The State of New Jersey
Department of Environmental Protection

State Implementation Plan (SIP) Revisions for the Attainment and Maintenance of the 8-Hour Carbon Monoxide National Ambient Air Quality Standard

2007 Area Source Carbon Monoxide Calculation Methodology Sheets

Proposed
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Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Anthracite Coal Combustion
SCC: 2102001000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and lead (Pb). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of anthracite coal in industrial boilers are calculated using statewide tons of coal burned, allocated to the county level by industrial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Total statewide industrial anthracite coal use, COAL [2] (tons)
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF, (lbs/ton of coal burned)

Emission Factor		Reference
VOC =	0.07	4 SCC 10100102 stoker-fired boiler
NOx =	9.0	5 Table 1.2-1 stoker fired boiler
CO =	0.60	5 Table 1.2-2
PM10 =	4.75	5 Figure 1.2-1 total particulate
PM2.5 =	2.4	5 Figure 1.2-1 total particulate
SO2 = 39*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)		5 Table 1.2-1 and 1.1-3
Pb =	0.0089	4

4. Weekly activity factor, WAF=6 days/week [6]
5. Seasonal adjustment factors, SAF [2]

Summer Season Adjustment Factor	0.99
Fall Season Adjustment Factor	0.99
Winter Season Adjustment Factor	1.01
Spring Season Adjustment Factor	1.01

6. Wt% sulfur, S = 0.8 [7]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = COAL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the

preparation of the State Energy Data Report. [8]
2. All industrial anthracite coal burners are uncontrolled overfeed stokers.
3. All industrial coal consumption included in the State Energy Data Report is bituminous coal.

Control Measures:
The emissions from this source category are regulated by the following rules:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection.

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory:

Ep_{adj} = (COAL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' anthracite coal use (tons) [9]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Factor Information Retrieval (FIRE) system, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

7. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

8. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

9. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Subbituminous/Bituminous/Lignite Coal Combustion
SCC: 2102002000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), lead (Pb) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of bituminous coal in industrial boilers are calculated using statewide tons of coal burned, allocated to the county level by industrial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Total statewide industrial bituminous/subbituminous/lignite coal use, COAL (tons)[2]
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/ton of coal burned)[4a]

VOC = (0.11 + 0.05 + 0.05 + 1.3 + 0.07 + 0.03 + 0.03) / 7=0.23
which is the average of uncontrolled emission factors for bituminous coal (AP-42 Table 1.1-19) and lignite (AP-42 Table 1.7-1) for the following furnaces: cyclone furnaces, spreader stoker, overfeed stokers, and underfeed stokers

NOx = (33 + 17 + 11 + 8.8 + 7.5 + 9.5 + 15 + 5.8) / 8 = 13.45
CO = (0.5 + 0.5 + 5 + 5 + 6 + 11) / 6 = 4.67
which is the average of uncontrolled emission factors for bituminous coal (AP-42 Table 1.1-3) and lignite (AP-42 Table 1.7-1) for the following furnaces: cyclone furnaces, spreader stoker, overfeed stokers, and underfeed stokers

SO2 = 35*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)

PM10 = (13.2 + 6.0 + 6.2) / 3+ (0.04lb/MMBTU*23 MMBTU/ton) = 9.39
PM2.5 = (4.6 + 2.2 + 3.8) / 3 + (0.04lb/MMBTU*23 MMBTU/ton) = 4.45
which is the average of uncontrolled emission factors for bituminous coal for the following furnaces: spreader stoker (AP-42 Table 1.1-9), overfeed stokers (AP-42 Table 1.1-10), and underfeed stokers (AP-42 Table 1.1-11) for filterable particulates plus the condensible particulates in Table 1.1-5.

Pb = 0.0133

NH3 = 0.03[4b]

4. Weekly activity, WAF=6 days/week[5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.99
Fall Season Adjustment Factor	0.99
Winter Season Adjustment Factor	1.01
Spring Season Adjustment Factor	1.01

6. Wt% sulfur, S= [6]
   - 1.0: Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
   - 0.2: Burlington, Camden, Gloucester, Mercer, Salem,

Bergen, Essex, Hudson, Middlesex, Monmouth, Morris,
Passaic, Somerset, and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = COAL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report. [7]
2. All industrial coal consumption included in the State Energy Data Report is bituminous coal.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (COAL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' subbituminous/bituminous/lignite coal use (tons) [8]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009.

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

7. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

8. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Distillate Oil Combustion
SCC: 2102004000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), lead (Pb) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of distillate oil coal in industrial boilers are calculated using statewide gallons of fuel burned, allocated to the county level by industrial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Total statewide industrial distillate oil use, FUEL[2] (10^3 gallons)
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.2	4a Table 1.3-3 industrial boilers distilate oil fired
NOx =	20	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
CO =	5	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
PM10 =	(1.0+1.3)=2.3	4a Table 1.3-6 and 1.3-2 filterable plus condensible
PM2.5 =	(0.25+1.3)=1.55	4a Table 1.3-6 and 1.3-2 filterable plus condensible
SO2 =	142*(wt% sulfur, S)	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
Pb=	(8.9 lb/10^{12} BTU) * (1.42 *10^8 BTU/10^3 gals) = 0.001264	
NH3 =	0.8	4b ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [5]
5. NO_x Rule Effectiveness, RE; RE = 80% [6]
6. NO_x Rule Penetration, RP; RP = 30% [5]
7. Weekly activity, WAF=6 days/week[7]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.96
Fall Season Adjustment Factor	0.99
Winter Season Adjustment Factor	1.05
Spring Season Adjustment Factor	1.00

9. Wt% sulfur content, S = [8]
   - 0.3: Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
   - 0.2: Burlington, Camden, Gloucester, Mercer, Salem,Bergen, Essex, Hudson, Middlesex,Monmouth Morris,Passaic,Somerset,and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

$Ep_a = OIL*(EF/CF)*(CEMP/NJEMP)$
$Ep_s = Ep_a/AADF*SAF$
$Ep_w = Ep_a/AADF*SAF$

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county

Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[9]

Control Measures:
The emissions from this source category are regulated by the following rules:

1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

2. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection.

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (OIL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' distillate oil use[10] (10^3 gallons)

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

6. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of

Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

7. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

8. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

9. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

10. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Residual Oil Combustion
SCC: 2102005000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), lead (Pb) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of residual oil in industrial boilers are calculated using statewide gallons of fuel burned, allocated to the county level by industrial employees.

Required Input Parameters:
1. Total statewide industrial residual oil use, OIL[2] (10^3 gallons)
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.28	4a Table 1.3-3 industrial no 6 oil fired
NOx =	55	4a Table 1.3-1 boilers<100 million btu/hr, no 6 oil fired
CO =	5	4a Table 1.3-1 boilers<100 million btu/hr, no 6 oil fired
PM10=(7.17*(1.12*Wt%sulfur, S)+0.37))+1.5		4a Table 1.3-2 and 5 filterable plus condensible
PM2.5=(4.67*(1.12*Wt%sulfur, S)+0.37))+1.5		4a Table 1.3-2 and 5 filterable plus condensible
SO2 = 157*(Wt% sulfur, S)		4a Table 1.3-1 boilers<100 million btu/hr, no 6 oil fired
Pb=((28+194)/2 lb/10^{12} BTU)*(1.51/10^8 BTU/10^3 gals)= 111*1.51*10^{-4}lb /10^3 gals = 0.01676 lb/10^3 gals[5]		
NH3 = 0.8		4b ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25%[6]
5. NO_x Rule Effectiveness, RE; RE = 80% [7]
6. NO_x Rule Penetration, RP; RP = 30% [6]
7. Weekly activity factor, WAF=6 days/week[5]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.96
Fall Season Adjustment Factor	0.99
Winter Season Adjustment Factor	1.05
Spring Season Adjustment Factor	1.00

9. Wt% sulfur content, S= [8]

2.0:	Atlantic, Cape May, Cumberland, and Ocean Counties
1.0:	Hunterdon, Sussex, Warren, and Salem Counties
0.5:	Burlington County, Camden, Gloucester, and Mercer Counties except those municipalities included below in Zone 6
0.3:	The municipalities of Bass River, Shamong, Southampton, Tabernacle, Washington, Woodland Townships in Burlington County, and Waterford Township in Camden County, Bergen, Essex, Hudson, Middlesex, Monmouth,Morris, Passaic, Somerset and Union Counties.

