The State of New Jersey
Department of Environmental Protection

2017 Periodic Emission Inventory

Area Source Calculation Methodology Sheets
VOC, NOx, CO, SO2, PM2.5

September 2020

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Fugitive Dust

Area Sources Calculation Methodology Sheets for the 2017 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 =	0.30	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 =	2.38	5 Figure 1.2-1 total particulate
SO2 = 37.05*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)		5 Table 1.2-1 and 1.1-3
Pb =	0.1	4

4. Control Efficiency, CE[6]:

VOC = 34%
NOx = 4%
CO = 34%
SO2 = 4%
PM10 = 4%
PM2.5 = 4%

5. Rule Effectiveness, RE: 100%[7]
6. Rule Penetration, RP: 100%[7]
4. Weekly activity factor, WAF=6 days/week [8]
5. Seasonal adjustment factors, SAF [2]

Summer Season Adjustment Factor	1.00
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.01
Spring Season Adjustment Factor	0.99

6. Wt% sulfur, S = 0.8 [9]

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. [10]
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:

1. 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.
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} = (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) [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 2017 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 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

7a. 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

7b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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. 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

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 2017, New Jersey Department of Environmental Protection

12. ERTAC 2009

13. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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 = 0.05 – ERTAC 2009

NOx = 11.00 – EPA 2002 NEI Documentation, Appendix C
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 = 33.25*(wt% sulfur, S)*0.95(weight fraction of SO2 in SOx)

PM10 = 13.04
PM2.5 = 2.44
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. Control Efficiency, CE[6]:
   VOC = 34%
   NOx = 4%
   CO = 34%
   SO2 = 4%
   PM10 = 4%
   PM2.5 = 4%

5. Rule Effectiveness, RE: 100% (All Pollutants)[7]
6. Rule Penetration, RP: 100% (All Pollutants)[7]

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

Summer Season Adjustment Factor	1.00
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.01
Spring Season Adjustment Factor	0.99

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 rules:

1. 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
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} = (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 2017 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 2017 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

6a. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

6b. 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 2017, New Jersey Department of Environmental Protection

10. ERTAC 2009

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Distillate Oil Combustion - Boilers
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 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[2a] (10^3 gallons) (EIA sales data with 8.3% removed as non-combustion; 100% of No. 2 fuel oil included as stationary and 15% of No. 2 low sulfur diesel included as stationary; 90% of fuel allocated to boilers, 10% allocated to engines) [2b]
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/Notes
VOC =	0.2	4a Table 1.3-3 industrial boilers distillate 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; 4b Low sulfur fuel reduction.
Pb= 0		4a
NH3 = 0.8		4c ERTAC 2009

4. Control Efficiency, CE= [5]

VOC: 6%
NOx: 7.5%
CO: 6%
SO2: 4%
PM10: 4%
PM2.5: 4%

5.Rule Effectiveness, RE; RE = 100% (All Pollutants)[6]

6.Rule Penetration, RP; RP = 100% (All Pollutants) [5]
7. Weekly activity, WAF=6 days/week[7]
8. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.98
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.02

Spring Season Adjustment Factor 0.99

9. Wt% sulfur content, S = [8] 0.0015

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. Energy Information Administration. 2019. Form 821: Sales of Distillate Fuel Oil by End Use. Accessed from: https://www.eia.gov/dnav/pet/pet_cons_821usea_dcu_snj_a.htm.

2b. USEPA Industrial, Commercial and Institutional Fuel Consumption Nonpoint Emissions Methodology and Operator Instructions (NEMO) Final.
Accessed from: ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonpoint/.
3. Total 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

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

5. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Industrial Distillate Oil Combustion – Engines
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 in industrial engines 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[2a] (10^3 gallons) (EIA Sales data with 8.3% removed as non-combustion; 100% of No. 2 fuel oil included as stationary and 15% of No. 2 low sulfur diesel included as stationary; 90% of fuel allocated to boilers, 10% allocated to engines) [2b]
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/Notes
VOC =	42.00	4a
NOx =	273.00	4a
CO =	130.00	4a
PM10 =	43.50	4a filterable plus condensible
PM2.5 =	40.80	4a filterable plus condensible
SO2 =	39.80	4b Low Sulfur fuel reduction
Pb= 0		
NH3 = 0.8		4c ERTAC 2009

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

Summer Season Adjustment Factor	0.98
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.02
Spring Season Adjustment Factor	0.99

6. Sulfur Control Factor, S = [8] 0.01

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

2a. Energy Information Administration. 2019. Form 821: Sales of Distillate Fuel Oil by End Use. Accessed from: https://www.eia.gov/dnav/pet/pet_cons_821usea_dcu_snj_a.htm.

2b. USEPA Industrial, Commercial and Institutional Fuel Consumption Nonpoint Emissions Methodology and Operator Instructions (NEMO) Final.
Accessed from: ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonpoint/.

3. Total 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

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

5. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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/Notes
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 4b Low sulfur fuel half the year
Pb= 4.20E-03 lb/10^3 gals[5]		
NH3 = 0.8		4c ERTAC 2009

4. Control Efficiency, CE; CE = [6]

VOC: 6%
NOx: 4%
CO: 6%
SO2: 4%
PM10: 4%
PM2.5: 4%

5.Rule Effectiveness, RE; RE = 100% [7] (All Pollutants)

6.Rule Penetration, RP; RP = 100%[6] (All Pollutants)

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

Summer Season Adjustment Factor	0.98
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.02
Spring Season Adjustment Factor	0.99

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

0.5: Atlantic, Burlington County, Camden, Cape May, Cumberland, Gloucester, Hunterdon, Mercer, Ocean, Salem, Sussex and Warren.

0.3: 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 2017 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 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4c. 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 Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

7a. 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

7b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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) (1% removed as non-combustion)[2a]
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 =	0.54	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. Weekly activity, WAF=6 days/week[5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.91
Fall Season Adjustment Factor	0.93
Winter Season Adjustment Factor	1.13
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.[6]

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)[7]

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 2017 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

2a. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.

3. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4a. 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

4b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

5a. 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

5b. Eastern Regional Technical Advisory Committee (ERTAC) 2009

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

7. NJ Point Source Emission Inventory for 2014, New Jersey Department of Environmental Protection

8. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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] (91.3% removed as non-combustion)[2a]
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=0.52	5 ERTAC 2009
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=0.3	5 ERTAC 2009

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

Summer Season Adjustment Factor	0.98
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.02
Spring Season Adjustment Factor	0.99

6. 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 2017 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

2a. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.

3. Total 2017 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 Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

7a. 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

7b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

12. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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 distillate 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 4b Low sulfur fuel half the year
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	4c ERTAC 2009

4. Control Efficiency, CE[6]:
   - VOC = 6%
   - NOx = 26%
   - CO = 6%
   - SO2 = 4%
   - PM10 = 4%
   - PM2.5 = 4%

5. Rule Effectiveness, RE: 80%[7] (all pollutants)
6. Rule Penetration, RP: 100%[7] (all pollutants)

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

Summer Season Adjustment Factor	0.98
Fall Season Adjustment Factor	1.00
Winter Season Adjustment Factor	1.02
Spring Season Adjustment Factor	0.99

9. Wt% sulfur content, S= [6] 0.0015

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 2017 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 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4c Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4d. 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 2014, New Jersey Department of Environmental Protection

9. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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 =	0.3	4a ERTAC 2009
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	4b
NH3 =	0.03	4a ERTAC 2009

4. Control Efficiency, CE[6]:
   VOC = 34%
   NOx = 4%
   CO = 34%
   SO2 = 4%
   PM10 = 4%
   PM2.5 = 4%

5. Rule Effectiveness, RE: 80%[7] (all pollutants)
6. Rule Penetration, RP: 100%[7] (all pollutants)

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

Summer Season Adjustment Factor	0.74
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	1.38
Spring Season Adjustment Factor	0.99

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 rules:

1. 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

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} = (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 2017 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 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

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

4b. 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 2014, New Jersey Department of Environmental Protection

10. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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 = 11[4b]
CO = 5[4b]

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	0.74
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	1.38
Spring Season Adjustment Factor	0.99

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, 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 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 rules:

1. 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

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} = (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 2017 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 2017 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 2014, New Jersey Department of Environmental Protection

9. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Commercial/Institutional Distillate Oil Combustion – Boilers
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 boilers 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)[2a,] (EIA sales data with 100% of No. 2 fuel oil included as stationary; 0% of diesel fuel included as stationary; 95% of fuel allocated to boilers and 5% allocated to engines). [2b]

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 distillate 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 4b Low sulfur fuel reduction
NH3 =	0.8	4c ERTAC 2009

4. Control Efficiency, CE; CE = [5]

VOC: 6%
NOx: 26%
CO: 6%
SO2: 4%
PM10: 4%
PM2.5: 4%

5.Rule Effectiveness, RE; RE = 80% (All Pollutants) [6]

6.Rule Penetration, RP; RP = 100% (All Pollutants) [5]

7. Weekly activity, WAF=6 days/week[7]

8 Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.59
Fall Season Adjustment Factor	0.87
Winter Season Adjustment Factor	1.58
Spring Season Adjustment Factor	0.96

9. Wt% sulfur content, S= [8] 0.0015:

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

2a. Energy Information Administration. 2019. Form 821: Sales of Distillate Fuel Oil by End Use. Accessed from: https://www.eia.gov/dnav/pet/pet_cons_821usea_dcu_snj_a.htm.

