

**Cogeneration Facility
2004 Air Emissions Inventory**

**University of North Carolina at Chapel Hill
Chapel Hill, North Carolina**

Facility ID # 6800043
Permit # 03069T17

Prepared for:

University of North Carolina at Chapel Hill
Department of Environment, Health, and Safety
212 Finley Golf Course, CB 1650
Chapel Hill, North Carolina 27517

Prepared by:

RST Engineering
5416 Orchard Oriole Trail
Wake Forest, North Carolina 27587-6770

October 2005

General Contact Information**Company Name:** University of North Carolina at Chapel Hill**Facility ID #:** 6800043**Permit #(s):** 03069T17

**North Carolina Department of Environment and Natural Resources
Division of Air Quality
Calendar Year 2004 Annual Air Pollutant Point Source Emission Inventory**

**Notice: This form must be completed and returned only when changes or additions to the information are needed.
Note that some items such as changes in company name may require permit modification.**

The information that was pre-printed on the paper version of this form was from DAQ data systems, current as of December 31, 2003. If this pre-printed information was incorrect, please enter only the new or changed information in the spaces below (in color or use "strike through").

Facility (Physical) Address: 302 South Building, CB#1000
(Please use 911 address if not shown) Chapel Hill, North Carolina 27599

County: Orange County**Facility Classification:** Title V**DENR-DAQ Region:** Raleigh Regional Office**On-Site Inspection Contact (Facility Contact):** Dr. Richard Miller**Title:** Environmental Affairs Manager **e-mail:** rich_miller@unc.edu

Mailing Address: 212 Finley Golf Course Road CB#1650 **Telephone #:** (919) 962-5718
Chapel Hill, North Carolina 27517 **Fax #:** (919) 962-0227

Facility Responsible Official (Authorized Contact): Nancy Suttentfield**Title:** Vice Chancellor for Finance and Administration **e-mail:** nancy_suttentfield@unc.edu

Mailing Address: 302 South Building, CB#1000 **Telephone #:** (919) 962-3798
Chapel Hill, North Carolina 27599 **Fax #:** (919) 962-0647

Facility Technical/Permit Contact: Dr. Richard Miller**Title:** Environmental Affairs Manager **e-mail:** _____

Mailing Address: 212 Finley Golf Course Road CB#1650 **Telephone #:** (919) 962-5718
Chapel Hill, North Carolina 27517 **Fax #:** (919) 962-0227

Billing/Invoice Company: University of North Carolina at Chapel Hill

Billing/Invoice Address: 212 Finley Golf Course Road, CB#1650
Chapel Hill, North Carolina 27517

Billing/Invoice Contact Name: Dr. Richard Miller**Title:** Environmental Affairs Manager**Telephone #:** (919) 962-5718**e-mail:** rich_miller@unc.edu**Fax #:** (919) 962-0227**Standard Industrial Classification (SIC) Code(s) - being phased out:****North American Industry Classification System (NAICS - six digit) Codes(s)****-If Known (see instructions). These will replace SIC**

Primary	Secondary	Tertiary
8221		
611310		

Information on this form cannot be held confidential.

This form is due (postmarked) to the Appropriate Regional Office with emission inventory on June 30, 2003 and at other times as changes may occur. Please help us to keep our contact information up to date as changes occur.

Facility Total CY 2004 Emissions Summary

Facility ID #: **6800043**Permit #(s): **03069T17**Facility Name: 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

Record Facility-Wide Totals Below From all Permitted and Non-Permitted Air Pollutant Emission Sources

Criteria Pollutants	ID #'s of Contributing Sources	Actual Emissions (Tons/Year)*	
		CY 2003	CY 2004
Carbon Monoxide (CO) (Reporting required, but no fees based on CO)	ES-001, 002, 003		1,040.8
Oxides of Nitrogen (NOx) (Report as tons of NO ₂ equivalent)	ES-001, 002, 003		534.5
PM/TSP - Particulate Matter (Total - not used for emission fees)	ES-001, 002, 003, 010, 1, 2, 010A, 01, 02, 03, 04, 030, 030A		5.9
PM-10 Particulate Matter with mean aerodynamic particle size less than 10 micrometers. Include all condensibles, including Sulfur Trioxide and Sulfuric Acid as PM-10	ES-001, 002, 003, 010, 1, 2, 010A, 01, 02, 03, 04, 030, 030A		5.8
PM-2.5 Particulate Matter with mean aerodynamic particle size less than 2.5 micrometers. This pollutant includes all condensibles using best information available.	ES-001, 002, 003, 010, 1, 2, 010A, 01, 02, 03, 04, 030, 030A		4.4
Sulfur Dioxide (SO₂) Do not include Sulfur Trioxide and Sulfuric Acid	ES-001, 002, 003		203.7
VOC Volatile Organic Compounds - See instructions for Federal definition excluding some non-photochemically reactive organics	ES-001, 002, 003		3.4

On Next Page: Enter, in Alphabetical Order, All HAPs/TAPs Required by Instructions
(Sum Source Emissions From Emission Source / Operating Scenario Forms)

*Attach supporting documentation and calculations. For CY 2001 Inventory use a 1000 lb (facility total) threshold, except for compounds not previously reported to DAQ in 1999 or 2000 inventory. Report all for these.

(If using a blank form, you do not need to replicate the CY 2000 emissions column except to point out errors)

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Facility Total CY 2004 Emissions Summary

Facility ID **6800043**Permit #(s) **03069T17**Facility Name: 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

Hazardous Air Pollutants (HAPs) and/or Toxic Air Pollutants (TAPs)	CAS Number or Symbol (see instructions)	ID Numbers of Contributing Sources	Actual Emissions (Pounds/Year)*	
			CY 2003	CY 2004
2,3,7,8-TCDD		ES-001, 002, 003		0.000002
2,4-Dinitrotoluene	121-14-2	ES-001, 002, 003		0.03
2-Chloroacetophenone	532-27-4	ES-001, 002, 003		0.81
Acetaldehyde	75-07-0	ES-001, 002, 003		65.62
Acetophenone	98-86-2	ES-001, 002, 003		1.73
Acrolein	107-02-8	ES-001, 002, 003		33.38
Arsenic	ARSENICPDS	ES-001, 002, 003		1.31
Benzene	71-43-2	ES-001, 002, 003		150.24
Benzo(a)pyrene	50-32-8	ES-001, 002, 003		0.004
Benzyl Chloride	100-44-7	ES-001, 002, 003		80.58
Beryllium	BERYLCPDS	ES-001, 002, 003		56.63
Biphenyl	92-52-4	ES-001, 002, 003		0.20
Bis(2-ethylhexyl)phthalate (DEHP)		ES-001, 002, 003		8.40
Bromine	7726-95-6	ES-001, 002, 003		24.67
Bromoform	75-25-2	ES-001, 002, 003		4.49
Cadmium	CADMIUMCPDS	ES-001, 002, 003		0.22
Carbon Disulfide	75-15-0	ES-001, 002, 003		14.97
Chlorobenzene	108-90-7	ES-001, 002, 003		2.53
Chloroform	67-66-3	ES-001, 002, 003		6.79
Chromium	CROMCPDS	ES-001, 002, 003		2.15
Chromium VI	CHROM6CPDS	ES-001, 002, 003		2.11
Cumene	98-82-8	ES-001, 002, 003		0.61
Cyanide	CNC	ES-001, 002, 003		288
Dibenzofurans	132-64-9	ES-001, 002, 003		0.02
Dichlorobenzene	106-46-7	ES-001, 002, 003		0.12
Dimethyl Sulfate	77-78-1	ES-001, 002, 003		5.53
Ethyl Benzene	100-41-4	ES-001, 002, 003		10.93
Ethyl Chloride	75-00-3	ES-001, 002, 003		4.84
Ethylene Dibromide	106-93-4	ES-001, 002, 003		0.14
Ethylene Dichloride	107-06-2	ES-001, 002, 003		4.60

Inventory Report Prepared by RST Engineering, PLLC - S.G. "Butch" Smith, P.E.

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Information on this form cannot be held confidential.