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[9]

Control Measures:
The emissions from this source category are regulated by the following rules:

1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection
2. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (OIL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' residual oil use[10] (10^3 gallons)

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

7. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

8. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

9. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

10. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Natural Gas Combustion
SCC: 2102006000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) lead (Pb), and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of industrial natural gas are calculated using statewide amount of fuel burned, allocated to the county level by industrial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide industrial natural gas use, GAS[2] (10^6 cubic feet)
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/10^6 cubic feet burned)

Emission Factor		Reference
VOC =	5.5	4a Table 1.4-2
NOx =	100	4a Table 1.4-1 boilers<100 million btu/hr
CO =	84	4a Table 1.4-1 boilers<100 million btu/hr
PM10 =	0.45	4b ERTAC 2009
PM2.5 =	0.43	4b ERTAC 2009
SO2 =	0.6	4a Table 1.4-2
Pb =	0.0005	
NH3 =	3.2	4b ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [4]
5. NO_x Rule Effectiveness, RE; RE = 80% [5]
6. NO_x Rule Penetration, RP; RP = 30% [4]

7. Weekly activity, WAF=6 days/week[6]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.88
Fall Season Adjustment Factor	0.92
Winter Season Adjustment Factor	1.16
Spring Season Adjustment Factor	1.03

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = GAS*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[7]

Control Measures:
The emissions from this source category are regulated by the following rule:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (GAS-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' natural gas use (10^6 cubic feet)[8]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

5. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

6a. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

7. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

8. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Liquified Petroleum Gas Combustion
SCC: 2102007000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of industrial liquid petroleum gas are calculated using statewide amount of fuel burned, allocated to the county level by industrial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide industrial liquid petroleum gas use, LPG (10^3 gallons)[2]
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF, (lbs/10^3 gallons burned)

Emission Factor	Reference
VOC=(1.1-0.2)+(1.0-0.2)/2=0.05	4 Table 1.5-1, industrial boilers
NOx=(15+13)/2=14	4 Table 1.5-1, industrial boilers
CO =(8.4+7.5)/2=7.95	4 Table 1.5-1, industrial boilers
PM10=0.05	5 ERTAC 2009
PM2.5=0.04	5 ERTAC 2009
SO2=(0.09S+0.10S)/2=0.23	4 Table 1.5-1, industrial boilers
NH3=0.05	5 ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [6]
5. NO_x Rule Effectiveness, RE; RE = 80% [7]
6. NO_x Rule Penetration, RP; RP = 30% [6]

7. Weekly activity, WAF=6 days/week[8]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.96
Fall Season Adjustment Factor	0.99
Winter Season Adjustment Factor	1.05
Spring Season Adjustment Factor	1.00

9. Wt% sulfur content, S=2.456 gr/100cf [9]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = LPG*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)

SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[10]
2. Assumed 50/50 mixture of butane and propane in the development of the emission factors.

Control Measures:
The emissions from this source category are regulated by the following rule:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection.

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (LPG-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' liquified petroleum gas use (10^3 gallons)[11]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5. Eastern Regional Technical Advisory Committee (ERTAC) 2009

6. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

7. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

8. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

9. Nonroad Source Inventory Development for Nonroad Engines presentation,
http://www.epa.gov/ttn/chief/eidocs/partisec4.pdf

10. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

11. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Industrial Kerosene Combustion
SCC: 2102011000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), lead (Pb), and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of industrial kerosene are calculated using statewide amount of fuel burned, allocated to the county level by industrial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide industrial kerosene oil use, OIL[2] (10^3 gallons)
2. County and statewide employment totals for SIC 10-3999, 461, 4939 or NAICS 21- 339999, 4861, 4869, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.2	4a Table 1.3-3 industrial boilers distilate oil fired
NOx =	20	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
CO =	5	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
PM10 =	(1.0+1.3)=2.3	4a Table 1.3-6 and 1.3-2 filterable plus condensible
PM2.5 =	(0.25+1.3)=1.55	4a Table 1.3-6 and 1.3-2 filterable plus condensible
SO2 =	142*(wt% sulfur, S)	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
Pb =	((28+194)/2 lb/10^{12} BTU)*(1.51/10^8 BTU/10^3 gals) = 111*1.51*10^{-4}lb/10^3 gals =0.01676 lb/10^3 gals[5]	
NH3 =	0.77	4b ERTAC 2009

4. Weekly activity, WAF=6 days/week[5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.96
Fall Season Adjustment Factor	0.99
Winter Season Adjustment Factor	1.05
Spring Season Adjustment Factor	1.00

6. Wt% sulfur content, S= [6]

0.3:	Atlantic, Cape May, Cumberland, Ocean, Hunterdon, Sussex, and Warren Counties
0.2:	Burlington, Camden, Gloucester, Mercer, Salem, Bergen,Essex,Hudson,Middlesex,Monmouth, Morris,Passaic, Somerset, and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant

CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the industrial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[7]
2. Assume emission factors for kerosene are equivalent to distillate oil emission factors.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (OIL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Industrial point sources' kerosene oil use[8] (10^3 gallons)

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

7. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

8. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Anthracite Coal Combustion
SCC: 2103001000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), lead (Pb) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial anthracite coal are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional bituminous/subbituminous coal use, COAL[2] (tons)
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF, (lbs/ton of coal burned)

Emission Factor		Reference
VOC =	0.07	4a SCC 10300102 commercial stoker-fired boiler
NOx =	9.0	5 Table 1.2-1 stoker fired boiler
CO =	0.60	5 Table 1.2-2
PM10 =	4.75	5 Figure 1.2-1 total particulate
PM2.5 =	2.38	5 Figure 1.2-1 total particulate
SO2 = 39*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)		5 Table 1.2-1 and 1.1-3
Pb =	0.0089	4a
NH3 =	0.03	4b ERTAC 2009

4. Weekly activity factor, WAF=6 days/week [6]
5. Seasonal adjustment factors, SAF

Summer Season Adjustment Factor	0.80
Fall Season Adjustment Factor	1.01
Winter Season Adjustment Factor	1.27
Spring Season Adjustment Factor	0.92

6. Wt% sulfur, S = 0.8 [7]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = COAL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF /AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:

1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[8]
2. All commercial anthracite coal burners are uncontrolled overfeed stokers.
3. All commercial coal consumption included in the State Energy Data Report is anthracite coal.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (COAL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' anthracite coal use[9] (tons)

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Factor Information Retrieval (FIRE) system, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

7. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

8. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

9. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Bituminous/Subbituminous/Lignite Coal Combustion
SCC: 2103002000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial bituminous coal are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional bituminous/lignite coal use, COAL[2] (tons)
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/tons burned)[4a]

VOC = (0.11 + 0.05 + 0.05 + 1.3 + 0.07 + 0.03 + 0.03) / 7=0.23
which is the average of uncontrolled emission factors for bituminous coal (AP-42 Table 1.1-19) and lignite (AP-42 Table 1.7-1) for the following furnaces: cyclone furnaces, spreader stoker, overfeed stokers, and underfeed stokers

NOx = (33 + 17 + 11 + 8.8 + 7.5 + 9.5 + 15 + 5.8) / 8 = 13.45
CO = (0.5 + 0.5 + 5 + 5 + 6 + 11) / 6 = 4.67
which is the average of uncontrolled emission factors for bituminous coal (AP-42 Table 1.1-3) and lignite (AP-42 Table 1.7-1) for the following furnaces: cyclone furnaces, spreader stoker, overfeed stokers, and underfeed stokers

SO2 = 35*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)

PM10 = (13.2 + 6.0 + 6.2) / 3 + (0.04lb/MMBTU*23 MMBTU/ton) = 9.39
PM2.5 = (4.6 + 2.2 + 3.8) / 3 + (0.04lb/MMBTU*23 MMBTU/ton) = 4.45
which is the average of uncontrolled emission factors for bituminous coal for the following furnaces: spreader stoker (AP-42 Table 1.1-9), overfeed stokers (AP-42 Table 1.1-10), and underfeed stokers (AP-42 Table 1.1-11) for filterable particulates plus the condensible particulates in Table 1.1-5.

NH3 = 0.03 [4b]

4. Weekly activity, WAF=6 days/week[5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.80
Fall Season Adjustment Factor	1.01
Winter Season Adjustment Factor	1.27
Spring Season Adjustment Factor	0.92

6. Wt% sulfur content, S = [6]

1.0	Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
0.2	Burlington, Camden, Gloucester, Mercer,Salem, Bergen, Essex,

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = COAL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF /AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[7]
3. All commercial coal consumption included in the State Energy Data Report is anthracite coal.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (COAL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' bituminous/subbituminous/lignite coal use (tons)[8]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

7. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

8. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Distillate Oil Combustion
SCC: 2103004000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial distillate oil are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional distillate oil use, OIL (10^3 gallons)[2,]
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.34	4a Table 1.3-3 commercial boilers distilate oil fired
NOx =	20	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
CO =	5	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
PM10 =	(1.08+1.3)=2.38	4a Table 1.3-7 and 1.3-2 filterable plus condensible
PM2.5 =	(0.83+1.3)=2.13	4a Table 1.3-7 and 1.3-2 filterable plus condensible
SO2 =	142*(wt% sulfur, S)	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
NH3 =	0.8	4b ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [5]
5. NO_x Rule Effectiveness, RE; RE = 80% [6]
6. NO_x Rule Penetration, RP; RP = 30% [5]

7. Weekly activity, WAF=6 days/week[7]
8 Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.76
Winter Season Adjustment Factor	1.67
Spring Season Adjustment Factor	1.02

9. Wt% sulfur content, S= [8]

0.3:	Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
0.2:	Burlington, Camden, Gloucester, Mercer, Salem, Bergen, Essex, Hudson, Middlesex, Monmouth, Morris,Passaic, Somerset, and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:

Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[9]

Control Measures:
The emissions from this source category are regulated by the following rules:

1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

2. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (OIL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding counting
PT = Commercial/Institutional point sources' distillate oil use (10^3 gallons)[10]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

6. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I:

General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

7. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

8. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

9. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

10. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Residual Oil Combustion
SCC: 2103005000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial residual oil are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional residual oil use, OIL (10^3 gallons) [2]
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF, (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	1.13	4a Table 1.3-3 commercial boiler no 6 oil fired
NOx =	55	4a Table 1.3-1 boilers<100 million btu/hr, no 6 oil fired
CO =	5	4a Table 1.3-1 boilers<100 million btu/hr, no 6 oil fired
PM10=(5.17*(1.12*Wt%sulfur, S)+0.37))+1.5		4a Table 1.3-2 and 7 filterable plus condensible
PM2.5=(1.92*(1.12*Wt%sulfur, S)+0.37))+1.5		4a Table 1.3-2 and 7 filterable plus condensible
SO2 = 157*(Wt% sulfur, S)		4a Table 1.3-1 boilers<100 million btu/hr, no 6 oil fired
NH3 = 0.8		4b ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [5]
5. NO_x Rule Effectiveness, RE; RE = 80% [6]
6. NO_x Rule Penetration, RP; RP = 30% [5]

7. Weekly activity, WAF=6 days/week[7]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.76
Winter Season Adjustment Factor	1.67
Spring Season Adjustment Factor	1.02

9. Wt% sulfur content, S= [8]

2.0:	Atlantic, Cape May, Cumberland, and Ocean Counties
1.0:	Hunterdon, Sussex, Warren, and Salem Counties
0.5:	Burlington County, Camden, Gloucester, and Mercer Counties except those municipalities included below in Zone 6
0.3:	The municipalities of Bass River, Shamong, Southampton, Tabernacle, Washington, Woodland Townships in Burlington County, and Waterford Township in Camden County, Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset and Union Counties.

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF

Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[9]

Control Measures:
The emissions from this source category are regulated by the following rules:

1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (OIL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' residual oil use (10^3 gallons)[10]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

6. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

7. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

8. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

9. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

10. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Natural Gas Combustion
SCC: 2103006000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial natural gas are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional natural gas use, GAS (10^6 cubic feet)[2]
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF, (lbs/10^6 cubic feet burned)

Emission Factor		Reference
VOC =	5.5	4a Table 1.4-2
NOx =	100	4a Table 1.4-1 boilers<100 million btu/hr
CO =	84	4a Table 1.4-1 boilers<100 million btu/hr
PM10 =	0.52	4b ERTAC 2009
PM2.5 =	0.43	4b ERTAC 2009
SO2 =	0.6	4a Table 1.4-2
NH3 =	0.49	4b ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [5]
5. NO_x Rule Effectiveness, RE; RE = 80% [6]
6. NO_x Rule Penetration, RP; RP = 30% [5]

7. Weekly activity, WAF=6 days/week [7]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.58
Fall Season Adjustment Factor	0.81
Winter Season Adjustment Factor	1.64
Spring Season Adjustment Factor	0.97

Process:
The following equations are used to calculate the emissions (without rule effectiveness) for this source category.

Ep_a = GAS*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF /AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton

AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report. [8]

Control Measures:
The emissions from this source category are regulated by the following rule:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection
Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (GAS-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' natural gas use (10^6 cubic feet)[9]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

6. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

7. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

8. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

9. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Liquified Petroleum Gas Combustion
SCC: 2103007000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial liquid petroleum gas are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional liquified petroleum gas use, LPG (10^3 gallon)[2]
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF (lbs/10^3 gallon burned)

Emission Factor	Reference
VOC=(1.1-0.2)+(1.0-0.2)/2=0.05	4 Table 1.5-1, commercial boilers
NOx=(15+13)/2=14	4 Table 1.5-1, commercial boilers
CO =(8.4+7.5)/2=7.95	4 Table 1.5-1, commercial boilers
PM10=0.05	5 ERTAC 2009
PM2.5=0.04	5 ERTAC 2009
SO2=(0.09S+0.10S)/2=0.23	4 Table 1.5-1, commercial boilers
NH3 = 0.05	5 ERTAC 2009

4. NO_x Control Efficiency, CE; CE = 25% [6]
5.NO_x Rule Effectiveness, RE; RE = 80% [7]
6. NO_x Rule Penetration, RP; RP = 30% [6]

7. Weekly activity, WAF=6 days/week [8]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.76
Winter Season Adjustment Factor	1.67
Spring Season Adjustment Factor	1.02

9. Wt% sulfur content, S=2.456 gr/100cf [9, 10]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = LPG*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant

CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report. [11]
2. Assumed 50/50 mixture of butane and propane in the development of the emission factors
3. All commercial/institution combustion liquid petroleum gas burned in New Jersey is included as liquid petroleum gas in the State Energy Data Report [2].

Control Measures:
The emissions from this source category are regulated by the following rule:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (LPG-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' liquified petroleum gas use (10^3 gallons) [12]
4. NO_x Control Efficiency, CE; CE = 25% [6]
5.NO_x Rule Effectiveness, RE; RE = 80% [7]
6. NO_x Rule Penetration, RP; RP = 30% [6]

7. Weekly activity, WAF=6 days/week [8]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.76
Winter Season Adjustment Factor	1.67
Spring Season Adjustment Factor	1.02

9. Wt% sulfur content, S=2.456 gr/100cf [9, 10]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = LPG*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report. [11]
2. Assumed 50/50 mixture of butane and propane in the development of the emission factors

3. All commercial/institution combustion liquid petroleum gas burned in New Jersey is included as liquid petroleum gas in the State Energy Data Report [2].

Control Measures:
The emissions from this source category are regulated by the following rule:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 19, N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen, New Jersey Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (LPG-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' liquified petroleum gas use (10^3 gallons) [12]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5. Eastern Regional Technical Advisory Committee (ERTAC) 2009

6. Technical Support Document for the Development of the 2017/2020 Emission Inventories for Regional Air Quality Modeling in the Northeast/Mid-Atlantic Region, Version 3.3. January 23, 2012, SRA International, Inc. and AMEC Environment and Infrastructure for Mid-Atlantic Air Management Association (MARAMA), Towson, MD

7. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

8. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

9. Nonroad Source Inventory Development for Nonroad Engines presentation, http://www.epa.gov/ttn/chief/eidocs/partisec4.pdf

10. Air Pollution Control Regulations, N.J.S.A. 7:27-10.2, Sulphur Contents Standards, Office of Administrative Law, CN 301, Trenton, New Jersey

11. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

12. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial/Institutional Kerosene Combustion
SCC: 2103011000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of commercial kerosene are calculated using statewide amount of fuel burned, allocated to the county level by commercial employees.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide commercial/institutional kerosene oil use, OIL[2] (10^3 gallons)
2. County and statewide employment totals for SIC's 0850, 415,417,422-23,43,458,47-8,494-96,50-97, not including 881, or NAICS 1153, 2213, 42, 44 - 5, 48 - 9, 51 - 6, 61 - 2, 71 - 2, 81, not including 8141, 92, CEMP, NJEMP [3]
3. Emission Factors, EF, (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.34	4a Table 1.3-3 commercial boilers distilate oil fired
NOx =	20	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
CO =	5	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
PM10 =	(1.08+1.3)=2.38	4a Table 1.3-7 and 1.3-2 filterable plus condensible
PM2.5 =	(0.83+1.3)=2.13	4a Table 1.3-7 and 1.3-2 filterable plus condensible
SO2 =	142*(wt% sulfur, S)	4a Table 1.3-1 boilers<100 million btu/hr, distillate oil fired
NH3 =	0.8	4b ERTAC 2009

4. Weekly activity, WAF=6 days/week [5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.76
Winter Season Adjustment Factor	1.67
Spring Season Adjustment Factor	1.02

6. Wt% sulfur content, S= [6]
   - 0.3: Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
   - 0.2: Burlington, Camden, Gloucester, Mercer, Salem, Bergen,Essex,Hudson,Middlesex,Monmouth, Morris,Passaic, Somerset, and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(EF/CF)*(CEMP/NJEMP)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton

AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Employment data is representative of the commercial establishments surveyed by Department of Energy in the preparation of the State Energy Data Report.[7]
2. Assume emission factors for kerosene are equivalent to distillate oil emission factors.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

Ep_{adj} = (OIL-PT)*(EF/CF)*(CEMP/NJEMP)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Commercial/Institutional point sources' kerosene oil use [8] (10^3 gallons)

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC,EPA-450/4-81-026

2. State Energy Data 2007 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. Total 2007 employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

7. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

8. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Residential Anthracite Coal Combustion
SCC: 2104001000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), lead (Pb) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of residential anthracite coal are calculated using statewide amount of coal burned, allocated to the county level by the number of housing units using coal for primary heat source.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Total statewide residential anthracite coal use, COAL (tons)[2]
2. County and state totals of housing units heated by anthracite coal burners, CHEAT, SHEAT[3]
3. Emission Factors, EF (lbs/ton of coal burned)

Emission Factor		Reference
VOC =	0.07	4 SCC 10300102 commercial stoker-fired boiler
NOx =	3.0	4 SCC 2104001000
CO =	0.6	5 Table 1.2-2
PM10 =	4.75	5 Figure 1.2-1 total particulate
PM2.5 =	2.38	5 Figure 1.2-1 total particulate
SO2 = 39*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)		6 Table 1.2-1 and 1.1-3
Pb =	0.0089	5
NH3 = 2.00		7 ERTAC 2009

4. Weekly activity factor, WAF=7 days/week [6]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.81
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.27
Spring Season Adjustment Factor	0.92

6. Wt% sulfur, S = 0.8 [8]

Process:
The following equations are used to calculate the emissions (without rule effectiveness) for this source category.