2b. USEPA Industrial, Commercial and Institutional Fuel Consumption Nonpoint Emissions Methodology and

Operator Instructions (NEMO) Final.
Accessed from: ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonpoint/.

3. Total 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

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

5. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Commercial/Institutional Distillate Oil Combustion – Engines
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 engines 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)[2a,] (EIA sales data with 100% of No. 2 fuel oil included as stationary; 0% of diesel fuel included as stationary; 95% of fuel allocated to boilers and 5% allocated to engines). [2b]
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 =	42	4a
NOx =	273	4a
CO =	130	4a
PM10 =	43.5	4a filterable plus condensible
PM2.5 =	43.5	4a filterable plus condensible
SO2 =	39.8	4b Low sulfur fuel reduction
NH3 =	0.8	4c ERTAC 2009

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

Summer Season Adjustment Factor	0.59
Fall Season Adjustment Factor	0.87
Winter Season Adjustment Factor	1.58
Spring Season Adjustment Factor	0.96

6. Sulfur Control Factor, S= [8] 0.01

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

2a. Energy Information Administration. 2019. Form 821: Sales of Distillate Fuel Oil by End Use. Accessed from: https://www.eia.gov/dnav/pet/pet_cons_821usea_dcu_snj_a.htm.

2b. USEPA Industrial, Commercial and Institutional Fuel Consumption Nonpoint Emissions Methodology and Operator Instructions (NEMO) Final.
Accessed from: ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonpoint/.

3. Total 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

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

5. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US.,

Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

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 4b Low sulfur fuel half the year
NH3 = 0.8		4c ERTAC 2009

4.Control Efficiency, CE; CE = [5]

VOC: 6%
NOx: 4%
CO: 6%
SO2: 4%
PM10: 4%
PM2.5: 4%

5.Rule Effectiveness, RE; RE = 80% [6] (All Pollutants)
6. Rule Penetration, RP; RP = 100% [5] (All Pollutants)

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

Summer Season Adjustment Factor	0.59
Fall Season Adjustment Factor	0.87
Winter Season Adjustment Factor	1.58
Spring Season Adjustment Factor	0.96

9. Wt% sulfur content, S= [8]
   - 0.5: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Hunterdon, Mercer, Ocean, Salem, Sussex, Warren
   - 0.3: 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 2017 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 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4c. 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

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2014, New Jersey Department of Environmental Protection

11. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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. Weekly activity, WAF=6 days/week [5]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.45
Fall Season Adjustment Factor	0.77
Winter Season Adjustment Factor	1.74
Spring Season Adjustment Factor	1.03

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. [6]

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)[7]

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 2017 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 2017 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. Memo to file concerning discussion on fuel use sale data with Department of Energy officials, June 1,1999

7. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

8. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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=0.52	5 ERTAC 2009
NOx=(15+13)/2=14	4 Table 1.5-1, commercial boilers
CO = 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=6 days/week [8]
5. Seasonal adjustment factor, SAF [2]

Summer Season Adjustment Factor	0.59
Fall Season Adjustment Factor	0.87
Winter Season Adjustment Factor	1.58
Spring Season Adjustment Factor	0.96

6. 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 2017 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 2014 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 Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix DD, NJ and NC Studies of the Effect of Boiler MACT on point and Area Sources, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

7a. 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

7b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

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 2017, New Jersey Department of Environmental Protection

13. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

Area Sources Calculation Methodology Sheets for the 2017 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 distillate oil fired
NOx =	19.3	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
		4b Low sulfur fuel half the year
NH3 =	0.8	4c ERTAC 2009

4. Control Efficiency, CE[6]:
   - VOC = 6%
   - NOx = 26%
   - CO = 6%
   - SO2 = 4%
   - PM10 = 4%
   - PM2.5 = 4%

5. Rule Effectiveness, RE: 80%[7] (all pollutants)
6. Rule Penetration, RP: 100%[7] (all pollutants)

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

Summer Season Adjustment Factor	0.59
Fall Season Adjustment Factor	0.87
Winter Season Adjustment Factor	1.58
Spring Season Adjustment Factor	0.96

9. Wt% sulfur content, S= [6] 0.0015

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 2017 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 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4c. 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 2017, New Jersey Department of Environmental Protection

9. USEPA Nonpoint Methods Advisory Committee (NOMAD) 2014

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	0.84
Fall Season Adjustment Factor	0.76
Winter Season Adjustment Factor	1.33
Spring Season Adjustment Factor	1.06

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 2017 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. 2017 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

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 4b Low sulfur fuel
NH3 =	1	4c ERTAC 2009

4. Control Efficiency, CE[4b]:
   NOx = 22%

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

Summer Season Adjustment Factor	0.38
Fall Season Adjustment Factor	0.75
Winter Season Adjustment Factor	1.91
Spring Season Adjustment Factor	0.96

7. Wt% sulfur content, S= [6] 0.0015

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 2017 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. 2017 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4c. 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 2017 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	0.63
Winter Season Adjustment Factor	2.04
Spring Season Adjustment Factor	1.05

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 2017 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. 2017 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 2017 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	0.38
Fall Season Adjustment Factor	0.75
Winter Season Adjustment Factor	1.91
Spring Season Adjustment Factor	0.96

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 2017 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. 2017 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

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Residential Wood Combustion
SCC: 2104008100, 2104008210, 2104008220, 2104008230, 2104008310, 2104008320, 2104008330, 2104008400, 2104008510, 2104008610, 2104008700, 2104009000

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 2017 National Emissions Inventory Calculations[1]

Emissions from the combustion of residential wood are calculated by USEPA for the 2017 National Emissions Inventory.

Process:

To improve estimates in this sector, the EPA, along with the Commission on Environmental Cooperation (CEC), the Northeast States for Coordinated Air Use Management (NESCAUM), and Abt Associates, conducted a national survey of wood-burning activity in 2018. The results of this survey were used to estimate county-level burning activity.

The activity data for this category is the amount of wood burned in each county, which is based on data from the CEC survey on the fraction of homes in each county that use each wood-burning appliance and the average amount of wood burned in each appliance. These assumptions are used with the number of occupied homes in each county to estimate the total amount of wood burned in each county, in cords for cordwood appliances and tons for pellet appliances. Cords of wood are converted to tons using county-level density factors from the U.S. Forest Service. Emissions are calculated by multiplying the tons of wood burned by emissions factors.

Emissions from residential wood combustion (RWC) are calculated by multiplying the adjusted amount of wood burned in each SCC in each county by SCC- and pollutant-specific emissions factors.

$$Ec,SCC,p = AWc,SCC \times EFSCC,p$$

Where:
Ec,SCC,p = Emissions of pollutant p from each SCC in county c
AWc,SCC = Adjusted amount of wood burned in each SCC in county c, in tons per year
EFSCC,p = Emissions factor for pollutant p for each SCC, from Table 3 of the appendix in the "Residential Wood Combustion_DRAFT.DOCX" document on the 2017 NEI Supplemental data FTP site.[2]

Additional details are included In the USEPA 2017 NEI Technical Support Document.[1]

Control Measures:

The USEPA did not apply controls to this category.

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
VOC	tons/yr	tons/day
NOx	tons/yr	tons/day

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

References:

1. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020.
2. ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonpoint/

Area Sources Calculation Methodology Sheets for the 2017 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 4b Low sulfur fuel
NH3 =	0.77	4c ERTAC 2009

4. Control Efficiency, CE[4b]:
   NOx = 22%

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

Summer Season Adjustment Factor	0.38
Fall Season Adjustment Factor	0.75
Winter Season Adjustment Factor	1.91
Spring Season Adjustment Factor	0.96

7. Wt% sulfur content, S= [6] 0.0015

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 2017 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. 2017American 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. Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern US., Beta2 Version, Appendix S – Fuel Oil Reductions by State 4-18-2016, Mid-Atlantic Regional Air Management Association, Inc., (MARAMA), Towson, MD, and CSRA International, Inc., Charlottesville, VA, July 12, 2017

4c. 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 2017 Periodic Emission Inventory

Aviation Gasoline Distribution: Stage I
SCC: 2501080050

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 airports
2. Aviation fuel sales analysis

The aviation fuel sales analysis is selected because the input data elements are readily available.