Facility Total CY 2004 Emissions Summary

Facility ID #: 6800043

Permit #(s): 03069T17

Facility Name: 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

Hazardous Air Pollutants (HAPs) and/or Toxic Air Pollutants (TAPs)	CAS Number or Symbol (see instructions)	ID Numbers of Contributing Sources	Actual Emissions (Pounds/Year)*	
			CY 2003	CY 2004
Fluoride	16984-48-8	ES-001, 002, 003		4.99
Formaldehyde	50-00-0	ES-001, 002, 003		41.80
Glycol Ethers	GLYCOLETHERS	ES-001, 002, 003		0.00
Hexane	110-54-3	ES-001, 002, 003		193.89
Hydrogen Chloride	7647-01-0	ES-001, 002, 003		2.43E+05
Hydrogen Fluoride	7664-39-3	ES-001, 002, 003		5.07E+03
Isophorone	78-59-1	ES-001, 002, 003		66.77
Lead	LEADCPDS	ES-001, 002, 003		1.01
Manganese	MANGCPDS	ES-001, 002, 003		3.52
Mercury	MERCCPDS	ES-001, 002, 003		4.37
Methyl Chloride	74-87-3	ES-001, 002, 003		61.01
Methyl Ethyl Ketone	78-93-3	ES-001, 002, 003		44.90
Methyl Bromide	74-83-9	ES-001, 002, 003		18.42
Methyl Chloroform	71-55-6	ES-001, 002, 003		0.03
Methyl Hydrazine	60-34-4	ES-001, 002, 003		19.57
Methyl Methacrylate	80-62-6	ES-001, 002, 003		2.30
Methyl Tert Butyl Ether	1634-04-4	ES-001, 002, 003		4.03
Methylene Chloride	75-09-2	ES-001, 002, 003		33.38
Napthalene	91-20-3	ES-001, 002, 003		1.60
Nickel	NICKCPDS	ES-001, 002, 003		1.87
Phenol	108-95-2	ES-001, 002, 003		1.84
POM	POM	ES-001, 002, 003		7.25
Propionaldehyde	123-38-6	ES-001, 002, 003		43.75
Selenium	SEC	ES-001, 002, 003		0.281
Styrene	100-42-5	ES-001, 002, 003		2.88
Tetrachloroethane	79-34-5	ES-001, 002, 003		4.95
Toluene	108-88-3	ES-001, 002, 003		38.63
Vinyl Acetate	108-05-4	ES-001, 002, 003		0.87
Xylenes	1330-20-7	ES-001, 002, 003		4.45

Inventory Report Prepared by RST Engineering, PLLC - S.G. "Butch" Smith, P.E.
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University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory

Seasonal Fuel Usage Breakdown

Month	Boiler #5		Boiler #6			Boiler #7			Boiler #8	
	Gas (1,000cf)	Oil (gallons)	Coal (tons)	Gas (1,000cf)	Oil (gallons)	Coal (tons)	Gas (1,000cf)	Oil (gallons)	Gas (1,000cf)	Oil (gallons)
December 2004	0	0	5,441	0	0	6,179	0	0	0	0
January 2004	0	0	6,364	1,381	0	6,774	0	0	0	112,381
February 2004	0	0	5,647	430	0	6,303	50	0	2,790	21,310
1st Quarter Total	0	0	17,452	1,811	0	19,257	50	0	2,790	133,691
March 2004	0	0	5,518	65	0	4,682	408	0	5,877	0
April 2004	0	0	3,827	0	0	3,521	0	0	0	0
May 2004	0	0	6,230	707	0	2,564	1,572	0	33,712	0
2nd Quarter Total	0	0	15,575	772	0	10,767	1,980	0	39,589	0
June 2004	0	0	5,522	430	0	4,057	160	0	0	0
July 2004	0	0	5,155	30	0	4,032	30	0	1,780	0
August 2004	0	0	4,721	20	0	4,501	150	0	480	0
3rd Quarter Total	0	0	15,398	480	0	12,590	340	0	2,260	0
September 2004	0	0	4,630	1,765	0	3,420	1,005	0	19,511	0
October 2004	0	0	871	988	0	6,348	10	0	30,002	0
November 2004	0	0	4,316	30	0	4,496	40	0	10	0
4th Quarter Total	0	0	9,817	2,783	0	14,264	1,055	0	49,523	0
2004 TOTAL	0	0	58,243	5,846	0	56,878	3,425	0	94,162	133,691

Seasonal Btu Breakdown

Coal (btu/lb)	13,068	Natural Gas (btu/ft ³)	1,030	Fuel Oil (btu/gal)	137,006
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Month	Boiler #5		Boiler #6			Boiler #7			Boiler #8	
	Gas	Oil	Coal	Gas	Oil	Coal	Gas	Oil	Gas	Oil
December 2004	0	0	1.42E+11	0.00E+00	0	1.62E+11	0.00E+00	0	0	0.00E+00
January 2004	0	0	1.66E+11	1.42E+09	0	1.77E+11	0.00E+00	0	0	1.54E+10
February 2004	0	0	1.48E+11	4.43E+08	0	1.65E+11	5.15E+07	0	2.87E+09	2.92E+09
1st Quarter Total	0	0	4.56E+11	1.87E+09	0	5.03E+11	5.15E+07	0	2.87E+09	1.83E+10
March 2004	0	0	1.44E+11	6.70E+07	0	1.22E+11	4.20E+08	0	6.05E+09	0.00E+00
April 2004	0	0	1.00E+11	0.00E+00	0	9.20E+10	0.00E+00	0	0	0.00E+00
May 2004	0	0	1.63E+11	7.28E+08	0	6.70E+10	1.62E+09	0	3.47E+10	0.00E+00
2nd Quarter Total	0	0	4.07E+11	7.95E+08	0	2.81E+11	2.04E+09	0	4.08E+10	0.00E+00
June 2004	0	0	1.44E+11	4.43E+08	0	1.06E+11	1.65E+08	0	0	0.00E+00
July 2004	0	0	1.35E+11	3.09E+07	0	1.05E+11	3.09E+07	0	1.83E+09	0.00E+00
August 2004	0	0	1.23E+11	2.06E+07	0	1.18E+11	1.55E+08	0	4.94E+08	0.00E+00
3rd Quarter Total	0	0	4.02E+11	4.94E+08	0	3.29E+11	3.50E+08	0	2.33E+09	0.00E+00
September 2004	0	0	1.21E+11	1.82E+09	0	8.94E+10	1.04E+09	0	2.01E+10	0
October 2004	0	0	2.28E+10	1.02E+09	0	1.66E+11	1.03E+07	0	3.09E+10	0
November 2004	0	0	1.13E+11	3.09E+07	0	1.18E+11	4.12E+07	0	1.03E+07	0
4th Quarter Total	0	0	2.57E+11	2.87E+09	0	3.73E+11	1.09E+09	0	5.10E+10	0
2004 TOTAL	0	0	1.52E+12	6.02E+09	0	1.49E+12	3.53E+09	0	9.70E+10	1.83E+10

Seasonal Total Fuel Usage (%)

	Boiler #5	Boiler #6	Boiler #7	Boiler #8
Dec., Jan., Feb.	0.00	29.97	33.78	18.38
Mar., Apr., May	0.00	26.69	19.02	35
June, July, Aug.	0.00	26.37	22.11	2.02
Sept., Oct., Nov.	0.00	16.98	25.09	44.24
	0	100	100	100

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory

Coal Usage Breakdown

Month	Boiler #6 Coal (tons)	Boiler #7 Coal (tons)
December 2004	5,441	6,179
January 2004	6,364	6,774
February 2004	5,647	6,303
<i>1st Quarter Total</i>	<i>17,452</i>	<i>19,257</i>
March 2004	5,518	4,682
April 2004	3,827	3,521
May 2004	6,230	2,564
<i>2nd Quarter Total</i>	<i>15,575</i>	<i>10,767</i>
June 2004	5,522	4,057
July 2004	5,155	4,032
August 2004	4,721	4,501
<i>3rd Quarter Total</i>	<i>15,398</i>	<i>12,590</i>
September 2004	4,630	3,420
October 2004	871	6,348
November 2004	4,316	4,496
<i>4th Quarter Total</i>	<i>9,817</i>	<i>14,264</i>
2004 TOTAL	58,243	56,878

Facility-Wide Coal Usage

115,120

Tons/year

Seasonal Coal Usage (%)

	Boiler #6	Boiler #7	Average (%)
Dec., Jan., Feb.	29.96%	33.86%	31.91%
Mar., Apr., May	26.74%	18.93%	22.84%
June, July, Aug.	26.44%	22.13%	24.29%
Sept., Oct., Nov.	16.86%	25.08%	20.97%
	100%	100%	100%

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory

Supporting Documentation

Individual Source Emissions

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory**Boiler #6
(ES-001-Boiler #6)****Operating Scenarios**

#1 - Coal Firing

#2 - Natural Gas Firing

#4 - No.2 Fuel Oil Firing

(#3 - No.6 Fuel Oil Firing is no longer permitted)

The boilers are equipped with Continuous Emission Monitoring (CEMs) devices to measure SO₂ and NO_x emissions from each of the boilers. The monthly averages presented in the attached spreadsheets are for the total emissions from firing all types of fuel. The 2004 Annual Emission Inventory forms require that the emissions be divided among the three possible operating scenarios.