Ep_a = COAL*(CHEAT/SHEAT)*(EF/CF)
Ep_s = Ep_a*SAF/AADF
= Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All residential anthracite coal burners are of the handfed design except for determination of sulfur dioxide

emissions which represents space heaters for commercial/institutional operations.
2. All residential coal consumption included in the State Energy Data Report is anthracite coal.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2006 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. 2007 American Community Survey (ACS) 1-Year Estimates, United States Department of Commerce, Bureau of the Census, Washington, DC

4. Factor Information Retrieval (FIRE) system, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, 1995

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

7. Eastern Regional Technical Advisory Committee (ERTAC) 2009

8. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 10, N.J.A.C. 7:27-10, Sulfur in Solid Fuels, New Jersey State Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Residential Distillate Oil Combustion
SCC: 2104004000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of residential distillate oil are calculated using statewide amount of fuel burned, allocated to the county level by the number of housing units using distillate oil for primary heat source.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Total statewide residential distillate oil use, OIL (10^3 gallons)[2]
2. County and state totals of housing units heated by distillate oil burners, CHEAT, SHEAT[3]
3. Emission Factors, EF (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.71	4a Table 1.3-3 residential furnace, distillate oil fired
NOx =	18	4a Table 1.3-1 residential furnace
CO =	5	4a Table 1.3-1 residential furnace
PM10 = (0.22+1.3)=1.52		4a Table1.3-1, 2 and 7 res. furnace, filterable plus condensible
PM2.5 = (0.17+1.3)=1.47		4a Table1.3-1, 2 and 7 res. furnace, filterable plus condensible
SO2 = 142*(wt% sulfur, S)		4a Table 1.3-1 residential furnace, distillate oil fired
NH3 =	1	4b ERTAC 2009

4. Weekly activity, WAF=7 days/week[5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.41
Fall Season Adjustment Factor	0.66
Winter Season Adjustment Factor	1.91
Spring Season Adjustment Factor	1.02

6. Wt% sulfur content, S= [6]
   - 0.3: Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
   - 0.2: Burlington, Camden, Gloucester, Mercer, Salem, Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset, and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(CHEAT/SHEAT)(EF/CF)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All residential distillate oil burned in New Jersey is included as residential distillate oil in the State Energy Data Report.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2006 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. 2007 American Community Survey (ACS) 1-Year Estimates, United States Department of Commerce, Bureau of the Census, Washington, DC

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Residential Natural Gas Combustion
SCC: 2104006000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of residential natural gas are calculated using statewide amount of fuel burned, allocated to the county level by the number of housing units using natural gas for primary heat source.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total residential natural gas use, GAS[2] (10^6 cubic feet)
2. County and state totals of housing units heated by natural gas burners, CHEAT, SHEAT[3]
3. Emission Factors, EF (lbs/10^6 cubic feet burned)

Emission Factor		Reference
VOC =	5.5	4a Table 1.4-2
NOx =	94	4a Table 1.4-1 residential furnaces
CO =	40	4a Table 1.4-1 residential furnaces
PM10 =	0.52	4b ERTAC 2009
PM2.5 =	0.43	4b ERTAC 2009
SO2 =	0.6	4a Table 1.4-2
NH3 =	0.49	4b ERTAC 2009

5. Weekly activity, WAF=7 days/week[5]
6. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.28
Fall Season Adjustment Factor	0.65
Winter Season Adjustment Factor	2.05
Spring Season Adjustment Factor	1.02

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = GAS*(CHEAT/SHEAT)*(EF/CF)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All emission rates based on residential operations except for lead emissions which is based on Commercial/Institutional operations of <10MMBTU/hr.
2. All residential distillate oil burned in New Jersey is included as residential distillate oil in the State Energy Data Report[1].

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2006 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. 2007 American Community Survey (ACS) 1-Year Estimates, United States Department of Commerce, Bureau of the Census, Washington, DC

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Residential Liquified Petroleum Gas Combustion
SCC: 2104007000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of residential liquid petroleum gas are calculated using statewide amount of fuel burned, allocated to the county level by the number of housing units using liquid petroleum gas for primary heat source.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Total statewide residential liquified petroleum gas use, LPG (10^3 gallons)[2]
2. County and state totals of housing units heated by liquified petroleum gas burners, CHEAT, SHEAT[3]
3. Emission Factors, EF, (lbs/10^3 gallon burned)

Emission Factor	Reference
VOC=(1.1-0.2)+(1.0-0.2)/2=0.05	4 Table 1.5-1, commercial boilers
NOx=(15+13)/2=14	4 Table 1.5-1, commercial boilers
CO =(8.4+7.5)/2=7.95	4 Table 1.5-1, commercial boilers
PM10=0.05	5 ERTAC 2009
PM2.5=0.04	5 ERTAC 2009
SO2=(0.09S+0.10S)/2=0.23	4 Table 1.5-1, commercial boilers
NH3 = 0.05	5 ERTAC 2009

4. Weekly activity, WAF=7 days/week [6]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.41
Fall Season Adjustment Factor	0.66
Winter Season Adjustment Factor	1.91
Spring Season Adjustment Factor	1.02

6. Wt% sulfur content, S=2.456 gr/100cf [7]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = LPG*(CHEAT/SHEAT)*(EF/CF)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1.Assume residential liquid petroleum gas combustion has same emission factors as commercial/institution liquid

petroleum gas combustion.
2. Assumed 50/50 mixture of butane and propane in the development of the emission factors.

Control Measures:
The emissions from this source category are regulated by the following rule: None

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC,EPA-450/4-81-026

2. State Energy Data 2006 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. 2007 American Community Survey (ACS) 1-Year Estimates, United States Department of Commerce, Bureau of the Census, Washington, DC

4. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5. Eastern Regional Technical Advisory Committee (ERTAC) 2009

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

7. Nonroad Source Inventory Development for Nonroad Engines presentation, http://www.epa.gov/ttn/chief/eidocs/partisec4.pdf

Residential Wood Combustion

SCC: 2104008310, 2104008210, 2104008100, 2104008320, 2104008510, 2104008220, 2104008330, 2104009000, 2104008610, 2104008230, 2104008400

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10) and particulate matter less than or equal to 2.5 microns (PM2.5). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:
1. . USEPA Residential Wood Combustion Tool [1,2]

Emissions from the combustion of residential wood are calculated using USEPA's residential wood combustion tool.

Required Input Parameters:

The following input data is already incorporated in the residential wood tool.

Listing and Descriptions of the Tables Included in the RWC Tool

Table Name	Table Description
County Populations	Entries contain the county, the number of occupied units in 2008, the appliance profile, the burn profile, and the climate zone.
Appliance Profiles:	Entries contain the appliance profile, the SCC, the burn purpose (Main, Secondary, or Pleasure) and the percentage of households with an appliance of the type corresponding to the SCC and purpose.
Burn Rates	Entries contain the burn profile, the SCC, the burn purpose, and the cords burned per year per appliance.
Density by County	Entries contain the county, the density in lb/ft^3, the density in tons/cord, and the data source.
Other Appliance Populations	Entries contain the county, the SCC, the burn purpose, and the number of appliances in the county with an appliance of the type corresponding to the SCC.
Emission Factor by SCC	Entries contain the SCC, the pollutant, the emission factor with units, the emission factor converted to tons pollutant/tons of wood combusted, and the data source for the emission factor.

Process:
The USEPA Residential Wood Tool calculates emissions using the equation below.

$$Ep_y = u \times EF_y \times CF_y$$

where:

Ep_y = (tons/yr) for an annual emission of pollutant by county
u = annual activity (tons of fuel burned),
EF_y = emission factor (tons of pollutant emitted/mass of fuel used), and
CF_y = control factor.