Emissions from the refueling of aircraft using aviation gasoline are calculated using statewide amount of fuel burned, allocated to the county level by the number of landing and takeoff cycles at each airport.

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

1. Total statewide Aviation Gasoline use, SAG (10^3 gallons) [2]
2. The number of landing and takeoff cycles at each airport and statewide, ALTO, SLTO [3, 4,]
3. Emission factor, EF (lbs/10^3 gallons of aviation gasoline) [5]
   VOC = 19.3.
4. Weekly activity, WAF=7 days/week
5. Seasonal adjustment factor, SAF=1 [6]

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

$AAG = SAG*(ALTO/SLTO)$
CAG = AAG summed by county

$Ep_a = CAG*EF/CF$
$Ep_s = Ep_a*SAF/AADF$

Where:
AAG = Aviation Gasoline use at each airport (10^3 gallons)
CAG = Aviation Gasoline use in each county (10^3 gallons)
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

Assumptions:
1. Assume average fuel temperature of 60 ^oF

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2017 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. APO TERMINAL AREA FORECAST DETAIL REPORT FOR FISCAL YEAR 2014, Federal Aviation Administration, Office of Aviation Policy, Plans and Management Analysis (www.apo.data.faa.gov).

4. June 20, 2019 email submittal from Jim Koroniades, NJDEP

5. Eastern Regional Technical Advisory Committee (ERTAC) 2009

6. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Aircraft Refueling Aviation Gasoline: Stage II
SCC: 2501080100

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 airports
2. Aviation fuel sales analysis

The aviation fuel sales analysis is selected because the input data elements are readily available.

Emissions from the refueling of aircraft using aviation gasoline are calculated using statewide amount of fuel burned, allocated to the county level by the number of landing and takeoff cycles at each airport.

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

1. Total statewide Aviation Gasoline use, SAG (10^3 gallons) [2]
2. The number of landing and takeoff cycles at each airport and statewide, ALTO, SLTO [3, 4]
3. Emission factor, EF (lbs/10^3 gallons of aviation gasoline) [5]

VOC = (12.46*S*P*M)/T
VOC = (12.46*1.45*3.496*72.25)/519.67
VOC = 8.78

Where:
S = saturation factor for splash loading with dedicated normal service = 1.45
P = fuel true vapor pressure in psia at 60 degrees F. = 3.496 [6]
M = vapor molecular weight, lb/lb-mole = 72.25 [7]
T = bulk liquid temperature at 60 degrees = 519.67 Rankin

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

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

AAG = SAG*(ALTO/SLTO)
CAG = AAG summed by county

Ep_a = CAG*EF/CF
Ep_s = Ep_a*SAF/AADF

Where:
AAG = Aviation Gasoline use at each airport (10^3 gallons)
CAG = Aviation Gasoline use in each county (10^3 gallons)
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

Assumptions:
1. Assume average fuel temperature of 60 ^oF

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2017 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. APO TERMINAL AREA FORECAST DETAIL REPORT FOR FISCAL YEAR 2017, Federal Aviation Administration, Office of Aviation Policy, Plans and Management Analysis (www.apo.data.faa.gov).

4. June 20, 2019 email submittal from Jim Koroniades, NJDEP

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, Section 5.2 and Table 5.2-1 and Table 7.1-2.

6. Radian Corporation report prepared for J.F. Durham, USEPA, August 10, 1993

7. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Aircraft Refueling Jet Kerosene: Stage II
SCC: 2501080100

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 airports
2. Jet fuel sales analysis

The jet fuel sales analysis is selected because the input data elements are readily available.

Emissions from the refueling of aircraft using jet kerosene are calculated using statewide amount of fuel burned, allocated to the county level by the number of landing and takeoff cycles at each airport.

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

1. Total statewide Jet Kerosene use, SJET (10^3 gallons) [2]
2. The number of landing and takeoff cycles at each airport and statewide, ALTO, SLTO [3, 4]
3. Emission factor, EF (lbs/10^3 gallons of jet kerosene fuel) [5]

VOC = (12.46*S*P*M)/T
VOC = (12.46*1.45*0.0085*130)/519.67
VOC = 0.038

Where:
S = saturation factor for splash loading with dedicated normal service = 1.45
P = fuel true vapor pressure in psia at 60 degrees F. = .0085
M = vapor molecular weight, lb/lb-mole = 130
T = bulk liquid temperature at 60 degrees = 519.67 Rankin

4. Weekly activity, WAF=7 days/week
5. Seasonal adjustment factor, SAF=1 [6]

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

AJET = SJET*(ALTO/SLTO)
CJET = AJET summed by county

Ep_a = CJET*EF/CF
Ep_s = Ep_a*SAF/AADF

Where:
AJET = Jet Kerosene use at each airport (10^3 gallons)
CJET = Jet Kerosene use in each county (10^3 gallons)
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

Assumptions:
1. Assume average fuel temperature of 60 ^oF

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2017 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. APO TERMINAL AREA FORECAST DETAIL REPORT FOR FISCAL YEAR 2017, Federal Aviation Administration, Office of Aviation Policy, Plans and Management Analysis (www.apo.data.faa.gov).

4. June 20, 2019 email submittal from Jim Koroniades, NJDEP

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, Section 5.2 and Table 5.2-1 and Table 7.1-2.

6. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Aviation Gasoline Distribution: Underground Tank Breathing and Emptying
SCC: 2501080201

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 airports
2. Aviation fuel sales analysis

The aviation fuel sales analysis is selected because the input data elements are readily available.

Emissions from the refueling of aircraft using aviation gasoline are calculated using statewide amount of fuel burned, allocated to the county level by the number of landing and takeoff cycles at each airport.

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

1. Total statewide Aviation Gasoline use, SAG (10^3 gallons) [2]
2. The number of landing and takeoff cycles at each airport and statewide, ALTO, SLTO [3, 4]
3. Emission factor, EF (lbs/10^3 gallons of aviation gasoline) [5]
   VOC = 5.3
4. Weekly activity, WAF=7 days/week
5. Seasonal adjustment factor, SAF=1 [6]

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

$AAG = SAG*(ALTO/SLTO)$
CAG = AAG summed by county

$Ep_a = CAG*EF/CF$
$Ep_s = Ep_a*SAF/AADF$

Where:
AAG = Aviation Gasoline use at each airport (10^3 gallons)
CAG = Aviation Gasoline use in each county (10^3 gallons)
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

Assumptions:
1. Assume average fuel temperature of 60 ^oF

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2017 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. APO TERMINAL AREA FORECAST DETAIL REPORT FOR FISCAL YEAR 2017, Federal Aviation Administration, Office of Aviation Policy, Plans and Management Analysis (www.apo.data.faa.gov).

4. June 20, 2019 email submittal from Jim Koroniades, NJDEP

5. Eastern Regional Technical Advisory Committee (ERTAC) 2009

6. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Bakeries
SCC: 2302050000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 bakeries
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because (1) the input data elements are more readily available and (2) it is more accurate than population.

Emissions from bakeries are calculated using county level employment.

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

1. County employment for NAICS 31181-3, 445291CEMP [2]
2. Emission Factors, EF (tons/employee/year) [1]
   VOC=220.0
3. Weekly activity, WAF=7 days/week
4. Seasonal adjustment factors, SAF = 1

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

Ep_a = CEMP*EF
Ep_s = 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
CF = 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 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} = EF* (CEMP - PT)

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Point source employment for NAICS 31181-3, 445291[3]

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

References:

1. Memorandum from RADIAN Corp to SIP Inventory Preparers and EPA regions concerning VOC Emissions from Bakeries, April 24, 1992

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Breweries
SCC: 2302070001

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 breweries
2. Beer production analysis

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

Emissions from breweries are calculated using statewide beer production allocated to the county level using employment.

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

1. Statewide beer production, BEER (10^3 barrels of 42 gallons)

   =(1995 production of malt beverages in barrels of 31 gallons) [2] * (0.74 barrels of 42 gallons/barrel of 31 gallons)*(0.9895, growth factor 1996-2007)*(0.9658, growth factor 2007-2011)*(1.02, growth factor 2011-2013)*(1.0, growth factor 2013-2017) [3,4a,4b,4c]

2. County and state employment for SIC 2082 and 5181 or NAICS 312120, CEMP, NJEMP [5]
3. Emission Factors, EF, (lbs/10^3 barrels) [6]
   VOC=56.80
4. Weekly activity, WAF=5 days/week
5. Seasonal adjustment factor, SAF=1

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

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

Assumptions:
1. The emission factor for California's breweries are appropriate for NJ breweries
2. The 1996-2013 growth factor is based on national beer production
3. Assume a weekly activity factor of 5 days per week
4. 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 also been reported in the point source inventory. The Anheuser-Busch facility in Newark is the only facility which has reported emission in the point source inventory. [7] The number of employees that were reported for this facility were subtracted from the Essex county employment total.