NO_x emissions have been divided between the three operating scenarios based on the percentage of total heat input by each fuel. These calculations are detailed in the attached spreadsheets.

SO₂ emissions from natural gas combustion are insignificant, therefore, SO₂ emissions have been divided between the fuel oil and coal operating scenarios based on the percentage of total heat input by each fuel. These calculations are detailed in the attached spreadsheets.

Emissions CalculationsSO₂ and NO_x Emissions are taken from CEMs data

HCl, HF, Hg emissions are based on stack testing for Boiler MACT compliance planning completed in year 2004*

All other estimates are from DAQ Spreadsheets

Emission Source/Operating Scenario Data Page 1 of 3

Boiler #6 - Operating Scenario #1 - Coal

If Emission Source has multiple Operating Scenarios, complete one form for each.
(All permitted, insignificant and/or Non-permitted Sources)

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 insignificant)				ES-001-Boiler #6			
2. Emission Source Description				Coal / Natural Gas / No. 2 Fuel Oil Fired Circulating Fluidized Bed Combustion - Steam Generating Unit			
3. Operating Scenario Description				Operating Scenario #1 - Coal			
4. Maximum Permitted Operating Rate With Units (Ex. gal/hr, mmbtu/hr)				323.17 MMBtu/hr			
5. Throughput in CY (e.g. production or fuel use) With Units (Ex. lbs/yr, gal/yr)				58,243 tons/yr			
6. Fuel Information (if fuel used)		% Sulfur	1.16%	% Ash	8.17%	Heat Content (Btu/lb or mmCF)	13,068 Btu/lb

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

	Control Device ID # (as listed in permit)	Control Device Description
i. (nearest stack)	CD-004	Bagfilter with Calcium Carbonate (CaCO ₃) Sorbent Injection
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)

Stack ID #	Height (in whole feet)	Diameter (feet) Circle (enter #), Rectangle (L x W #) (in 0.1 feet)	Temperature (F)	Velocity (feet/sec)	Volume Flow Rate (acfm)	Release Point Description (Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)
EP-14-136	220	9	305	56.1	214,000	Vertical
--	--	--	--	--	--	--
--	--	--	--	--	--	--

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

Hours/Day	24	Days/Week	7	Weeks/Year	50	Hours/Year	8057 Total
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	29.96%	Mar-May	26.74%	June-Aug	26.44%	Sept-Nov	16.86%
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Emission Source/Operating Scenario Data Page 2 of 3

Boiler #6 - Operating Scenario #1 - Coal

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

(All permitted, insignificant and/or Non-permitted Sources)

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

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-001-Boiler #6

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	524.19	8	N/A
NOx	NOx	257.51	1	N/A
PM Total	PM	1.44	8	99.80%
PM-2.5	PM-2.5	0.86	8	97.90%
PM-10	PM-10	1.44	8	99.60%
SO2	SO2	100.75	1	90.00%
VOC	VOC	1.46	8	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)
Acetaldehyde	750-07-0	33.20	8	N/A
Acetophenone	98-86-2	0.87	8	N/A
Acrolein	107-02-8	16.89	8	N/A
Arsenic	ARSENICPDS	0.62	8	99.60%
Benzene	71-43-2	75.72	8	N/A
Benzo(a)pyrene	50-32-8	2.21E-03	8	N/A
Benzyl chloride	100-44-7	40.77	8	N/A
Beryllium	BERYLCPDS	28.62	8	N/A
Biphenyl	92-52-4	9.90E-02	8	N/A
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	4.25	8	N/A
Bromine	7726-95-6	12.48	8	99.60%
Bromoform	75-25-2	2.27	8	N/A
Cadmium	CADMIUMCPDS	2.51E-02	8	99.60%
Carbon disulfide	75-10-0	7.57	8	N/A
2-Chloroacetophenone	532-27-4	0.41	8	N/A
Chlorobenzene	108-90-7	1.28	8	N/A
Chloroform	67-66-3	3.44	8	N/A
Chromium	CROMCPDS	0.98	8	99.60%
Chromium (VI)	CHROM6CPDS	0.98	8	99.60%
Cumene	98-82-8	0.31	8	N/A
Cyanide	CNC	145.61	8	N/A
Dibenzofurans	132-64-9	1.17E-02	8	N/A
Dimethyl sulfate	77-78-1	2.80	8	N/A
2,4-Dinitrotoluene	121-14-2	1.63E-02	8	N/A
Ethyl benzene	100-41-4	5.47	8	N/A
Ethyl chloride	75-00-3	2.45	8	N/A
Ethylene dibromide	106-93-4	6.99E-02	8	N/A
Ethylene dichloride	107-06-2	2.33	8	N/A

Emissions and data on this form required to report or verify emissions cannot be held confidential.

To review instructions or get a blank copy, go to web page: <http://daq.state.nc.us/Offices/Planning/Attainment/est.html>

Copy and Use additional Sheets as needed.

Emission Source/Operating Scenario Data Page 3 of 3

Boiler #6 - Operating Scenario #1 - Coal

If Emission Source has multiple Operating Scenarios, complete one form for each.
(All permitted, insignificant and/or Non-permitted Sources)

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

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-001-Boiler #6

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	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	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)
Formaldehyde	50-0-00	13.98	8	N/A
Hexane	HEXANEISO	3.90	8	N/A
Hydrogen Chloride ***	7647-01-0	122892.31	8	90% Control with CaCO ₃
Hydrogen Fluoride ***	7664-39-3	2562.68	8	90% Control with CaCO ₃
Isophorone	78-59-1	33.78	8	N/A
Lead	LEADCPDS	0.40	8	99.60%
Manganese	MANGCPDS	1.70	8	99.60%
Mercury***	MERCCPDS	2.17	8	N/A
Methyl bromide	74-83-9	9.32	8	N/A
Methyl chloride	74-87-3	30.87	8	N/A
Methyl ethyl ketone	78-93-3	22.71	8	N/A
Methyl hydrazine	60-34-4	9.90	8	N/A
Methyl methacrylate	80-62-6	1.16	8	N/A
Methyl tert butyl ether	1634-04-4	2.04	8	N/A
Methylene chloride	75-09-2	16.89	8	N/A
Naphthalene	91-20-3	0.76	8	N/A
Nickel	NICKCPDS	0.81	8	99.60%
Phenol	108-95-2	0.93	8	N/A
POM	POM	3.41	8	N/A
Propionaldehyde	123-38-6	22.13	8	N/A
Styrene	100-42-5	1.46	8	N/A
2,3,7,8-TCDD	1746-01-6	8.33E-07	8	N/A
Tetrachloroethylene	79-34-5	2.50	8	N/A
Toluene	108-88-3	13.98	8	N/A
1,1,1-Trichloroethane	79-00-5	1.16	8	N/A
Vinyl acetate	108-05-4	0.44	8	N/A
Xylenes	1330-20-7	2.15	8	N/A

Emissions and data on this form required to report or verify emissions cannot be held confidential.

To review instructions or get a blank copy, go to web page: <http://daq.state.nc.us/Offices/Planning/Attainment/est.html>

Copy and Use additional Sheets as needed.