$_y$ is a specific pollutant

Fireplaces, Inserts, and Woodstoves - activity in terms of tons of fuel burned was calculated based on several factors as shown in the equation below.

$$u = P \times AP \times BR \times D$$

where:

P	=	Number of occupied units in a county in 2008,
AP	=	Percentage of occupied units for a specific appliance category (e.g. catalytic woodstoves used as main heating equipment, fireplaces without inserts used as other heating equipment, etc.),
BR	=	Burn rate (cords/year), and
D	=	average density of the wood fuel burned

Outdoor Hydronic Heaters, Indoor Furnaces, and Pellet Stoves

A second method, which applies to outdoor wood burning devices, indoor furnaces, and pellet stoves, estimates the number of appliances per county based on state level proportioned to the number of woodstoves per county. Activity is calculated using the following formula.

$$u = AN \times BR \times D$$

where:

AN	=	Number of appliances in county,
BR	=	Burn rate (cords/year), and
D	=	average density of the wood fuel burned.

USEPA Assumptions:

1. CF_y was assumed to be 1 for all appliances because emission improvements for RWC are represented by improved appliance designs. These were accounted for by applying appropriately adjusted emission factors.

Control Measures:

The emissions from this source category are regulated by the following rule:

USEPA Residential Wood Heaters New Source Performance Standards (NSPS) February 1988.

Double Counting:

Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:

The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. New Methodology for Estimating Emissions from Residential Wood Combustion, June 2008, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Inventory and Analysis Group (EIAG), Research Triangle Park, NC, and E.H. Pechan & Associates, Inc., Springfield, VA

2. 2011 National Emissions Inventory, Version 1 Technical Support Document, November 2013, U.S. Environmental Protection Agency , Office of Air Quality Planning and Standards Air Quality Assessment Division Emissions Inventory and Analysis Group , Research Triangle Park, North Carolina

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Residential Kerosene Oil Combustion
SCC: 2104011000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual facilities
2. Fuel consumption analysis

The fuel consumption analysis/methodology is selected because the input data elements are more readily available.

Emissions from the combustion of residential kerosene are calculated using statewide amount of fuel burned, allocated to the county level by the number of housing units using kerosene for primary heat source.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Total statewide residential kerosene oil use, OIL (10^3 gallons)[2]
2. County and state totals of housing units heated by kerosene oil burners, CHEAT, SHEAT[3]
3. Emission Factors, EF, (lbs/10^3 gallons burned)

Emission Factor		Reference
VOC =	0.71	4a Table 1.3-3 residential furnace, distillate oil fired
NOx =	18	4a Table 1.3-1 residential furnace
CO =	5	4a Table 1.3-1 residential furnace
PM10 = (0.22+1.3)=1.52		4a Table1.3-1, 2 and 7 res. furnace, filterable plus condensible
PM2.5 = (0.17+1.3)=1.47		4a Table1.3-1, 2 and 7 res. furnace, filterable plus condensible
SO2 = 142*(wt% sulfur, S)		4a Table 1.3-1 residential furnace, distillate oil fired
NH3 =	0.77	4b ERTAC 2009

4. Weekly activity, WAF=7 days/week[5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.41
Fall Season Adjustment Factor	0.66
Winter Season Adjustment Factor	1.91
Spring Season Adjustment Factor	1.02

6. Wt% sulfur content, S= [6]

0.3:	Atlantic, Cape May, Cumberland, Ocean Counties, Hunterdon, Sussex, and Warren Counties
0.2:	Burlington, Camden, Gloucester, Mercer, Salem, Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset, and Union Counties

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = OIL*(CHEAT/SHEAT)*(EF/CF)
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)

SAF = Seasonal adjustment factor

Assumptions:
1. All residential kerosene oil burned in New Jersey is included as residential kerosene oil in the State Energy Data Report.
2. Assume emission factors for kerosene are equivalent to distillate oil emission factors.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for Emission Inventory Preparation Vol III: Area Sources, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-81-026

2. State Energy Data 2006 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. 2007 American Community Survey (ACS) 1-Year Estimates, United States Department of Commerce, Bureau of the Census, Washington, DC

4a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 9, N.J.A.C. 7:27-9, Sulfur in Fuels, New Jersey State Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

On-Site Incineration, Industrial
SCC: 2601010000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and lead (Pb). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Emission limits from NJDEP permits

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Emission limits from NJDEP permits
2. Weekly activity, WAF=7 days/week
3. Seasonal adjustment factor, SAF=1 [2]

Process:

The following equations are used to calculate the emissions without control for this source category.

Ep_a = NJDEP Permit Data [1]
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All industrial incinerators are single or multiple chamber design for industrial sources.
2. All incinerators are assumed to be without controls.
3. Assume that 2007 permit data approximates current incinerator activity given that any incinerator known to have been closed has been deleted.
4. Assume incinerator operates for 40 hours over a 7 day week unless otherwise specified through the conductance of a survey of a specific incinerator.
5. Assume seasonal adjustment factor of 1

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 11, N.J.A.C. 7:27-11, New Jersey State Department of Environmental Protection, April 15, 1991, amended May 4, 1998

Double Counting:
Emissions for this source category may have also been reported in the point source inventory. [3] If so the incinerator was deleted from the area source inventory prior to calculation of area source emissions.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day

CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. 2007 NJDEP Permit Data

2. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

3. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

On-Site Incineration, Municipal Solid Waste Incinerator
SCC: 2601030000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and lead (Pb). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]
1. Emission limits from NJDEP permits

Required Input Parameters:
The following input data is required to calculate emissions for this source category:
1. Emission limits from NJDEP permits
2. Weekly activity, WAF=7 days/week
3. Seasonal adjustment factor, SAF=1 [2]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = NJDEP Permit Data [1]
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All municipal solid waste incinerators represent multiple chamber design for the burning of municipal solid waste.
2. All apartment incinerators are flue fed without afterburners for the burning of residential waste.
3. All incinerators are assumed to be without controls.
4. Assume that 2007 permit data approximates current incinerator activity given that any incinerator known to have been closed has been deleted.
5. Assume incinerator operates for 40 hours over a 7 day week unless otherwise specified through the conductance of a survey of a specific incinerator.
6. Municipal solid waste combustion is similar to commercial refuse combustion.
7. Assume seasonal adjustment factor of 1

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 11, N.J.A.C. 7:27-11, New Jersey State Department of Environmental Protection, April 15, 1991, amended May 4, 1998

Double Counting:
Emissions for this source category may have also been reported in the point source inventory.[3] If so the incinerator was deleted from the area source inventory prior to calcualtion of area source emissions.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. 2007 NJDEP Permit Data

2. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

3. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

On-Site Incineration, Pathological Incinerator
SCC: 2601000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and lead (Pb). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Emission limits from NJDEP permits

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Emission limits from NJDEP permits
2. Weekly activity, WAF=7 days/week
3. Seasonal adjustment factor, SAF=1 [2]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = NJDEP Permit Data [1]
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All pathological incinerators represent crematory or pathological waste incinerators.
2. All incinerators are assumed to be without controls.
3. Assume incinerator operates for 40 hours over a 7 day week unless otherwise specified through the conductance of a survey of a specific incinerator.
4. Assume that 2007 permit data approximates current incinerator activity given that any incinerator known to have been closed has been deleted.
5. Assume seasonal adjustment factor of 1

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 11, N.J.A.C. 7:27-11, New Jersey State Department of Environmental Protection, April 15, 1991, amended May 4, 1998

Double Counting:
Emissions for this source category may have also been reported in the point source inventory.[3] If so the incinerator was deleted from the area source inventory prior to calculation of area source emissions.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day

PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. 2007 NJDEP Permit Data

2. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

3. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

On-Site Incineration, Sewage Sludge
SCC: 2601030000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and lead (Pb). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Emission limits from NJDEP permits

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Emission limits from NJDEP permits
2. Weekly activity, WAF=7 days/week
3. Seasonal adjustment factor, SAF=1 [2]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = NJDEP Permit Data [1]
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All incinerators are assumed to be without controls.
2. Assume weekly activity factor of 7 days per week
3. Assume seasonal adjustment factor of 1

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 11, N.J.A.C. 7:27-11, New Jersey State Department of Environmental Protection, April 15, 1991, amended May 4, 1998

Double Counting:
Emissions for this source category may have also been reported in the point source inventory.[3] If so the incinerator was deleted from the area source inventory prior to calculation of area source emissions.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. 2007 NJDEP Permit Data

2. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

3. NJ Point Source Emission Inventory for 2007, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Open Burning
SCC: 2610000100, 2610000400, 2610030000, 2610040400

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10) and particulate matter less than or equal to 2.5 microns (PM2.5). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodology is used for this source category: [1]

1. MARAMA survey and calculations

Emissions from open burning are calculated using MARAMA's state specific survey and calculations.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Emission calculated by Pechan for MARAMA [1]
2. Emission factors, EF (lb/ton burned) [1]

	Residential Leaf	Residential Brush	Residential Municipal Solid Waste	Municipal Yard Waste
VOC	28	19	19	8.56
NOx	6.2	5	5	6
CO	112	140	140	85
SO2	0.76	1.66	1.66	1
PM10	22	19.73	19.73	38
PM2.5	22	1.26	1.26	34.8

3. Weekly activity, WAF=7 days/week
4. Seasonal adjustment factors, SAF [1]

	Residential Leaf	Residential Brush	Residential Municipal Solid Waste	Municpal Yard Waste
Summer	0	0.24	1	0.24
Fall	4	1.12	1	1.12
Winter	0	0.80	1	0.80
Spring	0	1.84	1	1.84

5. Growth factors = 1, no growth is anticipated for this category

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = MARAMA [1]
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 2, N.J.A.C. 7:27-2, New Jersey State Department of Environmental Protection, June 20, 1994

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. MANE-VU Open Burning in Residential Areas, Emissions Inventory Development Report, E.H. Pechan & Associates, for Mid-Atlantic/Northeast Visibility Union (MANE-VU) organized by the Mid-Atlantic Regional Air Management Association (MARAMA)., January 31, 2004.