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Beer Insitutute Brewer's Almanac 1998

3. Beer Institute Brewer's Almanac 2008

4a. Beer Institute Brewer's Almanac 2012

4b. Beer Institute Brewer's Almanac 2013

4c. Brewers Association U.S. Beer Sales Volume Growth 2017

5. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

6. Memorandum from RADIAN Corp to SIP Inventory Preparers and EPA regions concerning VOC Emissions from Breweries, February 5, 1992

7. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Wineries
SCC: 2302070005

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 wineries
2. Wine production analysis

Wine production analysis is selected because the input data elements are more readily available.

Emissions from wineries are calculated using statewide wine production, allocated to the county level using employment.

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

1. NJ wine production, WINE (gallons) [2] = 1,560,768.00
2. State and county totals for employment in NAICS 312130, NJEMP, CEMP[3]
3. Emission Factors, EF, (lbs/10^3 gallons)[4]
   VOC=(1.76+5.52)/2= 3.64
4. Weekly activity, WAF=5 days/week
5. Seasonal adjustment factors, SAF=1

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

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

Assumptions:

1. Assume 50/50 mix of red and white wines
2. Assume all white wine fermented at 52°F
3. Assume all red wine fermented at 80°F
4. Assume a weekly activity factor of 5 days per week
5. 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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. US Department of the Treasury Alcohol and Tobacco Tax and Trade Bureau Wine Statistical Reports, January 2017 – December 2017, dated April 27, 2018, accessed from http://ww.ttb.gov

3. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Memorandum from RADIAN Corp to SIP Inventory Preparers and EPA regions concerning VOC Emissions from Wineries, March 10, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Distilleries
SCC: 2302070010

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 distilleries
2. Distillery production analysis

Survey individual distilleries is selected because the input data elements are more readily available.

Emissions from distilleries are calculated using facility specific estimated emissions.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. Facility calculated annual VOC emissions (lb/year)
   Black Prince Distillery 1995 Emissions (BPEM): 7,920[2]
   Laird Distillery 1996 Emissions (LDEM): 9,320[3]
   William Grant & Sons 1995 Emissions (WGEM): 15,040[4]
2. Weekly activity, WAF=5 days/week
3. Seasonal adjustment factors, SAF=1

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

Ep_a = (BPEM + LDEM + WGEM)*(1.0255, growth factor 1996-1999) [5] * (1.0362, growth factor 1999-2002) [5]* (1.0322, growth factor 2002-2007)[6]*(1.0154, growth factor 2007-2011)[7]*(0.9938, growth factor 2011-2014)[8]*(1.0030, growth factor 2014-2017)[9]/CF

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

Assumptions:
1. Assume that Black Prince, Laird and William Grant distilleries represent the only distillery operations in New Jersey.
2. Assume that the 1996 emissions for Black Prince blending operations approximates those emissions provided by this facility in its 1995 emission statement.
3. Assume that 1996 emissions for Laird & Company approximates the 1995 emissions provided by this facility.
4. Assume a growth factor based on NJ population growth from 2002-2014. Assume a weekly activity factor of 5 days per week.
6. 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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. 1995 Emission Statement for Black Prince Distillery, Inc., New Jersey Department of Environmental Program, Bureau of Air Quality Planning

3. January 10, 1997 Cover Letter with enclosed VOC Emission Calculations for 1995 Distillery Operations from William Grant & Sons, Inc.

4. February 21, 1997 Cover Letter with enclosed VOC Emission Calculations for 1996 Distillery Operations from Laird & Company

5. The State of New Jersey Department of Environmental Protection, State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard (NAAQS) New Jersey 1996 Actual Emission Inventory and Rate of Progress (ROP) Plans for 2002, 2005 and 2007, Appendix II, March 31, 2001

6. Estimate of 2007 Total Resident Population by County, NJDOT, July 17, 2009.

7. Estimate of 2011 Total Resident Population by County, NJDOT, February 7, 2013.

8. Estimate of 2014 Total Resident Population by County, NJDOT, April 2015.

9. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

Architectural Surface Coating
SCC: 2401001000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 wholesale & retail suppliers of architectural coatings
2. Population based analysis

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

Emissions from architectural surface coatings application are calculated using county level 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) [3]
   VOC= 1.89 (see calculations below)
3. Control Efficiency, CE = 0% [4]
4. Rule Effectiveness, RE = 80% [1]
5. Rule Penetration, RP = 100%
6. Weekly activity, WAF= 7 days/week
7. Seasonal adjustment factors, SAF [5]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

Emission Factor Calculations:

Average of 5 CA air districts with the highest population in CA (Bay Area, Sacramento, San Diego, San Joquin, Ventura, from the CARB 2008 Inventory)[3]

EF (lb/capita) = CA 5 District Avg. ROG (tpy)/ CA State Pop * CF

CA Architectural Coatings EF (1.55 lb/year/capita) + CA Thinning and Cleanup Solvent EF (0.34 lb/year/capita) = NJ EF 1.89 lbs/year/capita

Where:

CF = Conversion factor for units = 2000 lbs/ton

Process:
The following equations are used to calculate the emissions with control efficiency for this source category.

Ep_a = CPOP*EF*(1- (CE*RP*RE))/CF
Ep_s = Ep_a*SAF//ADDF

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 rules:
1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 23, Architectural Coatings, February 21, 1989, amended June 21, 2004, minor amendments October 30, 2008 and September 6, 2011.
2. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart D National Volatile Organic Compound Standards for Architectural Coatings, operative September 13, 1999.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

3. California Air Resources Board (CARB) 2008 Emissions Inventory, accessed from http://www.arb.ca.gov

4. Existing rules incorporated into new emission factor.

5. Emission Inventory Improvement Program 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 2017 Periodic Emission Inventory

Automobile Refinishing
SCC: 2401005000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 automotive refinishing shops
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from auto refinishing operations are calculated using county level employment.

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

1. County employment for NAICS 81112, 4411,and 4412, CEMP[2]
2. Emission Factors, EF, (lbs/employee-year)
   Coating VOC= 75.58 see calculations below [3]
3. Control Efficiency, CE = 0% [4]
4. Rule Effectiveness, RE = 80% [1]
5. Rule Penetration, RP = 100%
6. Weekly activity, WAF= 5 days/week [4]
7. Seasonal adjustment factors, SAF=1 [4]

Process:
The following equations are used to calculate the emissions with control for this source category.

$Epcoat_a = (EFCOAT_{w/o\ epa\ rule}) * (CEMP/NJEMP)(1-CE*RE*RP)/CF$
$Epcoat_s = Epcoat_a*SAF/AADF$

Where:
$Epcoat_a$ = (tons/yr) for an annual emission of pollutant by county
$Epcoat_s$ = (tons/day) for a typical summer day emission of pollutant
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 rules:

1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16.12, amended June 2, 2003

2. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart B-National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings, operative January 11, 1999.

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

References:

1. Compilation of Air Pollutant Emission Factors Volume I:Stationary Point and Area Sources, Fourth Edition, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711, September 1991.

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.

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, EPA-454/R-97-004c.

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.

Architectural Surface Coating, Traffic Paints
SCC: 2401008000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 highway maintenance departments & contractors engaged in new road construction.
2. Lane-mile painted analysis
3. Population based analysis

The lane-mile painted analysis/methodology is selected because (1) the input data elements are more readily available and (2) it is more accurate than population.

Emissions from traffic paints surface coating applications are calculated using county specific lane mileage.