Emission Source/Operating Scenario Data Page 1 of 2

Boiler #6 - Operating Scenario #3 - Natural GasIf Emission Source has multiple Operating Scenarios, complete one form for each.
(All permitted, insignificant and/or Non-permitted Sources)Facility Name: University of North Carolina at Chapel HillFacility ID #: 6800043Permit #: 3069T17County: OrangeDAQ 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-001-Boiler #6	
2. Emission Source Description		Coal / Natural Gas / No. 2 Fuel Oil Fired Circulating Fluidized Bed Combustion - Steam Generating Unit	
3. Operating Scenario Description		Operating Scenario #2 - Natural Gas	
4. Maximum Permitted Operating Rate With Units (Ex. gal/hr, mmBtu/hr)		323.17 MMBtu/hr	
5. Throughput in CY (e.g. production or fuel use) With Units (Ex. lbs/yr, gal/yr)		5,846 1,000 ft ³ /yr	
6. Fuel Information (if fuel used)	% Sulfur	N/A	% Ash N/A Heat Content (Btu/lb or mmCF) 1,030 Btu/ft ³

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-004	Bagfilter with Calcium Carbonate (CaCO ₃) Sorbent Injection
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)

Stack ID #	Height (in whole feet)	Diameter (feet) Circle (enter #), Rectangle (L#, W#) (in 0.1 feet)	Temperature (F)	Velocity (feet/sec)	Volume Flow Rate (acfm)	Release Point Description (Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)
EP-14-136	220	9	305	56.1	214,000	Vertical
--	--	--	--	--	--	--
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10. Operating Schedule (Source/Operating Scenario that best characterizes calendar year)

Hours/Day	24	Days/Week	7	Weeks/Year	50	Hours/Year	8059 Total
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	30.98%	Mar-May	13.21%	June-Aug	8.21%	Sept-Nov	47.61%
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Emission Source/Operating Scenario Data Page 1 of 2

Boiler #6 - Operating Scenario #3 - No. 6 Fuel OilIf Emission Source has multiple Operating Scenarios, complete one form for each.
(All permitted, insignificant and/or Non-permitted Sources)Facility Name: University of North Carolina at Chapel HillFacility ID #: 6800043Permit #: 3069T17County: OrangeDAQ 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-001-Boiler #6	
2. Emission Source Description		Coal / Natural Gas / No. 2 Fuel Oil Fired Circulating Fluidized Bed Combustion - Steam Generating Unit	
3. Operating Scenario Description		Operating Scenario #3 - No. 6 Fuel Oil	
4. Maximum Permitted Operating Rate With Units (Ex. gal/hr, mmBtu/hr)		323.17 MMBtu/hr	
5. Throughput in CY (e.g. production or fuel use) With Units (Ex. lbs/yr, gal/yr)		0 gallons/yr	
6. Fuel Information (if fuel used)	% Sulfur	2.10%	% Ash 0.10% Heat Content (Btu/lb or mmCF) 150,000 Btu/gal

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-004	Bagfilter with Calcium Carbonate (CaCO ₃) Sorbent Injection
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)

Stack ID #	Height (in whole feet)	Diameter (feet) Circle (enter #), Rectangle (Lx, Wx) (in 0.1 feet)	Temperature (F)	Velocity (feet/sec)	Volume Flow Rate (acfm)	Release Point Description (Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)
EP-14-136	220	9	305	56.1	214,000	Vertical
--	--	--	--	--	--	--
--	--	--	--	--	--	--

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

Hours/Day	0	Days/Week	0	Weeks/Year	0	Hours/Year	0
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	0.00%	Mar-May	0.00%	June-Aug	0.00%	Sept-Nov	0.00%
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Emission Source/Operating Scenario Data Page 1 of 2

Boiler #6 - Operating Scenario #4 - No. 2 Fuel OilIf Emission Source has multiple Operating Scenarios, complete one form for each.
(All permitted, insignificant and/or Non-permitted Sources)Facility Name: University of North Carolina at Chapel HillFacility ID #: 6800043Permit #: 3069T17County: OrangeDAQ 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-001-Boiler #6	
2. Emission Source Description		Coal / Natural Gas / No. 6 Fuel Oil / No. 2 Fuel Oil Fired Circulating Fluidized Bed Combustion - Steam Generating Unit			
3. Operating Scenario Description		Operating Scenario #4 - No. 2 Fuel Oil			
4. Maximum Permitted Operating Rate With Units (Ex. gal/hr, mmBtu/hr)		323.17 MMBtu/hr			
5. Throughput in CY (e.g. production or fuel use) With Units (Ex. lbs/yr, gal/yr)		0 gallons/yr			
6. Fuel Information (if fuel used)		% Sulfur	0.05%	% Ash	
		Heat Content (Btu/lb or mmCF)		137,006 Btu/gal	

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-004	Bagfilter with Calcium Carbonate (CaCO ₃) Sorbent Injection
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)

Stack ID #	Height (in whole feet)	Diameter (feet) Circle (enter #), Rectangle (L#, W#) (in 0.1 feet)	Temperature (F)	Velocity (feet/sec)	Volume Flow Rate (acfm)	Release Point Description (Fugitive, Vertical, Vertical w/ cap, Horizontal, Downward - see instructions)
EP-14-136	220	9	305	56.1	214,000	Vertical
--	--	--	--	--	--	--
--	--	--	--	--	--	--

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

Hours/Day	24	Days/Week	7	Weeks/Year	50	Hours/Year	8,057 Total
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	#DIV/0!	Mar-May	#DIV/0!	June-Aug	#DIV/0!	Sept-Nov	#DIV/0!
------------------------------	---------	---------	---------	----------	---------	----------	---------

To review instructions or get a blank copy, go to web page: <http://daq.state.nc.us/Offices/Planning/Attainment/est.html>

Copy and Use additional Sheets as needed

North Carolina Department of Environment and Natural Resources
Division of Air Quality
Air Pollutant Point Source Emissions Inventory - Calendar Year 2004

ES-001-Boiler #6

Copy and Use additional Sheets as needed.

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory

Boiler #6

(ES-001-Boiler #6)

Emissions Calculations

SO₂ and NO_x Emissions are Taken from CEMs Data

HCl, HF, Hg emissions are based on stack test data

All other estimates are from DAQ Spreadsheets

Bituminous Coal Combustion

2004 Annual Emissions Inventory

Facility University of North Carolina at Chapel Hill
 City Chapel Hill
 County Orange County

APP #/Fac ID 6800043
 Input By RST Engineering
 Source ID Boiler #6
 (ES-001-Boiler #6)

Operating Scenario #1

Data Input

Maximum Heat Input mmBtu/hrBoiler Size/Type Actual Fuel Usage ton/yr
orHours of Operation hr/yr
andHeating Value Btu/lb

ton/yr

Sulfur Content %Ash Content : %(B)ituminous or (S)ubbituminous? (B/S)Calcium to Sulfur Ratio

Boiler Type:

- 1) Pulverized/Dry Bottom
- 2) Pulverized/Wet Bottom
- 3) Cyclone Furnace
- 4) Spreader Stoker
- 5) Overfeed Stoker

- 6) Underfeed Stoker
- 7) Fluidized Bed Cir.
- 8) Fluidized Bed Bub.
- 9) Hand Fed

Control Device Efficiencies:

PM	<input type="text" value="99.80"/>	%
PM-10	<input type="text" value="99.60"/>	%
PM-2.5	<input type="text" value="97.90"/>	%
SOx*	<input type="text" value="90.00"/>	%
NOx*	<input type="text" value="0.00"/>	%

**SOx and NOx emission estimates were calculated using CEMS data. Please refer to the SOx and NOx emissions data presented in the following CEMS spreadsheets.*

HCl, HF, and Hg emissions based on stack test data.

Bituminous Coal Combustion

2004 Annual Emissions Inventory

Facility University of North Carolina at Chapel Hill
City Chapel Hill
County Orange County

APP #/Fac ID 6800043
Input By RST Engineering
Source ID Boiler #6
(ES-001-Boiler #6)

Operating Scenario #1

ACTUAL CRITERIA EMISSIONS

Pollutant	Factor		Emission Rates	
	(lb poll./ton coal)	(lb/hr)	(lb/yr)	(tpy)
PM	17	0.61	2,889	1.44
PM-10	12.4	0.61	2,889	1.44
PM-2.5*	1.4	0.36	1,712	0.86
SO ₂	10.09	**	**	**
SO ₃ *	0.07	**	**	**
NO _x	3.90	**	**	**
VOC	0.05	0.62	2,912	1.46
CO	18	222.57	1,048,370	524.19