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Agricultural Field Burning, Land Clearing
SCC: 2801500600

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), carbon monoxide (CO), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Contacting the Bureau of Forest Fire Management for information concerning agricultural field burning

This is the only recommended method and was employed in developing the inventory.

Emissions from agricultural field burning are calculated using the number of county and section specific permits.

Required Input Parameters:
The following input data was obtained to calculate emissions for this source category:

1. Total agricultural field burning land clearing permits issued by county for New Jersey Divisions A and B and by section for New Jersey Division C, CPER [2,3,4]
2. Average Acreage per permit (average acres/permit): ACRE [4]
   Division A,B,C: 7.5 acres per permit
3. Fuel loading factors (ton matter burned/permit): FL [5]
   Division A : 20.0 tons per acre
   Division B,C: 13.5 tons per acre
4. Percentage of each municipality in each NJDEP Forestry Section [6]
5. Area of each municipality, square miles [7]
6. Emission Factors, EF, (lbs/ton burned) [8a, 8b]

VOC=Non Methane Hydrocarbons (NMHC):	19
CO:	140
PM10:	17
PM2.5:	17
NH3:	1.3

7. Weekly activity, WAF=7 days/week [9]
8. Seasonal adjustment factors, SAF [4]

Summer Season Adjustment Factor	0.69
Fall Season Adjustment Factor	0.02
Winter Season Adjustment Factor	2.62
Spring Season Adjustment Factor	0.67

Process:
The following equations are used to calculate the emissions without control for this source category.

STEP 1: For Division C calculate the number of permits issued at the municipal level based on the # permits in each section and the % of each municipality in each section.

STEP 2: For Division C total the number of permits at the municipal level to obtain the number of permits at the county level.

STEP 3: For Divisions A, B and C, calculate the amount of agricultural land clearing material burned ALCTON (tons material burned) :

ALCTON = CPER*ACRE*FL

STEP 4: Calculate Emissions:

Ep_a = EF*ALCTON
Ep_s = Ep_a/AADF*SAF
Ep_w = Ep_a/AADF*SAF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Acreage of agricultural fields burned in each county based on the number of agricultural field burning permits issued in each county and represents the best available estimate of acreage burned per permit that can be provided by the NJ Forestry Service.
2. Assume that tons of matter burned per acreage is uniform across the specified division and represents the best available estimate that can be provided by NJ Forestry Service.
3. Assume particulate matter from most agricultural refuse burning is within the submicrometer size range. [8]
4. Assume that the EF for NMHC is equivalent to the EF for VOC.
5. North of the Raritan represents Division A and the Mullica River divides B and C division. [5,6]
6. Assume that approximately 5/6 of Somerset County belongs to Division A and the remaining 1/6 belongs to Division B. [2,3]
7. Assume that 1/2 of Mercer County belongs to Division A and the other 1/2 belongs to Division B. [5,6]

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 2, N.J.A.C. 7:27-2, New Jersey State Department of Environmental Protection, June 20, 1994

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
NH3	tons/yr	tons/day	tons/day

References
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. NJDEP Division A Permit Log for 2007 by County, April 1, 2009

3. NJDEP Division B Permit Log for 2007 by Township, April 1, 2009

4. NJDEP Division C Permit Log for 2007 by Section, April 1, 2009

5. Memo to File on Phone Conversations with NJ Forestry Service

6. Administrative Map, State of New Jersey, NJDEP, Forestry Service, November 1984

7. Estimate of 1996 Total Resident Population and Square Mile Area by Counties and Municipalities, US Bureau of the Census, Population Data Division, 6/30/99

8a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, Table 2.5-5, Unspecified Forest Residue and Note b.

8b. Eastern Regional Technical Advisory Committee (ERTAC) 2009.

9. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Agricultural Field Burning, Herbaceous
SCC: 2801500170

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), carbon monoxide (CO), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Contacting the Bureau of Forest Fire Management for information concerning agricultural field burning This is the only recommended method and was employed in developing the inventory. Emissions from agricultural field burning are calculated using the number of county and section specific permits.

Required Input Parameters:
The following input data is required to calculate emissions for this source category:

1. Total agricultural field burning herbacous permits issued by county for New Jersey Divisions A and B and by section for New Jersey Division C, CPER [2,3,4]
2. Average Acreage per permit (average acres/permit): ACRE [4]
   Division A,B,C: 3 acres per permit
3. Fuel loading factors (ton matter burned/permit): FL [5]
   Division A, B, C: 1.0 tons per acre
4. Percentage of each municipality in each NJDEP Forestry Section [6]
5. Area of each municipality, square miles [7]
6. Emission Factors, EF, (lbs/ton burned) [8a, 8b]
   VOC=Non Methane Hydrocarbons (NMHC): 9
   CO: 85
   PM10: 15
   PM2.5: 15
   NH3: 1.3
7. Weekly activity, WAF=7 days/week [9]
8. Seasonal adjustment factors, SAF [10]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.78
Winter Season Adjustment Factor	1.16
Spring Season Adjustment Factor	1.51

Process:
The following equations are used to calculate the emissions without control for this source category.

STEP 1: For Division C calculate the number of permits issued at the municipal level based on the # permits in each section and the % of each municipality in each section.

STEP 2: For Division C total the number of permits at the municipal level to obtain the number of permits at the county level.

STEP 3: For Divisions A, B and C, calculate the amount of agricultural herbacous material burned HERBTON (tons material burned) :

HERBTON = CPER*ACRE*FL

STEP 4: Calculate Emissions:

Ep_a = EF*ALCTON
Ep_s = Ep_a/AADF*SAF
Ep_w = Ep_a/AADF*SAF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county

Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Acreage of agricultural fields burned in each county based on the number of agricultural field burning permits issued in each county and represents the best available estimate of acreage burned per permit that can be provided by the NJ Forestry Service.
2. Assume that tons of matter burned per acreage is uniform across the specified division and represents the best available estimate that can be provided by NJ Forestry Service.
3. Assume particulate matter from most agricultural refuse burning is within the submicrometer size range. [8]
4. Assume that the EF for NMHC is equivalent to the EF for VOC.
5. North of the Raritan represents Division A and the Mullica River divides B and C division. [5,6]
6. Assume that approximately 5/6 of Somerset County belongs to Division A and the remaining 1/6 belongs to Division B. [2,3]
7. Assume that 1/2 of Mercer County belongs to Division A and the other 1/2 belongs to Division B. [5,6]

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 2, N.J.A.C. 7:27-2, New Jersey State Department of Environmental Protection, June 20, 1994

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
NH3	tons/yr	tons/day	tons/day

References
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. NJDEP Division A Permit Log for 2007 by County, April 1, 2009

3. NJDEP Division B Permit Log for 2007 by Township, April 1, 2009

4. NJDEP Division C Permit Log for 2007 by Section, April 1, 2009

5. Memo to File on Phone Conversations with NJ Forestry Service

6. Administrative Map, State of New Jersey, NJDEP, Forestry Service, November 1984

7. Estimate of 1996 Total Resident Population and Square Mile Area by Counties and Municipalities, US Bureau of the Census, Population Data Division, 6/30/99

8a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, Table 2.5-5, Unspecified Weeds and Note b.

8b. Eastern Regional Technical Advisory Committee (ERTAC) 2009.

9. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory

Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

10. NJDEP Division A Fire Call in Log for 2007, September 21, 2009

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Agricultural Field Burning, Infested
SCC: 2801500100

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), carbon monoxide (CO), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Contacting the Bureau of Forest Fire Management for information concerning agricultural field burning. This is the only recommended method and was employed in developing the inventory. Emissions from agricultural field burning are calculated using the number of county and section specific permits.

Required Input Parameters:
The following input data is required to calculate emissions for this source category:

1. Total agricultural field burning infested permits issued by county for New Jersey Divisions A and B and by section for New Jersey Division C, CPER [2,3,4]
2. Average Acreage per permit (average acres/permit): ACRE [4]
   Division A,B,C: 1.5 acres per permit
3. Fuel loading factors (ton matter burned/permit): FL [5]
   Division A, B, C: 2.0 tons per acre
4. Percentage of each municipality in each NJDEP Forestry Section [6]
5. Area of each municipality, square miles [7]
6. Emission Factors, EF, (lbs/ton burned) [8a, 8b]

VOC=Non Methane Hydrocarbons (NMHC):	18
CO:	117
PM10:	21
PM2.5:	21
NH3:	1.3

7. Weekly activity, WAF=7 days/week [9]
8. Seasonal adjustment factors, SAF [10]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.78
Winter Season Adjustment Factor	1.16
Spring Season Adjustment Factor	1.51

Process:
The following equations are used to calculate the emissions without control for this source category.