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

1. Total lane mileage within county, TOTLANE [2]
   = (1996 estimated lane miles) * (county growth factors 1996-2002) [2a]* (county growth factors 2002-2007)[2b]*(county growth factors 2007-2011)[2c]*(county growth factors 2011-2014)[2d]*(county growth factors 2014-2017)[2e]
2. Total lane miles maintained by State of New Jersey, NJDOT [2e]
3. Emission Factors, EF, (lbs/lane-mile/year) [1]
   VOC = 69
4. Control Efficiency, CE

The following process is used to calculate CE for this source category:

STEP ONE: Establish voc content (lbs/gal) prior to rule implementation
$\text{voc content}_{\text{no rule}}$ = (EF lbs/year)/(coating usage factor) (gal/year)
$\text{voc content}_{\text{no rule}}$ = (69 lbs/lane-mile[1])/(22 gal/year[1])
$\text{voc content}_{\text{no rule}}$ = 3.14 lbs/gal*(453.593 grams/lb/3.78544 liter/gallon)
$\text{voc content}_{\text{no rule}}$ = 375.82 grams/liter

STEP TWO: Establish rule voc content
$\text{voc content}_{\text{rule}}$ = 150 grams/liter [5]

STEP THREE: Calculate CE
CE = ($\text{voc content}_{\text{no rule}}$ - $\text{voc content}_{\text{rule}}$)/($\text{voc content}_{\text{no rule}}$)
CE = (375.82 grams/liter - 150 grams/liter)/(375.82 grams/liter) * 100%
CE = 60%

5. Rule Effectiveness, RE = 100% [1]
6. Rule Penetration, RP = 100%
7. Weekly activity, WAF=5 days/week [6]
8. Seasonal adjustment factors, SAF [6]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = (TOTLANE - NJDOT)*EF*(1 - (CE*RP*RE))/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Assume that a pre-formed 100% solid field-reacted epoxy based traffic paint is applied in 3 year intervals on all NJDOT maintained roadways. and that the application of this epoxy generates negligible VOC emissions. [7]

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

1. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart D National Volatile Organic Compound Standards for Architectural Coatings, operative September 13, 1999.
2. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 23, Architectural Coatings, February 21, 1989, amended June 21, 2004, minor amendments October 30, 2008 and September 6, 2011

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey's Public Road Mileage by Functional Classification, Year Ending 1996, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development, Faxed by Jim Carl on February 19, 1998

2a. New Jersey's Public Road Mileage by Jurisdiction, Years Ending 1996 and 2002, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

2b. New Jersey's Public Road Mileage by Jurisdiction, Year Ending 2007, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

2c. New Jersey's Public Road Mileage by Jurisdiction, Year Ending 2011, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

2d. New Jersey's Public Road Mileage by Jurisdiction, Year Ending 2014, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

2e. New Jersey's Public Road Mileage by Jurisdiction, Year Ending 2017, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

3. NJDOT Specification for Latex (water based traffic paint and 100% solid epoxy traffic paint,Section 912.34 Traffic Paint, NJDOT, Bureau of Materials, faxed by Fred Lovett on May 9, 1998

4. Memo to file on traffic paint application on New Jersey roadways, May 9, 1998

5. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart B-National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings.

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. Emission Inventory Improvement Program, Volume III, Area Sources Preferred and Alternative Methods, Chapter 14, Traffic Markings, Table 14.2-2, Advantages and Disadvantages of Alternative Traffic Marking Materials (EPA, 1988), Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 26, 1997

8. Emission Inventory Improvement Program, Volume III, Area Sources Preferred and Alternative Methods, Chapter 14, Traffic Markings, Table 14.2-1, Comparison of Estimated VOC Emissions (EPA, 1988).

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Factory Finished Wood
SCC: 2401015000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 factory finished wood facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from factory finished wood surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 321 [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 44.71
3. Weekly activity, WAF=5 days/week[4]
4. Seasonal adjustment factor, SAF=1[4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF

where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS 321 [5]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Industrial Surface Coating Paper, Film and Foil
SCC: 2401030000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 paper, film and foil facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from paper, film and foil surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 322220, CEMP [2]
2. Emission Factors, EF, (lbs/employee/year) [2,3]
   VOC= 398.22
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1[4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF

where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS code 32222[5]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Wood Furniture & Fixtures
SCC: 2401020000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 furniture & fixtures facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from wood furniture and fixtures surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 337110, 337121, 337122, 337127*, 337211, 337212, 337215*, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [2]
   VOC= 282.27
3. Weekly Activity, WAF = 5 days/week
4. Seasonal adjustment factor, SAF = 1[4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 16, 7:27-16.7 Table 7B, Miscellaneous Surface Coating Operations Control Criteria and Compliance Dates

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} = (CEMP - PTCEMP)*EF/CF

where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS codes 337110, 337121, 337122, 337127*, 337211, 337212, 337215* [5]

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

References:

1a. Procedures for the Preparation of Emission Inventories for Carbon Monoxide andMonoxide 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Metal Furniture & Fixtures
SCC: 2401025000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 furniture & fixtures facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from metal furniture and fixtures surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 337124, 337127*, 337214, 337215*, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [2]
   VOC= 769.02
3. Weekly Activity, WAF = 5 days/week
4. Seasonal adjustment factor, SAF = 1[4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 16, 7:27-16.7 Table 7B, Miscellaneous Surface Coating Operations Control Criteria and Compliance Dates

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} = (CEMP - PTCEMP)*EF/CF

where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS codes 337124, 337127*, 337214, 337215* [5]

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

References:

1a. Procedures for the Preparation of Emission Inventories for Carbon Monoxide andMonoxide 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Metal Containers
SCC: 2401040000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 metal container facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from metal container surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 33243, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 2239.43
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1[4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF

where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS code 33243[5]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Sheet, Strip, & Coil
SCC: 2401050000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 sheet, strip, & coil facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from sheet, strip and coil surface coating applications are calculated using county level employment.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. County employment for NAICS 332812, 339911-2, 339914, CEMP [2]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 2877
3. Control Efficiency, CE = 58% [4]
4. Rule Effectiveness, RE = 80% [1]
5. Rule Penetration, RP = 100%
6. Weekly activity, WAF=5 days/week [5]
7. Seasonal adjustment factor, SAF=1 [5]

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

Ep_a = CEMP*EF*(1- (CE*RE*RP))/CF
Ep_s = 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
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 16, 7:27-16.7 Table 7B, Miscellaneous Surface Coating Operations Control Criteria and Compliance Dates

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} = (CEMP - PTCEMP)*EF/CF

where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS codes 332812, 339911-2, 339914 [6]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. Emission Inventory Improvement Program, Volume III, Area Sources Preferred and Alternative Methods, Chapter 8, Industrial Surface Coating, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 26, 1997

4. State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards, Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy, Appendix VI: 1990 Base Year Emission Inventory, Table 7:Minor Point Source Emission Calculation, The State of New Jersey, Department of Environmental Protection, December 31, 1996

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. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Machinery & Equipment
SCC: 2401055000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 machinery & equipment facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from machinery and equipment surface coating applications are calculated using county level employment.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. County employment for NAICS 3331, 3332, 3333, 3341, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 34.28
3. Weekly Activity, WAF = 5 days/week [4]
4. Seasonal adjustment factor, SAF = 1 [4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 16, 7:27-16.7 Table 7B, Miscellaneous Surface Coating Operations Control Criteria and Compliance Dates

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} = (CEMP - PTCEMP)*EF/CF
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting

Where:
PTCEMP = Point source employment in NAICS codes 3331, 3332, 3333, 3341 [5]

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Appliances
SCC: 2401060000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 appliances facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from appliances surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 3352, CEMP [2]
2. Emission Factors, EF, (lbs/employee/year)[3]
   VOC= 168.96
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

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

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

Rule Effectiveness:
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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency,

office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020

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, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Electrical Insulation
SCC: 2401065000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 electrical insulation facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from electrial insulation surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 331318, 331420, 331491, 335921, 335929, 335311, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 15.58
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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. If they were, 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} = (CEMP - PTCEMP)*EF/CF
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting

Where:
PTCEMP = Point source employment in NAICS Codes 331318, 331420, 331491, 335921, 335929, 335311[5]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Motor Vehicles
SCC: 2401070000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 new automobile facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from new automobile surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 3361. 3362, 3363, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year)
   VOC= 160.31 [3]
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 16, 7:27-16.7 Table 7A, Automobile and Light Duty Truck Surface Coating Operations Control Criteria and Compliance Dates

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} = (CEMP - PTCEMP)*EF/CF
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting

Where:
PTCEMP = Point source employment in NAICS codes 3361, 3362, 3363[5]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Aircraft
SCC: 2401075000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 marine coating facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from other transportational equipment surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 3364, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year [3]
   VOC= 15.4
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1[4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting

Where:
PTCEMP = Point source employment in NAICS code 3364 [5]

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Marine Coatings
SCC: 2401080000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 marine coating facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from marine surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 3366, 488390 CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 176.75
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS codes 3366, 488390[5]

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Railroad Coatings
SCC: 2401085000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 railroad coating facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from marine surface coating applications are calculated using county level employment.

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

1. County employment for NAICS 3365, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 212.9
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS code 3365 [5]

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Surface Coating Miscellaneous Manufacturing
SCC: 2401090000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 wholesale & retail suppliers of architectural coatings
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from miscellaneous manufacturing applications are calculated using county level employment.