ACTUAL TOXIC EMISSIONS

Pollutant	Factor		Emission Rates	
	(lb poll./ton coal)	(lb/hr)	(lb/yr)	(tpy)
Acetaldehyde	5.70E-04	7.05E-03	3.32E+01	1.66E-02
Acetophenone	1.50E-05	1.85E-04	8.74E-01	4.37E-04
Acrolein	2.90E-04	3.59E-03	1.69E+01	8.45E-03
Arsenic	5.29E-03	1.31E-04	6.16E-01	3.08E-04
Benzene	1.30E-03	1.61E-02	7.57E+01	3.79E-02
Benzo(a)pyrene	3.80E-08	4.70E-07	2.21E-03	1.11E-06
Benzyl chloride	7.00E-04	8.66E-03	4.08E+01	2.04E-02
Beryllium	4.91E-04	6.08E-03	2.86E+01	1.43E-02
Biphenyl	1.70E-06	2.10E-05	9.90E-02	4.95E-05
Bis(2-ethylhexyl)phthalate (DEHP)	7.30E-05	9.03E-04	4.25E+00	2.13E-03
Bromine	1.07E-01	2.65E-03	1.25E+01	6.24E-03
Bromoform	3.90E-05	4.82E-04	2.27E+00	1.14E-03
Cadmium	2.15E-04	5.33E-06	2.51E-02	1.25E-05
Carbon disulfide	1.30E-04	1.61E-03	7.57E+00	3.79E-03
2-Chloroacetophenone	7.00E-06	8.66E-05	4.08E-01	2.04E-04
Chlorobenzene	2.20E-05	2.72E-04	1.28E+00	6.41E-04
Chloroform	5.90E-05	7.30E-04	3.44E+00	1.72E-03
Chromium	8.46E-03	2.09E-04	9.85E-01	4.92E-04
Chromium (VI)	8.46E-03	2.09E-04	9.85E-01	4.92E-04
Cumene	5.30E-06	6.55E-05	3.09E-01	1.54E-04
Cyanide	2.50E-03	3.09E-02	1.46E+02	7.28E-02
Dibenzofurans	2.01E-07	2.49E-06	1.17E-02	5.85E-06
Dimethyl sulfate	4.80E-05	5.94E-04	2.80E+00	1.40E-03
2,4-Dinitrotoluene	2.80E-07	3.46E-06	1.63E-02	8.15E-06
Ethyl benzene	9.40E-05	1.16E-03	5.47E+00	2.74E-03
Ethyl chloride	4.20E-05	5.19E-04	2.45E+00	1.22E-03
Ethylene dibromide	1.20E-06	1.48E-05	6.99E-02	3.49E-05
Ethylene dichloride	4.00E-05	4.95E-04	2.33E+00	1.16E-03
Formaldehyde	2.40E-04	2.97E-03	1.40E+01	6.99E-03
Hexane	6.70E-05	8.28E-04	3.90E+00	1.95E-03
Hydrogen Chloride ***	2.11E+00	2.61E+01	1.23E+05	6.14E+01
Hydrogen Fluoride ***	4.40E-02	5.44E-01	2.56E+03	1.28E+00
Isophorone	5.80E-04	7.17E-03	3.38E+01	1.69E-02
Lead	3.41E-03	8.44E-05	3.98E-01	1.99E-04

**SO₂ and NO_x emissions were estimated using CEMS data, please refer to the attached data sheets entitled "Sulfur Dioxide Emissions from Boiler #6" and "Nitrogen Dioxide Emissions from Boiler #6".

*** HCl, HF, and Hg emissions based on stack test data.

Bituminous Coal Combustion

2004 Annual Emissions Inventory

Facility University of North Carolina at Chapel Hill
City Chapel Hill
County Orange County

APP #/Fac ID 6800043
Input By RST Engineering
Source ID Boiler #6
(ES-001-Boiler #6)

Operating Scenario #1

ACTUAL TOXIC EMISSIONS (continued)

Pollutant	Factor		Emission Rates	
	(lb poll./ton coal)	(lb/hr)	(lb/yr)	(tpy)
Manganese	1.46E-02	3.61E-04	1.70E+00	8.51E-04
Mercury***	3.73E-05	4.61E-04	2.17E+00	1.08E-03
Methyl bromide	1.60E-04	1.98E-03	9.32E+00	4.66E-03
Methyl chloride	5.30E-04	6.55E-03	3.09E+01	1.54E-02
Methyl ethyl ketone	3.90E-04	4.82E-03	2.27E+01	1.14E-02
Methyl hydrazine	1.70E-04	2.10E-03	9.90E+00	4.95E-03
Methyl methacrylate	2.00E-05	2.47E-04	1.16E+00	5.82E-04
Methyl tert butyl ether	3.50E-05	4.33E-04	2.04E+00	1.02E-03
Methylene chloride	2.90E-04	3.59E-03	1.69E+01	8.45E-03
Naphthalene	1.30E-05	1.61E-04	7.57E-01	3.79E-04
Nickel	6.95E-03	1.72E-04	8.10E-01	4.05E-04
Phenol	1.60E-05	1.98E-04	9.32E-01	4.66E-04
POM	5.85E-05	7.24E-04	3.41E+00	1.70E-03
Propionaldehyde	3.80E-04	4.70E-03	2.21E+01	1.11E-02
Styrene	2.50E-05	3.09E-04	1.46E+00	7.28E-04
2,3,7,8-TCDD	1.43E-11	1.77E-10	8.33E-07	4.16E-10
Tetrachloroethylene	4.30E-05	5.32E-04	2.50E+00	1.25E-03
Toluene	2.40E-04	2.97E-03	1.40E+01	6.99E-03
1,1,1-Trichloroethane	2.00E-05	2.47E-04	1.16E+00	5.82E-04
Vinyl acetate	7.60E-06	9.40E-05	4.43E-01	2.21E-04
Xylenes	3.70E-05	4.58E-04	2.15E+00	1.08E-03
Total HAPs		26.76	126,029.64	63.01

Version 5b-1.0k by Tony Pendola; 06/17/97

Notes:

- 1) Emission factors are from Supplement B to the 5th edition of AP-42, unless otherwise noted
- 2) Emission calculations will be based on the hours of operation only when actual fuel usage is not supplied
- 3) Particulate controls affect PM, PM-10, PM-2.5, and all toxics that are regulated as particulates except Mercury
- 4) VOC = NMTOC = TOC * (1-%METHANE)
- 5) PM-2.5 and SO3 do not currently need to be reported
- 6) Dibenzofurans = Polychlorinated dibenzo-p-furans
- 7) The Br emission factor is based on a mass balance generated from a 3 year coal analysis for Duke Power (1990-1992, 7 samples per year). The average concentration of bromine was 55.33 ppm (wet basis) and a heating value of 13,500 Btu/lb was assumed
- 8) For fluidized bed combustion the emission factor for underfeed stokers is utilized whenever the calcium-to-sulfur ratio is outside of the acceptable range of 1.5 to 7

Natural Gas Combustion Emissions Calculator NG2000 Revision C
2004 Annual Emissions Inventory

Boiler #6
 (ES-001-Boiler #6)

Operating Scenario #2

Facility ID # 6800043
 Permit # 03069T17

User Input <div style="border: 1px solid black; padding: 5px;"> Company Name: University of North Carolina at Chapel Hill Plant County: Orange County Plant City: Chapel Hill Permit Number: 03069T17 User: RST Engineering Heat Input Capacity (mmBtu/hr): 323.17 Fuel Input Capacity (10⁶ scf/hr): 0.32 Annual Fuel Throughput (10⁶ scf): 5.85 Latest Construction/Modification Date: N/A </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Enter the boiler type below <div style="border: 1px solid black; width: 100px; height: 20px; margin-top: 5px; text-align: center;">2</div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Other NOx Control <div style="border: 1px solid black; width: 100px; height: 20px; margin-top: 5px; text-align: center;">4</div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Large Wall-Fired Boilers (≥100 mmBtu/hr) 1 = Uncontrolled (Pre-NSPS) 2 = Uncontrolled (Post-NSPS) 3 = Controlled - Low NOx burners 4 = Controlled - Flue gas recirculation (FGR) </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Small Boilers (<100 mmBtu/hr) 5 = Uncontrolled 6 = Controlled - Low NOx burners 7 = Controlled - Low NOx burners/FGR </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Tangential-Fired Boilers (All Sizes) 8 = Uncontrolled 9 = Controlled - FGR </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Residential Furnaces (<0.3 mmBtu/hr) 10 = Uncontrolled </div>		Emissions Output (for operation 18.53 hr/yr) <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%;">Criteria Pollutants</th> <th style="width:10%;">lb/hr</th> <th style="width:10%;">lb/yr</th> <th style="width:10%;">tpy</th> <th style="width:10%;">Emission Factor (lb/mmssc)</th> </tr> </thead> <tbody> <tr> <td>PM</td> <td>2.4E+00</td> <td>4.4E+01</td> <td>2.2E-02</td> <td>7.6E+00</td> </tr> <tr> <td>PM-10</td> <td>2.4E+00</td> <td>4.4E+01</td> <td>2.2E-02</td> <td>7.6E+00</td> </tr> <tr> <td>PM-2.5</td> <td>2.4E+00</td> <td>4.4E+01</td> <td>2.2E-02</td> <td>7.6E+00</td> </tr> <tr> <td>NOx</td> <td>**</td> <td>**</td> <td>**</td> <td>1.9E+02</td> </tr> <tr> <td>VOC</td> <td>1.7E+00</td> <td>3.2E+01</td> <td>1.6E-02</td> <td>5.5E+00</td> </tr> <tr> <td>CO</td> <td>2.7E+01</td> <td>4.9E+02</td> <td>2.5E-01</td> <td>8.4E+01</td> </tr> <tr> <td>SO2</td> <td>**</td> <td>**</td> <td>**</td> <td>6.0E-01</td> </tr> <tr> <td>Total HAP</td> <td>6.0E-01</td> <td>1.1E+01</td> <td>5.5E-03</td> <td>1.9E+00</td> </tr> <tr> <td>Largest HAP</td> <td>5.7E-01</td> <td>1.1E+01</td> <td>5.3E-03</td> <td>1.8E+00</td> </tr> </tbody> </table> Toxic/Hazardous Air Pollutants <table border="1" style="width:100%; 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Dichlorobenzene	3.8E-04	NA	7.0E-03	1.2E-03																																																																																																																																
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** SO₂ and NO_x emissions were estimated using CEMS data, please refer to the attached spreadsheets

Hourly emission rates for all pollutants based on hourly rated capacity.

