons/yr
5. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash	N/A	Heat Content (Btu/lb or numCF)	N/A

If you do not provide annual throughput/fuel use, your inventory will be deemed incomplete and returned to you.

7. Capture Efficiency (% Emissions from Emission Source Vented to Control Device or Stack)	1 1000/
11. Captuic Einciency (% Emissions from Emission Source vented to Control Device or Stack)	100%
The state of the s	1 ***/*

#### 8. Control Device Information, if none, write "none"

	Control Device ID #  (as listed in permit)	Control Device Description
i. (nearest stack)	CD-014	Bagfilter on Bunker ES-01
ii.	CD-015	Bagfilter on Bunker ES-02
iii.	CD-016	Bagfilter on Bunker ES-03
iv.	CD-017	Bagfilter on Bunker ES-04

#### 9. Stack Information (sources vented to more than one stack use additional entry lines)

	Height	Diameter (feet)	Temperature	Velocity	Volume Flow Rate	Release Point Description	
Stack ID#		Circle (enter #), Rectangle (L#, W#)	(E)	(6.4)	( 2 )	(Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward	
	(in whole feet)	(in 0.1 feet)	(F)	(feet/sec)	(acfm)	see instructions)	
EP-14-054	137	0.52	Ambient	78	1,000	Horizontal	
EP-14-056	137	0.52	Ambient	78	1,000	Horizontal	
EP-15-054	137	0.52	Ambient	78	1,000	Horizontal	
EP-15-056	137	0.52	Ambient	78	1,000	Horizontal	

#### 10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

	<u> </u>			<del>*                                    </del>			
Hours/Day	1.5	Days/Week	7	Weeks/Year	52	Hours/Year	546
Typical Start	t & End Times in C	Y:		Start:	N/A	End:	N/A

Jan-Feb, 2002 + Dec, 2002

Jan-Feb, 2002 + Dec, 2002 31.91% Mar-May 2	84% June-Aug	24.29% Se	Sept-Nov 20.97%
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#### These Sources are Vented Inside the Boiler Building. There is NO Discharge to the Ambient Air.

#### Emission Source/Operating Scenario Data Page 2 of 2

Coal Storage Bunkers

If Emissi	on Source has multiple Operating Sconarios, complete one form for each.	Permit #:	3069T17
	(All permitted, Insignificant and/or Non-permitted Sources)	County:	Orange
cility Name:	University of North Carolina at Chapel Hill	DAQ Region:	RRO

#### North Carolina Department of Environment and Natural Resources Division of Air Quality

Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

Emissions: Attach calculations and documentation of emission factors or other estimation methods used.

Emission Source ID No. (same as in permit - Use "U" prefix for non-permitted and "I" for insignificant)

ES-01, 02, 03, 04

Facility ID #:

	· •	productor non-poin	<b></b>	ES-01, 02, 03, 04
Criteria (NAAQS) Pollutants	Pollutant Code	Emissions Criteria (Tons/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
Carbon Monoxide	СО	N/A	N/A	N/A
NOx	NOx	N/A	N/A	N/A
PM Total	PM	0	2	Source is vented inside the boiler building
PM-2.5	PM-2.5	0	2	Source is vented inside the boiler building
PM-10	PM-10	0	2	Source is vented inside the boiler building
SO2	SO2	N/A	N/A	N/A
VOC	VOC	N/A	N/A	N/A N/A
HAP/TAP Pollutants (In Alphabetical Order)	CAS # (or other code - see instructions)	Emissions HAP/TAP (Pounds/Year)	Emissions Estimation Method Code (see instructions for code)	Control Efficiency (Net after all controls)
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Chapel Hill, North Carolina Orange County Facility ID # 6800043 Permit # 03069T17

2004 Annual Emissions Inventory

#### **4 Coal Bunker Storage Areas**

(ES-01, 02, 03, 04)

Coal is transported from the coal crusher building in enclosed conveyors to the boiler building. Inside the boiler building the coal is stored in four coal bunkers.

Assume that the total amount of coal fed to the bunkers is equal to the total amount of coal combusted in 2004.

Boiler #6	58,243	Tons/yr
Boiler #7	56,878	Tons/yr
Total	115,120	Tons/yr

The bulk density of coal is 47 lb/ft<sup>3</sup>

Total volume of coal combusted is =  $4,898,743 \text{ ft}^3/\text{yr}$ (Volume of coal combusted = volume of displaced air through bin filter)

These emissions are routed through bin filters (baghouses). Emissions from the bin filters are conservatively estimated at 0.015 gr/acfm (displaced air through bin filters).

$$lb/yr = (ft^3/yr) (0.015 gr/acfm) (1/7000 lb/gr)$$

	73,481	gr/yr
Total Emissions from the bunkers	10.497	lb/yr
	0.005	ton/yr

This baghouse is vented inside the Boiler Building, therefore there are no emissions to the ambient air.