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

1. County employment for NAICS 339, 3369, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 69.99
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

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

Ep_a = CEMP*EF/CF
Ep_s = 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
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 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} = (CEMP - PTCEMP)*EF/CF

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PTCEMP = Point source employment in NAICS codes 339, 3369 [5]

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

5. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Architectural and Industrial Surface Coating, Industrial Maintenance Coatings
SCC: 2401100000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 high performance maintenance facilities
2. Population based analysis

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

Emissions from high maintenance surface coating application are calculated using county level 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/capita/year) [3]
   VOC= 0.36 (see calculations below)
3. Control Efficiency, CE = 0% [4]
4. Rule Effectiveness, RE = 80% [1]
5. Rule Penetration, RP = 100%
6. Weekly activity, WAF=5 days/week [5]
7. Seasonal adjustment factor, SAF [5]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

Emission Factor Calculation:

Average of 5 CA air districts with the highest population in CA (Bay Area, Sacramento, San Diego, San Joquin, Ventura, from the CARB 2008 Inventory)

EF (lb/capita) = CA 5 District Avg. ROG (tpy)/ CA State Pop * CF

CA District Avg. = 0.22 lb/year/capita * 1.64 (NJ LA) = NJ EF 0.36 lbs/year/capita

Where:

CF = Conversion factor for units = 2000 lbs/ton
NJ LA = NJ Limit Adjustment for IM Coatings

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CPOP*EF*(1 - (CE*RP*RE))/CF
Ep_s = 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
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:

1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 23, Architectural Coatings, February 21, 1989, amended June 21, 2004, minor amendments October 30, 2008 and September 6, 2011.
2. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart D National Volatile Organic Compound Standards for Architectural Coatings, operative September 13, 1999.

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

3. California Air Resources Board (CARB) 2008 Emissions Inventory, accessed from http://www.arb.ca.gov

4. Existing rules incorporated into new emission factor.

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

Degreasing
SCC: 2415000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 degreasing facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because (1) the input data elements are more readily available and (2) it is more accurate than population.

Emissions from degreasing operations are calculated using county level employment.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. County employment for NAICS 314999, 31611*, 322291,324199, 325992, 325998, 326199, 326212, 331*, 332*, 333*, 334*, 335*, 336*, 337*, 339*, 441*, 442299, 4431*, 447*, 45111*, 45299*, 53211*, 53212*, 54171*, 561622, 56179*, 562991, 562998, 811*, 81293*, 483, 484, 485, 488, CEMP [2, 2A]
2. Emission Factors, EF, (lbs/employee/year)
   VOC= 29 [3A,3B,4A,4B]
3. Weekly activity, WAF=6 days/week [5]
4. Seasonal adjustment factor, SAF=1 [5]

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CEMP*EF*(1- (CE*RE*RP))/CF

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

Emission Factor Calculations:[3A,3B,4A,4B]

1. 60% reduction from the 2002 EF based on the NJ rule prior to 2003
2. An additional 17% reduction from the 2002 EF for the NJ 2003 rule

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, 7:27-16.6, Open Top Tanks and Surface Cleaners, September 22, 1986, amended June 2, 2003.

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} = (CEMP - PTCEMP)*EF/CF

Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting

Where:
PTCEMP = Point source employment in NAICS codes 314999, 31611*, 322291,324199, 325992, 325998, 326199, 326212, 331*, 332*, 333*, 334*, 335*, 336*, 337*, 339*, 441*, 442299, 4431*, 447*, 45111*, 45299*,

53211*, 53212*, 54171*, 561622, 56179*, 562991, 562998, 811*, 81293*, 483, 484, 485, 488 [6]

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

2A. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

3A. Emission Inventory Improvement Program, Volume III, Area Sources Preferred and Alternative Methods, Chapter 6, Solvent Cleaning, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 1997

3B. Existing rules incorporated into new emission factor.

4A. State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards, Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy, Appendix VI: 1990 Base Year Emission Inventory, Table 7:Minor Point Source Emission Calculation, The State of New Jersey, Department of Environmental Protection, December 31, 1996

4B. 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. 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. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Commercial/Industrial Dry Cleaning
SCC: 2420000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 commercial/industrial cleaning facilities
2. Employment based analysis
3. Population based analysis

The employment based analysis/methodology is selected because the (1) input data elements are more readily available and (2) it is more accurate than population.

Emissions from dry cleaning operations are calculated using county level employment.

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

1. County employment for NAICS 812320, CEMP [2,3]
2. Emission Factors, EF, (lbs/employee/year) [3]
   VOC= 10
3. Weekly activity, WAF=5 days/week [4]
4. Seasonal adjustment factor, SAF=1 [4]

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CEMP*EF*(1 - (CE*RE*RP))/CF
Ep_s = 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
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 16, 7:27-16.20, Petroleum Solvent Dry Cleaning Operations, September 22, 1986

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

3. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020

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, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Graphic Arts (Offset lithography/letterpress) – Combined with 2425030000
SCC: 2425020000

Note: *Emissions from SCC 2425020000 and SCC 2425030000 were added together and reported as one SCC (2425000000) in the 2017 Area Source Inventory*.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 graphic arts facilities
2. Population based analysis

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

Emissions from graphic arts operations are calculated using county level population.

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

1. County Population, CPOP [2]
2. Percentage of population representative of offset lithography/letterpress operations,
   PERPOP = 28 + 18 = 46% [3]
3. Emission Factors, EF, (lbs/person/year) [4]
   VOC= 1.3
4. Weekly activity, WAF=5 days/week [5]
5. Seasonal adjustment factor, SAF=1 [5]

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

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

Assumptions:
1. All solvent consumed is emitted; no accounting for waste solvent recycling and disposal
2. The 46.0% of population that utilizes offset lithography/letterpress within the graphic arts inventory is presumed 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 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.

$Ep_{adj} = Ep_a - PT$

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting

PT = Point source emissions (tons/yr) [6]

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

3. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.9.1.2, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 7 - Graphic Arts, November 18, 1996, 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

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. NJ Point Source Emission Inventory for 2014, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Graphic Arts (rotogravure/flexography) – Combined into 2425000000 Graphic Arts
SCC: 2425030000

Note: *Emissions from SCC 2425020000 and SCC 2425030000 were added together and reported as one SCC (2425000000) in the 2017 Area Source Inventory*.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 graphic arts facilities
2. Population based analysis

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

Emissions from graphic arts operations are calculated using county level population.

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

1. County Population, CPOP [2]
2. Percentage of population representative of rotogravure/flexography operations,
   PERPOP = 41 + 13 = 54% [3]
3. Emission Factors, EF, (lbs/person/year) [4]
   VOC= 1.3
4. Control Efficiencies, CE

   The following equations are used to calculate the control efficiency for this source category:

   STEP ONE: Establish voc content (lbs/gal) prior to rule implementation
   voc content$_{no\ rule}$ = 75% by volume for both rotogravure [5] and flexography [6]

   STEP TWO: Establish rule voc content
   voc content$_{rule}$ = 25% lbs/gal [7]

   STEP THREE: Calculate CE
   CE = (voc content$_{no\ rule}$ - voc content$_{rule}$)/(voc content$_{no\ rule}$)
   CE = (75 - 25)/(75) * 100%
   CE = 66.67%

5. Rule Effectiveness, RE = 80% [1]
6. Rule Penetration, RP = 100%
7. Weekly activity, WAF=6 days/week [8]
8. Seasonal adjustment factor, SAF=1 [8]

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CPOP*PERPOP*EF*(1 - (CE*RE*RP))/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:

1. All solvent consumed is emitted; no accounting for waste solvent recycling and disposal.
2. The 54.0% of population that utilizes rotogravure and flexography operations within the graphic arts inventory is presumed to be valid.
3. Assume that the 75% by volume voc content for rotogravure and flexography operations corresponds to 0.75 lb/gal.
4. Assume that voc content limitation of 25% for graphic arts source operation required by the rule cited by reference 7, applies to all rotogravure and flexography operations conducted in New Jersey.
5. Assume a rule penetration factor of 100%.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, 7:27-16.7(4), Surface Coating and Graphic Arts Operations, Table 7D Graphic Arts Operations, Part B, Control Criteria for Graphic Arts Source Operations Except Screen Printing Operations, December 31, 1981 and December 31, 1987 and May 31, 1995

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.

$$Ep_{adj} = Ep_a - PT$$

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Point source emissions (tons/yr) [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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

3. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.9.1.2, page 4.9.1-6, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 7 - Graphic Arts, November 18, 1996, 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

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.9.1.1.3 , page 4.9.1-3

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 7 - Graphic Arts, Section 2.2 Flexographic Printing, page 7.2-7

7. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, 7:27-16.7(4), Surface Coating and Graphic Arts Operations, Table 7D Graphic Arts Operations, Part B, Control Criteria for Graphic Arts Source

Operations Except Screen Printing Operations, December 31, 1981 and December 31, 1987 and May 31, 1995

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. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Adhesives
SCC: 2440000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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. California Air Resources Board (CARB)/Population based analysis

Emissions from industrial adhesive use and application are calculated using the CARB calculations 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 [1]
2. Emission Factor, EF, (lbs/year/capita) [2]

VOC = 45 tons/day * 365 days/year * 2000 lbs/ton / 29,760,021 capita where 45 tons/day is the estimated state-wide emissions for industrial adhesives in California, 2000 lbs/ton is a conversion factor, and 29,760,021 capita is the 1990 population of California.