STEP 1: For Division C calculate the number of permits issued at the municipal level based on the # permits in each section and the % of each municipality in each section.

STEP 2: For Division C total the number of permits at the municipal level to obtain the number of permits at the county level.

STEP 3: For Divisions A, B and C, calculate the amount of agricultural infested material burned INFTON (tons material burned) :

$$INFTON = CPER*ACRE*FL$$

STEP 4: Calculate Emissions:

$$Ep_a = EF*ALCTON$$
$$Ep_s = Ep_a/AADF*SAF$$
$$Ep_w = Ep_a/AADF*SAF$$

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county

Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Acreage of agricultural fields burned in each county based on the number of agricultural field burning permits issued in each county and represents the best available estimate of acreage burned per permit that can be provided by the NJ Forestry Service.
2. Assume that tons of matter burned per acreage is uniform across the specified division and represents the best available estimate that can be provided by NJ Forestry Service.
3. Assume particulate matter from most agricultural refuse burning is within the submicrometer size range. [8]
4. Assume that the EF for NMHC is equivalent to the EF for VOC.
5. North of the Raritan represents Division A and the Mullica River divides B and C division. [5,6]
6. Assume that approximately 5/6 of Somerset County belongs to Division A and the remaining 1/6 belongs to Division B. [2,3]
7. Assume that 1/2 of Mercer County belongs to Division A and the other 1/2 belongs to Division B. [5,6]

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 2, N.J.A.C. 7:27-2, New Jersey State Department of Environmental Protection, June 20, 1994

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
NH3	tons/yr	tons/day	tons/day

References
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. NJDEP Division A Permit Log for 2007 by County, April 1, 2009
3. NJDEP Division B Permit Log for 2007 by Township, April 1, 2009
4. NJDEP Division C Permit Log for 2007 by Section, April 1, 2009

5. Memo to File on Phone Conversations with NJ Forestry Service

6. Administrative Map, State of New Jersey, NJDEP, Forestry Service, November 1984

7. Estimate of 1996 Total Resident Population and Square Mile Area by Counties and Municipalities, US Bureau of the Census, Population Data Division, 6/30/99

8a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, Table 2.5-5, Unspecified Field Crops and Note b.

8b. Eastern Regional Technical Advisory Committee (ERTAC) 2009.

9. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

10. NJDEP Division A Fire Call in Log for 2007, September 21, 2009

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Agricultural Field Burning, Orchard
SCC: 2801500300

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), carbon monoxide (CO), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Contacting the Bureau of Forest Fire Management for information concerning agricultural field burning This is the only recommended method and was employed in developing the inventory. Emissions from agricultural field burning are calculated using the number of county and section specific permits.

Required Input Parameters:
The following input data is required to calculate emissions for this source category:

1. Total agricultural field burning orchard permits issued by county for New Jersey Divisions A and B and by section for New Jersey Division C, CPER [2,3,4]
2. Average Acreage per permit (average acres/permit): ACRE [4]
   Division A,B,C: 7.5 acres per permit
3. Fuel loading factors (ton matter burned/permit): FL [5]
   Division A, B, C: 9.0 tons per acre
4. Percentage of each municipality in each NJDEP Forestry Section [6]
5. Area of each municipality, square miles [7]
6. Emission Factors, EF, (lbs/ton burned) [8a, 8b]
   VOC=Non Methane Hydrocarbons (NMHC): 8
   CO: 52
   PM10: 6
   PM2.5: 6
   NH3: 1.3
7. Weekly activity, WAF=7 days/week [9]
8. Seasonal adjustment factors, SAF [10]

Summer Season Adjustment Factor	0.55
Fall Season Adjustment Factor	0.78
Winter Season Adjustment Factor	1.16
Spring Season Adjustment Factor	1.51

Process:
The following equations are used to calculate the emissions without control for this source category.

STEP 1: For Division C calculate the number of permits issued at the municipal level based on the # permits in each section and the % of each municipality in each section.

STEP 2: For Division C total the number of permits at the municipal level to obtain the number of permits at the county level.

STEP 3: For Divisions A, B and C, calculate the amount of agricultural orchard material burned ORCTON (tons material burned) :

$$ORCTON = CPER*ACRE*FL$$

STEP 4: Calculate Emissions:

$$Ep_a = EF*ALCTON$$
$$Ep_s = Ep_a/AADF*SAF$$
$$Ep_w = Ep_a/AADF*SAF$$

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county

Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Acreage of agricultural fields burned in each county based on the number of agricultural field burning permits issued in each county and represents the best available estimate of acreage burned per permit that can be provided by the NJ Forestry Service.
2. Assume that tons of matter burned per acreage is uniform across the specified division and represents the best available estimate that can be provided by NJ Forestry Service.
3. Assume particulate matter from most agricultural refuse burning is within the submicrometer size range. [8]
4. Assume that the EF for NMHC is equivalent to the EF for VOC.
5. North of the Raritan represents Division A and the Mullica River divides B and C division. [5,6]
6. Assume that approximately 5/6 of Somerset County belongs to Division A and the remaining 1/6 belongs to Division B. [2,3]
7. Assume that 1/2 of Mercer County belongs to Division A and the other 1/2 belongs to Division B. [5,6]

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 2, N.J.A.C. 7:27-2, New Jersey State Department of Environmental Protection, June 20, 1994

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
NH3	tons/yr	tons/day	tons/day

References
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. NJDEP Division A Permit Log for 2007 by County, April 1, 2009

3. NJDEP Division B Permit Log for 2007 by Township, April 1, 2009

4. NJDEP Division C Permit Log for 2007 by Section, April 1, 2009

5. Memo to File on Phone Conversations with NJ Forestry Service

6. Administrative Map, State of New Jersey, NJDEP, Forestry Service, November 1984

7. Estimate of 1996 Total Resident Population and Square Mile Area by Counties and Municipalities, US Bureau of the Census, Population Data Division, 6/30/99

8a. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, Table 2.5-5, Unspecified Orchard Crops and Note b.

8b. Eastern Regional Technical Advisory Committee (ERTAC) 2009.

9. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory

Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

10. NJDEP Division A Fire Call in Log for 2007, September 21, 2009

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Forest Wildfires
SCC: 2810010000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Contacting the Bureau of Forest Fire Management for information concerning wildfire burning

This is the only recommended method and was employed in developing the inventory.

Emissions from forest wildfires are calculated using county specific acres burned.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Annual Acres burned by county and month, ACRES [2]
2. Fuel loading factor, FL [3]
   Division A, B, C = 11 tons/acre
3. Emission Factors, EF, (lbs/ton burned)

VOC = (296kg/hect*2.2046lb/kg)/(25Mgfuel/hect*1.1023tonfuel/Mg)=	23.7	[4]
NOx = (49kg/hect*2.2046lb/kg)/(25Mgfuel/hect*1.1023tonfuel/Mg)=	4	[4]
CO = (1730kg/hect*2.2046lb/kg)/(25Mgfuel/hect*1.1023tonfuel/Mg)=	140	[4]
PM10 = (15kg/Mg*2.2046lb/kg)/(1.1023tonfuel/Mg) =	30	[5]
PM2.5 = (13.5kg/Mg*2.2046lb/kg)/(1.1023tonfuel/Mg) =	27	[5]
NH3=	1.3	[6]

4. Weekly activity, WAF=7 days/week [7]
5. Seasonal adjustment factors, SAF [2]

Summer Season Adjustment Factor	0.54
Fall Season Adjustment Factor	0.03
Winter Season Adjustment Factor	0.01
Spring Season Adjustment Factor	3.42

Process:
The following equations are used to calculate the emissions without control for this source category:

$$Ep_a = EF*ACRES*FL$$
$$Ep_s = Ep_a/AADF*SAF$$
$$Ep_w = Ep_a/AADF*SAF$$

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. The NJ Forest Service fuel loadings factors are assumed to be valid.

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:

Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
NH3	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. Wildfire Acres Burned 2000-2007, May 14, 2009 from Pat Stockman, NJDEP, Forestry Service

3. Memo to File on Phone Conversations with NJ Forestry Service

4. Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, Table 13.1-2, Eastern Group

5. Development of Emissions Inventory Methods for Wildland Fires, February 2002, Table 22, Average WIldfies

6. Eastern Regional Technical Advisory Committee (ERTAC) 2009

7. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Managed Burning
SCC: 2810015000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5) and ammonia (NH3). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Contacting the Bureau of Forest Fire Management for information concerning managed burning

This is the only recommended method and was employed in developing the inventory.