NG2000 Revision C dated March 9, 2000

**Fuel Oil Combustion Emissions Calculator FO2000 Revision A
2004 Annual Emissions Inventory**

**Boiler #6
(ES-001-Boiler #6)
Facility ID # 6800043
Permit # 03069T17**

Operating Scenario #3

User Input	
Company Name:	University of North Carolina at Chapel Hill
Plant County:	Orange County
Plant City:	Chapel Hill
Permit Number:	03069T17
User:	RST Engineering
Heat Input Capacity (mmBtu/hr):	323.17
Fuel Input Capacity (10 ³ gal/hr):	2.15
Annual Fuel Throughput (1000 gal):	0.00
Maximum fuel sulfur content (%):	2.1
Latest Construction/Modification Date:	N/A
Enter the boiler type below ▾	
1	

Boilers =>100 mmBtu/hr 1 = No. 6 oil fired, normal firing (U) 2 = No. 6 oil fired, normal firing (I) 3 = No. 6 oil fired, normal firing (C) 4 = No. 6 oil fired, normal firing, low NOx burner (U) 5 = No. 6 oil fired, normal firing, low NOx burner (I) 6 = No. 6 oil fired, normal firing, low NOx burner (C) 7 = No. 6 oil fired, tangential firing (U) 8 = No. 6 oil fired, tangential firing, low NOx burner (U) 9 = No. 5 oil fired, normal firing (U) 10 = No. 5 oil fired, normal firing (I) 11 = No. 5 oil fired, tangential firing (U) 12 = No. 4 oil fired, normal firing (U) 13 = No. 4 oil fired, normal firing (I) 14 = No. 4 oil fired, tangential firing (U) 15 = No. 2 oil fired (U,I)	Boilers =>100 mmBtu/hr (cont'd) 16 = No. 2 oil fired (C) 17 = No. 2 oil fired, LNB/FGR (U,I) 18 = No. 2 oil fired, LNB/FGR (C)
	19 = Vertical fired utility boiler
	Small Boilers (<100 mmBtu/hr) 20 = No. 6 oil fired (I) 21 = No. 6 oil fired (C) 22 = No. 5 oil fired (C) 23 = No. 4 oil fired (C) 24 = No. 2 oil fired (I) 25 = No. 2 oil fired (C)
	26 = Residential Furnace

**Fuel Oil Combustion Emissions Calculator FO2000 Revision A
2004 Annual Emissions Inventory**

**Boiler #6
(ES-001-Boiler #6)
Facility ID # 6800043
Permit # 03069T17**

Operating Scenario #3

User Input	
Company Name:	University of North Carolina at Chapel Hill
Plant County:	Orange County
Plant City:	Chapel Hill
Permit Number:	03069T17
User:	RST Engineering
Heat Input Capacity (mmBtu/hr):	323.17
Fuel Input Capacity (10 ³ gal/hr):	2.15
Annual Fuel Throughput (1000 gal):	0.00
Maximum fuel sulfur content (%):	2.1
Latest Construction/Modification Date:	N/A

Emission Controls

Particulate controls

Enter the control type below ▾	Message Area	Or enter a PM control efficiency below to override built in values.
3		
<u>Control Device</u> 0 = None/other 1 = ESP 2 = Scrubber 3 = Bagfilter 4 = Multiple cyclone	<u>Avg. Cont. Effic.</u> 99.0	<u>User Input PM Cont. Effic.</u> Message Area

Postcombustion SO₂ controls

Enter the control type below ▾	Message Area	Or enter an SO ₂ control efficiency below to override built in values.
0		
<u>Control Technology/Process</u> 0 = None/other 1 = Wet scrubber, Lime/limestone 2 = Wet scrubber, Sodium carbonate 3 = Wet scrubber, Magnesium oxide/hydroxide 4 = Wet scrubber, Dual alkali 5 = Spray drying, calcium hydroxide slurry, vap. in spray vessel 6 = Furnace injection, Dry calcium carbonate/hydrate inj. in upper furn. cavity 7 = Duct injection, Dry sorbent injection into duct, sometimes combined with water spray	<u>Avg. Cont. Effic.</u> 0.0 <u>Remarks</u> NA	<u>User Input SO₂ Cont. Effic.</u> 90.0 User entered control efficiency may be overestimated and should be documented.

NO_x controls

Enter the control type below ▾	Message Area	Or enter a NO _x control efficiency below to override built in values.
5		
<u>Control Technology/Process</u> 0 = None/other 1 = Low excess air (LEA) 2 = Staged combustion (SC) 3 = Burners out of service (BOOS) 4 = Flue gas recirculation (FGR) 5 = Flue gas recirculation plus staged combustion 6 = Low NO _x burners (LNB) 7 = Reduced air preheat (RAP) 8 = Selective noncatalytic reduction (SNCR) 9 = Conventional selective catalytic reduction (SCR)	<u>Avg. Cont. Effic.</u> 39.0 <u>Remarks</u> Available for boilers with sufficient operational flexibility	<u>User Input NO_x Cont. Effic.</u> 0.0 Message Area

**Fuel Oil Combustion Emissions Calculator FO2000 Revision A
2004 Annual Emissions Inventory**

**Boiler #6
(ES-001-Boiler #6)
Facility ID # 6800043
Permit # 03069T17**

Operating Scenario #3

User Input	
Company Name:	University of North Carolina at Chapel Hill
Plant County:	Orange County
Plant City:	Chapel Hill
Permit Number:	03069T17
User:	RST Engineering
Heat Input Capacity (mmBtu/hr):	323.17
Fuel Input Capacity (10 ³ gal/hr):	2.15
Annual Fuel Throughput (1000 gal):	0.00
Maximum fuel sulfur content (%):	2.1
Latest Construction/Modification Date:	N/A

Emissions Output (for operation 3.42 hr/yr)

Criteria Pollutants

Pollutant	lb/hr ²	tpy	lb/yr ³	Emission Factor ¹ (lb/10 ³ gal)
Total PM (FPM + CPM)	3.7	0.000	0	2.49E+01
Filterable PM (FPM) rates @ 99% control	0.5	0.000	0	2.34E+01
Condensable PM (CPM) ⁴	3.2	0.000	0	1.50E+00
Filterable PM-10 ⁵	0.4	0.000	0	1.67E+01
Filterable PM-2.5 ⁵	0.3	0.000	0	1.22E+01
NOx rates @ 39% control	**	**	**	4.70E+01
NMTOC	2	0.000	0	7.60E-01
CO	11	0.000	0	5.00E+00
SO2 rates @ 90% control	**	**	**	3.45E+02
Total HAP ⁶	3.92E-01	0.000	0	1.82E-01
Largest HAP ⁶	1.82E-01	0.000	0	8.45E-02