VOC = 1.1

4. Control Efficiency, CE; CE = 64% [3]
5. Rule Effectiveness, RE; RE = 80% [4]
6. Rule Penetration, RP; RP = 100%

7. Weekly activity, WAF=7 days/week
8. Seasonal adjustment factors SAF = 1

Process:
The following equations are used to calculate the emissions with out control for this source category.

Ep_a = CPOP*EF/CF
Ep_s = Ep_a*SAF//ADDF

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:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 26, New Jersey State Department of Environmental Protection, Effective December 1, 2008. Operative December 29, 2008

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

References:

1. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018

2. Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Adhesives and Sealants, California Air Resources Board, December 1998.

3. 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

4a. 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

4b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Consumer Products
SCC: 2460000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 households
2. Population based analysis

The population based analysis is selected because the input data elements are more readily available.

Emissions from consumer products are calculated using county level population.

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

1. County population, CPOP [2]
2. Emission factor, EF, (lbs/capita/year)
   VOC = 5.9 lbs/capita [3A,3B]
3. Control Efficiency, CE; CE=2% [3B,4]
4. Rule Effectiveness, RE; RE = 80% [1]
5. Rule Penetration, RP; RP = 100%
5. Weekly activity, WAF=7 days/week [5]
7. Seasonal adjustment factor, SAF=1 [5]

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CPOP*EF*(1 - (CE*RE*RP))/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Emission Factor Calculations:[3A,3B,4]

1. 12.4% reduction from the 2002 emission factor based on New Jersey's 1996 rule and National Rule
2. An additional 14.2% reduction of the 2002 emission factor based on New Jersey's 2004 rule

Control Measures:
The emissions from this source category are regulated by the following rules:
1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 24, New Jersey State Department of Environmental Protection, November 6, 1995, amended May 3, 2004 and December 1, 2008
2. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart C-National Volatile Organic Compound Emission Standards for Consumer Products

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

3A. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 5 - Consumer and Commercial Solvent Use, August 2, 1996, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

3B. Ecisting rules prior to 2008 incorporated into new emission factor.

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. 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

Asphalt Application Paving Asphalt
SCC: 2461020000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 construction contractors
2. Population based analysis
3. Volume of asphalt used analysis

The Asphalt Institute supplied NJDEP with total asphalt use in NJ. With this information, AP-42's volume of asphalt use methodology is selected because of the available data.

Emissions from asphalt paving applications are calculated using statewide asphalt use, allocated to the county level using county lane mileage.

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

1. NJ asphalt cement, AC = 1,085,364 tons/yr [2]
2. State and county lane mileage, SLM, CLM [3]
   = (1996 estimated lane miles) * (growth factors 1996-2002) [3] * (growth factors 2002-2007)[3]*(growth factors 2007-2011)

3. Emission Factors, EF, (lbs/ton asphalt cement) [4]
   VOC= 0.0006 lbs/ton asphalt cement
4. Weekly activity, WAF=5 days/week
5. Seasonal adjustment factor, SAF=1

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

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

Assumptions:

1. Assume that the asphalt cement emission factor calculation provided by reference 4 is valid.
2. All asphalt cement was used for paving purposes.
3. Assume a weekly activity factor of 5 days/week.
4. Assume a SAF of 1.0.

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

References:

1. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.5, Asphalt Paving Operations, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

2. New Jersey Asphalt Usage 2007, Asphalt Institute, Carlos Rosenberger, crosenberger@asphaltinstitute.org.

3. New Jersey's Public Road Mileage by Jurisdiction, Years Ending 1996, 2002 2007, and 2011, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

4. Daily Amount of Organic Emissions from Hot Mix Paving Operations, Fax transmittal from Una Connolly of the National Asphalt Pavement Association, March 29, 2000

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Asphalt Application Cutback Asphalt
SCC: 2461021000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 construction contractors
2. Population based analysis
3. Volume of asphalt used analysis

The Asphalt Institute supplied NJDEP with total asphalt use in NJ. With this information, AP-42's volume of asphalt use methodology is selected because of the available data.

Emissions from cutback asphalt applications are calculated using statewide cutback asphalt use, allocated to the county level using county lane mileage.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. NJ cutback asphalt use, CU= 745 tons/yr [2]
2. State and county lane mileage, SLM, CLM [3]
   = (1996 estimated lane miles) * (growth factors 1996-2002) [3] * (growth factors 2002-2007)[3] * (growth factors 2007-2011)[3]

3. Evaporative VOC emissions by weight content from medium cure cutback asphalt with 35% of Diluent in Cutback, CONTENT = 20% [4]
4. EF (lb/ton cutback asphalt)
   VOC = CONTENT * 2000 lb/ton cutback
   VOC = 0.20 * 2000 lb/ton cutback
   VOC = 400 lb/ton cutback

5. Control Efficiency, CE; CE = 70% [5]
6. Rule Effectiveness, RE; RE = 80% [6]
7. Rule Penetration, RP; RP = 100%

8. Weekly activity, WAF=5 days/week
9. Seasonal adjustment factor, SAF=1

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

$Ep_a = CU*EF*(CLM/SLM)/CF$
$Ep_s = Ep_a*SAF/AADF$

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

Assumptions:
1. Average diluent content by volume is 35%
2. Medium cure evaporative loss of 70% is assumed
3. All cutback asphalt was used for paving purposes
4. Assume a weekly activity factor of 5 days/week

Control Measures:

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

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16.19, New Jersey State Department of Environmental Protection, March 2, 1992 and March 20, 2009

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

References:

1. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.5, Asphalt Paving Operations, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

2. New Jersey Asphalt Usage 2007, Asphalt Institute, Carlos Rosenberger, crosenberger@asphaltinstitute.org.

3. New Jersey's Public Road Mileage by Jurisdiction, Years Ending 1996, 2002, 2007 and 2011, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

4. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.5, Table 4.5-1, EVAPORATIVE VOC EMISSIONS FROM CUTBACK ASPHALTS AS A FUNCTION OF DILUENT CONTENT AND CUTBACK ASPHALT TYPE

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

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

Asphalt Application Emulsified Asphalt
SCC: 2461022000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 construction contractors
2. Population based analysis
3. Volume of asphalt used analysis

The Asphalt Institute supplied NJDEP with total asphalt use in NJ. With this information, AP-42's volume of asphalt use methodology is selected because of the available data.

Emissions from emulsified asphalt applications are calculated using statewide emulsified asphalt use, allocated to the county level using county lane mileage.

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

1. NJ emulsified asphalt use, EU=28,805 tons/yr [2]
2. State and county lane mileage, SLM, CLM [3]
   = (1996 estimated lane miles) * (growth factors 1996-2002)[3] * (growth factors 2002-2007)[3] * (growth factors 2007-2011)[3]

3. Evaporative VOC emissions by weight content from emulsified asphalt, CONTENT = 8% [4]
4. Emission factor, EF, (lbs/ton of asphalt)
   VOC = CONTENT * 2000 lb/ton cutback
   VOC = 0.08 * 2000 lb/ton cutback
   VOC = 160 lb/ton emulsified asphalt applied

5. Control Efficiency, CE; CE = 25% [5]
6. Rule Effectiveness, RE; RE = 80% [6]
7. Rule Penetration, RP; RP = 100%

8. Weekly activity, WAF=5 days/week
9. Seasonal adjustment factor, SAF=1

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

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

Assumptions:

1. Major use of emulsion asphalt is for road paving
2. Assume 100% evaporation of the VOC portion of the emulsified asphalt.
3. Assume percent VOC by volume percent is equivalent to percent VOC by weight because emulsified asphalt has a density nearly equivalent to water.
4. Assume a weekly activity factor of 5 days per week

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

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16.19, New Jersey State Department of Environmental Protection, March 2, 1992 and March 20, 2009

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

References:

1. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.5, Asphalt Paving Operations, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

2. New Jersey Asphalt Usage 2007, Asphalt Institute, Carlos Rosenberger, crosenberger@asphaltinstitute.org.

3. New Jersey's Public Road Mileage by Jurisdiction, Years Ending 1996, 2002, 2007 and 2011, New Jersey Department of Transportation (NJDOT), Bureau of Transportation Data Development

4. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.5, Table 4.5-1, EVAPORATIVE VOC EMISSIONS FROM CUTBACK ASPHALTS AS A FUNCTION OF DILUENT CONTENT AND CUTBACK ASPHALT TYPE

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

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Asphalt Application Roofing Asphalt
SCC: 2461023000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 construction contractors
2. Population based analysis
3. Volume of asphalt used analysis

The Asphalt Institute supplied NJDEP with total asphalt use in NJ. With this information, AP-42's volume of asphalt use methodology suggested for paving operations is selected for roofing applications because of the available data.