Emissions from managed burning are calculated using county specific acres burned.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Annual Acres burned by county and month, ACRES [2]
2. Fuel loading factor, FL [3]
   Division A, B, C = 4 tons/acre
3. Emission Factors, EF, (lbs/ton burned)

VOCA = (6.4 g/kg) * (907kg/ton)/(454 g/lb) =	12.8	[4] (Table 13.1-3 Hardwood Fire)
VOCBC = (3.5 g/kg) * (907kg/ton)/(454 g/lb) =	7	[4] (Table 13.1-3 Short Needle)
NOx = (4 g/kg) * (907kg/ton)/(454 g/lb) =	8	[4] (Section 13.1 page 13.1-6)
CO = (143.8 g/kg) * (907kg/ton)/(454 g/lb) =	287.6	[4] (Table 13.1-4 North and Centeral Eastern Region, Average for the Region)
PM10 = (14 g/kg) * (907kg/ton)/(454 g/lb) =	28	[4] (Table 13.1-4 North and Centeral Eastern Region, Average for the Region)
PM2.5 = (12 g/kg) * (907kg/ton)/(454 g/lb) =	24	[4] (Table 13.1-3 Short Needle Conifer)
NH3=	1.3	[5] ERTAC 2009

4. Weekly activity, WAF=7 days/week [6]
5. Seasonal adjustment factors, SAF [2]

Summer Season Adjustment Factor	0
Fall Season Adjustment Factor	0
Winter Season Adjustment Factor	1.24
Spring Season Adjustment Factor	2.75

Process:
The following equations are used to calculate the emissions without control for this source category:

$$Ep_a = EF*ACRES*FL$$
$$Ep_s = Ep_a/AADF*SAF$$
$$Ep_w = Ep_a/AADF*SAF$$

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. The NJ Forest Service fuel loadings factors are assumed to be valid.

Control Measures:

The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 2, N.J.A.C. 7:27-2, New Jersey State Department of Environmental Protection, June 20, 1994

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. Prescribed Fire in 2007, October 2, 2009, Michael Drake NJDEP, Forestry Service

3. Memo to File on Phone Conversations with NJ Forestry Service

4 Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5. Eastern Regional Technical Advisory Committee (ERTAC) 2009

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial Cooking: Conveyor Charbroiling
SCC: 2302002100

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), and carbon monoxide (CO). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. USEPA 2008 National Emissions Inventory Calculation Methodology

Emissions from commercial cooking are calculated using the USEPA calculation methodology and allocating emissions to the county level using population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. County population, CPOP [2]
2. Emission Factors, EF, (lbs/year/capita) [1]
   VOC= 1.89
   PM10= 0.05
   PM2.5= 0.05
   CO= 0.04
3. Weekly activity, WAF= 7 days/week
4. Seasonal adjustment factor, SAF = 1

Process:

The following equations are used to calculate the emissions without control for this source category.

Ep_a = CPOP*EF/CF
Ep_s = Ep_a*SAF_i/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day

References:

1. Documentation for the 2008 Non-point Source National Emission Inventory for Criteria and Hazardous Air Pollutants (September 2009 Version), E.H. Pechan & Associates for EPA, September 2009.

2. Estimate of 2007 Total Resident Population by County, NJDOT, July 17, 2009.

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial Cooking: Underfired Charbroiling
SCC: 2302002200

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), and carbon monoxide (CO). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. USEPA 2008 National Emissions Inventory Calculation Methodology

Emissions from commercial cooking are calculated using the USEPA calculation methodology and allocating emissions to the county level using population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. County population, CPOP [2]
2. Emission Factors, EF, (lbs/year/capita) [1]
   VOC= 0.04
   PM10= 0.35
   PM2.5= 0.34
   CO= 0.14
3. Weekly activity, WAF= 7 days/week
4. Seasonal adjustment factor, SAF = 1

Process:

The following equations are used to calculate the emissions without control for this source category.

Ep_a = CPOP*EF/CF
Ep_s = Ep_a*SAF_i/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day

References:

1. Documentation for the 2008 Non-point Source National Emission Inventory for Criteria and Hazardous Air Pollutants (September 2009 Version), E.H. Pechan & Associates for EPA, September 2009.

2. Estimate of 2007 Total Resident Population by County, NJDOT, July 17, 2009.

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Commercial Cooking: Flat Griddle Frying
SCC: 2302003100

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), particulate matter less than or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), and carbon monoxide (CO). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. USEPA 2008 National Emissions Inventory Calculation Methodology

Emissions from commercial cooking are calculated using the USEPA calculation methodology and allocating emissions to the county level using population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. County population, CPOP [2]
2. Emission Factors, EF, (lbs/year/capita) [1]
   VOC= 0.01
   PM10= 0.10
   PM2.5= 0.08
   CO= 0.01
3. Weekly activity, WAF= 7 days/week
4. Seasonal adjustment factor, SAF = 1

Process:

The following equations are used to calculate the emissions without control for this source category.

Ep_a = CPOP*EF/CF
Ep_s = Ep_a*SAF_i/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day

References:

1. Documentation for the 2008 Non-point Source National Emission Inventory for Criteria and Hazardous Air Pollutants (September 2009 Version), E.H. Pechan & Associates for EPA, September 2009.

2. Estimate of 2007 Total Resident Population by County, NJDOT, July 17, 2009.

Area Sources Calculation Methodology Sheets for the 2007 Periodic Emission Inventory

Structural Fires
SCC: 2810030000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10) and particulate matter less than or equal to 2.5 microns (PM2.5). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Local fire department information
2. Population based estimate of the number of structural fires

Local fire department information was used because the input data elements were readily available

Emissions from structural fires are calculated using fire department specific number of fires.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Number of fires per county in 2007, FIRE [2]
3. Fuel loading factor: FL = 1.15 tons burned/fire [3]
4. Emission Factors, EF, (lbs/ton burned) [3]
   - VOC = 11
   - NOx = 1.4
   - CO = 60
   - PM10 = 10.8
   - PM2.5 = 10.8

5. Weekly activity, WAF=7 days/week [4]
6. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	0.8
Fall Season Adjustment Factor	0.94
Winter Season Adjustment Factor	1.32
Spring Season Adjustment Factor	0.94

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a= FIRE*FL*EF/CF
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. PM 2.5 and PM10 emission factors are conservatively assumed to be equal to PM.

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. 2007 Structural Fire Data, Number of Fires per county, Heather Puskar, NJ Division of Fire Safety, April 30, 2009.

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 18 - Structure Fires, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c, Table 18.4-1

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

Vehicle Fires
SCC: 2810050000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10) and particulate matter less than or equal to 2.5 microns (PM2.5). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Local fire department information
2. Population based estimate of the number of structural fires

Local fire department information was used because the input data elements were readily available

Emissions from vehicle fires are calculated using fire department specific number of fires.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Number of fires per county in 2007, FIRE [2]
3. Fuel loading factor: FL = 500 pounds burned/fire [3]
4. Emission Factors, EF, (lbs/ton burned) [3]
   - VOC = 32
   - NOx = 4
   - CO = 125
   - PM10 = 100
   - PM2.5 = 100

5. Weekly activity, WAF=7 days/week [4]
6. Seasonal adjustment factor, SAF = 1

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a= FIRE*FL*EF/CF
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. PM 2.5 and PM10 emission factors are conservatively assumed to be equal to PM.
2. VOC emission factor is equal to nonmethane TOC

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:

1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. 2007 Vehicle Fire Data, Number of Fires per county, Heather Puskar, NJ Division of Fire Safety, April 30, 2009.

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Area Souce Category Method Absract-Vehicle Fires, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c, May 15, 2004

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

Cigarette Smoking
SCC: 2810003000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns (PM10) and particulate matter less than or equal to 2.5 microns (PM2.5). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Obtaining state specific data on cigarette smoking

This is the only recommended method and was used in developing the emission inventory.

Emissions from cigarette smoking are calculated using statewide packs of cigarettes sold, allocated to the county level using population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. Packs of cigarettes sold in New Jersey in 2007, PCIG [2]
2. Cigarettes per pack, #CIGPP = 20
3. County and State population, CPOP, SPOP [3]
4. Emission Factors, EF, (mg/cigarette smoked) [1]
   - VOC = 6.75
   - NOx = 0.35
   - CO = 19.0
   - PM10 = 22.5
   - PM2.5 = 22.5
5. Weekly activity, WAF=7 days/week
6. Seasonal adjustment factor, SAF=1

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = PCIG*#CIGPP*EF*(CPOP/SPOP)*CF1/CF2
Ep_s = Ep_a*SAF/AADF
Ep_w = Ep_a*SAF/AADF

Where:

PCIG = Number of cigarettes sold in New Jersey per capita * SPOP
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
Ep_w = (tons/day) for a typical winter day emission of pollutant
CF1 = Conversion factor for units = $2.205*10^6$ pounds/miligrams
CF2 = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Assume a weekly activity factor of 7 days per week
2. Assume a seasonal adjustment factor of 1

Control Measures:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day
NOx	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day
SO2	tons/yr	tons/day	tons/day
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. State Tobacco Activities Tracking and Evaluation (STATE) System. Cigarette Sales New Jersey 2007. Centers for Disease Control and Prevention (CDC). Accessed from http://apps.nccd.cdc.gov/StateSystem.

3. Estimate of 2007 Total Resident Population by County, NJDOT, July 17, 2009.