Toxic/Hazardous Air Pollutants

Pollutant	lb/hr ²	lb/day ⁷	lb/yr ³	Emission Factor ¹ (lb/10 ³ gal)
Antimony rates @ 99% control	1.13E-04	NA	0.00E+00	5.25E-03
Arsenic rates @ 99% control	2.84E-05	NA	0.00E+00	1.32E-03
Benzene	4.61E-04	NA	0.00E+00	2.14E-04
Beryllium rates @ 99% control	5.99E-07	NA	0.00E+00	2.78E-05
Cadmium rates @ 99% control	8.57E-06	NA	0.00E+00	3.98E-04
Chromium rates @ 99% control	1.82E-05	NA	0.00E+00	8.45E-04
Chromium VI rates @ 99% control	5.34E-06	NA	0.00E+00	2.48E-04
Cobalt rates @ 99% control	1.30E-04	NA	0.00E+00	6.02E-03
Ethylbenzene	1.37E-04	NA	0.00E+00	6.36E-05
Fluoride	8.04E-02	1.93E+00	0.00E+00	3.73E-02
Formaldehyde	7.11E-02	1.71E+00	0.00E+00	3.30E-02
Lead rates @ 99% control	3.25E-05	NA	0.00E+00	1.51E-03
Manganese rates @ 99% control	6.46E-05	1.55E-03	0.00E+00	3.00E-03
Mercury	2.43E-04	5.84E-03	0.00E+00	1.13E-04
Methyl chloroform (1,1,1-Trichloroethane)	5.08E-04	1.22E-02	0.00E+00	2.36E-04
Naphthalene	2.43E-03	NA	0.00E+00	1.13E-03
Nickel rates @ 99% control	1.82E-03	4.37E-02	0.00E+00	8.45E-02
POM rates @ 99% control	1.31E-06	NA	0.00E+00	6.06E-05
Selenium rates @ 99% control	1.47E-05	NA	0.00E+00	6.83E-04
Toluene	1.34E-02	3.21E-01	0.00E+00	6.20E-03
Xylene	2.35E-04	5.64E-03	0.00E+00	1.09E-04

¹Emission factors represent AP-42 uncontrolled values. Emission rates are reflective of controls where applicable.

²Hourly emission rates for all pollutants are based on hourly rated capacity.

³Annual emission rates for all pollutants are based on maximum annual fuel throughput.

⁴Wet scrubbers are assumed to control CPM whereas other PM control devices are assumed to only control FPM.

⁵AP-42 assumes PM-10 and PM-2.5 assumes these pollutants are controlled with the same efficiency as total PM.

⁶Total and largest HAP factors and emission rates do not reflect control of metals. Individual metal emission rates are reflective of particulate matter controls where applicable.

⁷Daily emission rates are based on operation 24 hours per day at rated capacity.

**SOx and NOx emissions were estimated using CEMS data, please refer to the attached spreadsheets.

FO2000 Revision A dated March 9, 2000

**Fuel Oil Combustion Emissions Calculator FO2000 Revision A
2004 Annual Emissions Inventory**

**Boiler #6
(ES-001-Boiler #6)
Facility ID # 6800043
Permit # 03069T17**

Operating Scenario #4 - No.2 Fuel Oil

User Input	
Company Name:	University of North Carolina at Chapel Hill
Plant County:	Orange County
Plant City:	Chapel Hill
Permit Number:	03069T17
User:	RST Engineering
Heat Input Capacity (mmBtu/hr):	323.17
Fuel Input Capacity (10 ³ gal/hr):	2.31
Annual Fuel Throughput (1000 gal):	0.00
Maximum fuel sulfur content (%)	0.5
Latest Construction/Modification Date:	N/A
Enter the boiler type below ▾	
15	

Boilers =>100 mmBtu/hr 1 = No. 6 oil fired, normal firing (U) 2 = No. 6 oil fired, normal firing (I) 3 = No. 6 oil fired, normal firing (C) 4 = No. 6 oil fired, normal firing, low NOx burner (U) 5 = No. 6 oil fired, normal firing, low NOx burner (I) 6 = No. 6 oil fired, normal firing, low NOx burner (C) 7 = No. 6 oil fired, tangential firing (U) 8 = No. 6 oil fired, tangential firing, low NOx burner (U) 9 = No. 5 oil fired, normal firing (U) 10 = No. 5 oil fired, normal firing (I) 11 = No. 5 oil fired, tangential firing (U) 12 = No. 4 oil fired, normal firing (U) 13 = No. 4 oil fired, normal firing (I) 14 = No. 4 oil fired, tangential firing (U) 15 = No. 2 oil fired (U,I)	Boilers =>100 mmBtu/hr (cont'd) 16 = No. 2 oil fired (C) 17 = No. 2 oil fired, LNB/FGR (U,I) 18 = No. 2 oil fired, LNB/FGR (C) 19 = Vertical fired utility boiler Small Boilers (<100 mmBtu/hr) 20 = No. 6 oil fired (I) 21 = No. 6 oil fired (C) 22 = No. 5 oil fired (C) 23 = No. 4 oil fired (C) 24 = No. 2 oil fired (I) 25 = No. 2 oil fired (C) 26 = Residential Furnace
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**Fuel Oil Combustion Emissions Calculator FO2000 Revision A
2004 Annual Emissions Inventory**

**Boiler #6
(ES-001-Boiler #6)
Facility ID # 6800043
Permit # 03069T17**

Operating Scenario #4 - No.2 Fuel Oil

User Input	
Company Name:	University of North Carolina at Chapel Hill
Plant County:	Orange County
Plant City:	Chapel Hill
Permit Number:	03069T17
User:	RST Engineering
Heat Input Capacity (mmBtu/hr):	323.17
Fuel Input Capacity (10 ³ gal/hr):	2.31
Annual Fuel Throughput (1000 gal):	0.00
Maximum fuel sulfur content (%)	0.5
Latest Construction/Modification Date:	N/A

Emission Controls

Particulate controls

Enter the control type below ▾	Message Area	Or enter a PM control efficiency below to override built in values.
3		
<u>Control Device</u> 0 = None/other 1 = ESP 2 = Scrubber 3 = Bagfilter 4 = Multiple cyclone	<u>Avg. Cont. Effic.</u> 99.0	<u>User Input PM Cont. Effic.</u> Message Area

Postcombustion SO₂ controls

Enter the control type below ▾	Message Area	Or enter an SO ₂ control efficiency below to override built in values.
0		
<u>Control Technology/Process</u> 0 = None/other 1 = Wet scrubber, Lime/limestone 2 = Wet scrubber, Sodium carbonate 3 = Wet scrubber, Magnesium oxide/hydroxide 4 = Wet scrubber, Dual alkali 5 = Spray drying, calcium hydroxide slurry, vap. in spray vessel 6 = Furnace injection, Dry calcium carbonate/hydrate inj. in upper furn. cavity 7 = Duct injection, Dry sorbent injection into duct, sometimes combined with water spray	<u>Avg. Cont. Effic.</u> 0.0 <u>Remarks</u> NA	<u>User Input SO₂ Cont. Effic.</u> 90.0 User entered control efficiency may be overestimated and should be documented.

NO_x controls

Enter the control type below ▾	Message Area	Or enter a NO _x control efficiency below to override built in values.
5		
<u>Control Technology/Process</u> 0 = None/other 1 = Low excess air (LEA) 2 = Staged combustion (SC) 3 = Burners out of service (BOOS) 4 = Flue gas recirculation (FGR) 5 = Flue gas recirculation plus staged combustion 6 = Low NO _x burners (LNB) 7 = Reduced air preheat (RAP) 8 = Selective noncatalytic reduction (SNCR) 9 = Conventional selective catalytic reduction (SCR)	<u>Avg. Cont. Effic.</u> 39.0 <u>Remarks</u> Available for boilers with sufficient operational flexibility	<u>User Input NO_x Cont. Effic.</u> 0.0 Message Area

Fuel Oil Combustion Emissions Calculator FO2000 Revision A
2004 Annual Emissions Inventory

Boiler #6
(ES-001-Boiler #6)
Facility ID # 6800043
Permit # 03069T17

Operating Scenario #4 - No.2 Fuel Oil

User Input	
Company Name:	University of North Carolina at Chapel Hill
Plant County:	Orange County
Plant City:	Chapel Hill
Permit Number:	03069T17
User:	RST Engineering
Heat Input Capacity (mmBtu/hr):	323.17
Fuel Input Capacity (10 ³ gal/hr):	2.31
Annual Fuel Throughput (1000 gal):	0.00
Maximum fuel sulfur content (%):	0.5
Latest Construction/Modification Date:	N/A

Emissions Output (for operation 3.42 hr/yr)

Criteria Pollutants

Pollutant	lb/hr ²	tpy	lb/yr ³	Emission Factor ¹ (lb/10 ³ gal)
Total PM (FPM + CPM)	3.0	0.000	0	3.30E+00
Filterable PM (FPM) rates @ 99% control	0.0	0.000	0	2.00E+00
Condensable PM (CPM) ⁴	3.0	0.000	0	1.30E+00
Filterable PM-10 ⁵	0.0	0.000	0	1.00E+00
Filterable PM-2.5 ⁵	0.0	0.000	0	2.50E-01
NOx rates @ 39% control	**	**	**	2.40E+01
NMTOC	0	0.000	0	2.00E-01
CO	12	0.000	0	5.00E+00
SO2 rates @ 90% control	**	**	**	2.98E+02
Total HAP ⁶	4.17E-01	0.000	0	1.81E-01
Largest HAP ⁶	1.84E-01	0.000	0	7.97E-02

Toxic/Hazardous Air Pollutants

Pollutant	lb/hr ²	lb/day ⁷	lb/yr ³	Emission Factor ¹ (lb/10 ³ gal)
Antimony rates @ 99% control	0.00E+00	NA	0.00E+00	0.00E+00
Arsenic rates @ 99% control	1.29E-05	NA	0.00E+00	5.60E-04
Benzene	6.35E-03	NA	0.00E+00	2.75E-03
Beryllium rates @ 99% control	9.70E-06	NA	0.00E+00	4.20E-04
Cadmium rates @ 99% control	9.70E-06	NA	0.00E+00	4.20E-04
Chromium rates @ 99% control	9.70E-06	NA	0.00E+00	4.20E-04
Chromium VI rates @ 99% control	2.85E-06	NA	0.00E+00	1.23E-04
Cobalt rates @ 99% control	0.00E+00	NA	0.00E+00	0.00E+00
Ethylbenzene	1.89E-03	NA	0.00E+00	8.17E-04
Fluoride	8.61E-02	2.07E+00	0.00E+00	3.73E-02
Formaldehyde	1.11E-01	2.66E+00	0.00E+00	4.80E-02
Lead rates @ 99% control	2.91E-05	NA	0.00E+00	1.26E-03
Manganese rates @ 99% control	1.94E-05	4.65E-04	0.00E+00	8.40E-04
Mercury	9.70E-04	2.33E-02	0.00E+00	4.20E-04
Methyl chloroform (1,1,1-Trichloroethane)	5.45E-04	1.31E-02	0.00E+00	2.36E-04
Naphthalene	7.69E-04	NA	0.00E+00	3.33E-04
Nickel rates @ 99% control	9.70E-06	2.33E-04	0.00E+00	4.20E-04
POM rates @ 99% control	7.62E-05	NA	0.00E+00	3.30E-03
Selenium rates @ 99% control	4.85E-05	NA	0.00E+00	2.10E-03
Toluene	1.84E-01	4.41E+00	0.00E+00	7.97E-02
Xylene	3.23E-03	7.76E-02	0.00E+00	1.40E-03

¹Emission factors represent AP-42 uncontrolled values. Emission rates are reflective of controls where applicable.

²Hourly emission rates for all pollutants are based on hourly rated capacity.

³Annual emission rates for all pollutants are based on maximum annual fuel throughput.

⁴Wet scrubbers are assumed to control CPM whereas other PM control devices are assumed to only control FPM.

⁵AP-42 assumes PM-10 and PM-2.5 assumes these pollutants are controlled with the same efficiency as total PM.

⁶Total and largest HAP factors and emission rates do not reflect control of metals. Individual metal emission rates are reflective of particulate matter controls where applicable.

⁷Daily emission rates are based on operation 24 hours per day at rated capacity.

**SOx and NOx emissions were estimated using CEMS data, please refer to the attached spreadsheets.

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory**Sulfur Dioxide Emissions from Boiler #6****(ES-001-Boiler #6)**

The exhaust duct at Boiler #6 is equipped with a continuous emissions monitor (CEMs) for SO₂ emissions.

For the 2004 calendar year, 30 day facility averages for the SO₂ emission rate measured by the CEM are as follows:

Month	30 day average CEM reading (lb/MMBtu)
January 2004	0.144
February 2004	0.134
March 2004	0.129
April 2004	0.136
May 2004	0.139
June 2004	0.136
July 2004	0.136
August 2004	0.139
September 2004	0.117
October 2004	0.115
November 2004	0.131
December 2004	0.127
Annual Average	0.132

This average includes SO₂ emissions from coal, fuel oil, and natural gas within Boiler #6 over the entire year, representing a composite average for all fuels combusted.

Fuel Inputs to Boiler #6 for 2004

Boiler #6			
Coal Tons/yr	Gas 1,000cf/yr	No. 6 Oil Gallons/yr	No. 2 Oil Gallons/yr
58,243	5,846	0	0
Coal (13,068 btu/lb)	Nat. Gas (1,030 btu/cf)	Oil (150,000 btu/gal)	Oil (137,006 btu/gal)
MMBtu/year			
1.52E+06	6.02E+03	0.00E+00	0.00E+00

Total for Boiler #6 (MMBtu/yr)	1.53E+06
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Total SO ₂ Emissions from Boiler #6 (lb/yr)	201,500
Total SO ₂ Emissions from Boiler #6 (ton/yr)	100.8

SO ₂ Emissions Associated with Coal Combustion (ton/yr)	100.8
SO ₂ Emissions Associated with No. 6 Fuel Oil Combustion (ton/yr)	0.0
SO ₂ Emissions Associated with No. 2 Fuel Oil Combustion (ton/yr)	0.00

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory

Nitrogen Dioxide Emissions from Boiler #6

(ES-001-Boiler #6)

The exhaust duct at Boiler #6 is equipped with a continuous emissions monitor (CEMs) for NOx emissions. For the 2004 calendar year, 30 day facility averages for the NOx emission rate measured by the CEM are as follows:

Month	30 day average CEM reading (lb/MMBtu)
January 2004	0.41
February 2004	0.41
March 2004	0.37
April 2004	0.37
May 2004	0.35
June 2004	0.29
July 2004	0.26
August 2004	0.26
September 2004	0.26
October 2004	0.28
November 2004	0.39
December 2004	0.41
Annual Average	0.34

This average includes NOx emissions from coal, fuel oil, and natural gas within Boiler #6 over the entire year, representing a composite average for all fuels combusted.

Fuel Inputs to Boiler #6 for 2004

Boiler #6			
Coal Tons/yr	Gas 1,000cf/yr	No. 6 Oil Gallons/yr	No. 2 Oil Gallons/yr
58,243	5,846	0	0
Coal (13,068 btu/lb)	Nat. Gas (1,030 btu/cf)	Oil (150,000 btu/gal)	Oil (137,006 btu/gal)
MMBtu/year			
1.52E+06	6.02E+03	0.00E+00	0.00E+00

Total for Boiler #6 (MMBtu/yr)	1.53E+06
--------------------------------	----------

Total NOx Emissions from Boiler #6 (lb/yr)	517,060
Total NOx Emissions from Boiler #6 (ton/yr)	258.5

NOx Emissions Associated with Coal Combustion (ton/yr)	257.5
NOx Emissions Associated with Fuel Oil No. 6 Combustion (ton/yr)	0.0
NOx Emissions Associated with Fuel Oil No. 2 Combustion (ton/yr)	0.0
NOx Emissions Associated with Natural Gas Combustion (ton/yr)	1.0

University of North Carolina at Chapel Hill

Chapel Hill, North Carolina

Orange County

Facility ID # 6800043

Permit # 03069T17

2004 Annual Emissions Inventory**Boiler #7
(ES-002-Boiler #7)****Operating Scenarios**

#1 - Coal Firing

#2 - Natural Gas Firing

#4 - No.2 Fuel Oil Firing

(#3 - No.6 Fuel Oil Firing is no longer permitted)

The boilers are equipped with Continuous Emission Monitoring (CEMs) devices to measure SO₂ and NO_x emissions from each of the boilers. The monthly averages presented in the attached spreadsheets are for the total emissions from firing all types of fuel. The 2004 Annual Emission Inventory forms require that the emissions be divided among the three possible operating scenarios.

NO_x emissions have been divided between the three operating scenarios based on the percentage of total heat input by each fuel. These calculations are detailed in the attached spreadsheets.

SO₂ emissions from natural gas combustion are insignificant, therefore, SO₂ emissions have been divided between the fuel oil and coal operating scenarios based on the percentage of total heat input by each fuel. These calculations are detailed in the attached spreadsheets.

Emissions CalculationsSO₂ and NO_x Emissions are taken from CEMs data

HCl, HF, Hg emissions are based on stack testing for Boiler MACT compliance planning completed in year 2004*

All other estimates are from DAQ Spreadsheets