Emissions from asphalt roofing applications are calculated using statewide roofing asphalt use, allocated to the county level using employment.

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

1. NJ roofing asphalt use, RU=18,659 tons [2]
2. Percentage of roofing asphalt used for direct application to roofs:PERCENT = 40% [3]
3. State and county totals for employment in SIC 15 or NAICS 2362, NJEMP, CEMP [4]
4. Emission factor, EF, (lbs/ton of asphalt) [5]
   VOC = 6.2 lb/ton melted asphalt
5. Weekly activity, WAF=5 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 = RU*PERCENT*EF*(CEMP/NJEMP)
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Assume that the emission factor of 6.2 pounds VOC/ton of asphalt melted from reference 5 is representative of voc emissions from the direct application of melted asphalt to roofs.
2. Assume that only 40% of roofing asphalt usage obtained from reference 2 constitutes direct application of melted asphalt to roofing structures.
3. Building contractors are assumed to only do asphalt roofing in a localized area
4. Assume a weekly activity factor of 5 days per week
5. 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

References:

1. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.5, Asphalt Paving Operations, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

2. New Jersey Asphalt Usage 2007, Asphalt Institute, Carlos Rosenberger, crosenberger@asphaltinstitute.org.

3. April 6, 2000 E-mail from Tonalee Key concerning telephone conversation with Russ Synder of the Asphalt Roofing Manufacturers Assoc.

4. Total 2011 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

5. "STRAWMAN" FOR AREA SOURCE CATEGORY ABSTRACT, Asphalt Roofing Kettles (SIC 1761),Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, January 21, 1998, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

Pesticide Application, Commercial
SCC: 2461800001

Note: *The following SCCs were estimated individually and then combined and reported as one SCC (2461800001) for the 2017 Area Source Inventory: 2461800001, 2461870999, 2461800002, 2461850099, 2461870999*.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 areas for pesticide applications

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

Emissions from fumigant pesticide applications are calculated using statewide fumigant pesticide use, allocated to the county level using population.

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

1. 2016 Statewide totals of right-of-way pesticide applications, AGRI (lbs) [2]
2. County and state population, CPOP, SPOP [3]
2. Uncontrolled Emission Factors for Pesticide Active Ingredients, EFA
   VOC = 1160 lb/ton pest applied = 0.58 lb/lb pest applied [3]
3. Average VOC Content of Pesticide Inert Ingredient Portion, by Formulation Type, EFI
   VOC = 66% lb/lb pest applied [3]
4. Amount inert portion in relation to active portion: 1.45*AGRI [3]
5. Overall Emission factor in relation to AGRI, EF (lbs/lb pest applied) [4]
   EF = EFA + 1.45*EFI
   EF = 0.58 + 1.45*0.66
   EF = 1.537
6. Weekly activity, WAF=6 days/week [4]
7. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

Ep_a = AGRI*EF*(CPOP/SPOP)/CF
Ep_s = 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
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor
CF = Conversion factor for units = 2,000 lbs/ton

Assumptions:
1. Assume that the inert portion of the pesticide applied is 1.45 times the active ingredient. [3]
2. Assume that the average VOC content of the pesticide inert ingredient portion, by formulation type represents 66% which represents the highest % weight of inert portion included in Table 9.4-3 from reference [3].
3. Assume that all pesticides are applied to the surface and have a vapor pressure of >1 x 10^{-4} as referenced in table 9.4-4 from reference [3].

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey 2016 Fumigant Pesticide Use Survey the Bureau of Pesticide Operations, New Jersey Department of Environmental Protection, Pesticide Control Program, West Trenton, NJ

3. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 9 - Pesticides - Agricultural and Nonagricultural, December 1997, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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-97-004c4.

Pesticide Application, Agricultural
SCC: 2461850000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 areas for pesticide applications

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

Emissions from agricultural pesticide applications are calculated using county level agricultural pesticide use.

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

1. 2015 county totals of agricultural pesticide applications, AGRI (lbs) [2]
2. Uncontrolled Emission Factors for Pesticide Active Ingredients, EFA
   VOC = 1160 lb/ton pest applied = 0.58 lb/lb pest applied [3]
3. Average VOC Content of Pesticide Inert Ingredient Portion, by Formulation Type, EFI
   VOC = 66% lb/lb pest applied [3]
4. Amount inert portion in relation to active portion: 1.45*AGRI [3]
5. Overall Emission factor in relation to AGRI, EF (lbs/lb pest applied) [3]
   EF = EFA + 1.45*EFI
   EF = 0.58 + 1.45*0.66
   EF = 1.537
6. Weekly activity, WAF=6 days/week [4]
7. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

Ep_a = AGRI*EF/CF
Ep_s = 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
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor
CF = Conversion factor for units = 2,000 lbs/ton

Assumptions:
1. Assume that the inert portion of the pesticide applied is 1.45 times the active ingredient. [3]
2. Assume that the average VOC content of the pesticide inert ingredient portion, by formulation type represents 66% which represents the highest % weight of inert portion included in Table 9.4-3 from reference [3].
3. Assume that all pesticides are applied to the surface and have a vapor pressure of >1 x 10^{-4} as referenced in table 9.4-4 from reference [3].

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Agricultural Pesticide Use in New Jersey: 2015 Survey, the Bureau of Pesticide Operations, New Jersey Department of Environmental Protection, Pesticide Control Program, West Trenton

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 9 - Pesticides - Agricultural and Nonagricultural, December 1997, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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, EPA-454/R-97-004c4.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Pesticide Application, Golf Courses – Combined into SCC 246180001 (Commercial Pesticides)
SCC: 2461870999

Note: *The following SCCs were estimated individually and then combined and reported as one SCC (2461800001) for the 2017 Area Source Inventory: 2461800001, 2461870999, 2461800002, 2461850099, 2461870999.*

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 areas for pesticide applications

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

Emissions from golf course pesticide applications are calculated using county level golf course pesticide use.

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

1. 2014 County totals of golf course pesticide applications, AGRI (lbs) [2]
2. Uncontrolled Emission Factors for Pesticide Active Ingredients, EFA
   VOC = 1160 lb/ton pest applied = 0.58 lb/lb pest applied [3]
3. Average VOC Content of Pesticide Inert Ingredient Portion, by Formulation Type, EFI
   VOC = 66% lb/lb pest applied [3]
4. Amount inert portion in relation to active portion: 1.45*AGRI [3]
5. Overall Emission factor in relation to AGRI, EF (lbs/lb pest applied) [3]
   EF = EFA + 1.45*EFI
   EF = 0.58 + 1.45*0.66
   EF = 1.537
6. Weekly activity, WAF=6 days/week [4]
7. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

Ep_a = AGRI*EF/CF
Ep_s = 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
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor
CF = Conversion factor for units = 2,000 lbs/ton

Assumptions:
1. Assume that the inert portion of the pesticide applied is 1.45 times the active ingredient.[3]
2. Assume that the average VOC content of the pesticide inert ingredient portion, by formulation type represents 66% which represents the highest % weight of inert portion included in Table 9.4-3 from reference [3].
3. Assume that all pesticides are applied to the surface and have a vapor pressure of $>1 \times 10^{-4}$ as referenced in table 9.4-4 from reference [3].

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey 2014 Golf Course Pesticide Use Survey, the Bureau of Pesticide Operations, New Jersey Department of Environmental Protection, Pesticide Control Program, West Trenton

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 9 - Pesticides - Agricultural and Nonagricultural, December 1997, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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, EPA-454/R-97-004c4.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Pesticide Application, Lawn and Garden – Combined into SCC 246180001 (Commercial Pesticides)
SCC: 2461800002

Note: *The following SCCs were estimated individually and then combined and reported as one SCC (2461800001) for the 2017 Area Source Inventory: 2461800001, 2461870999, 2461800002, 2461850099, 2461870999.*

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 areas for pesticide applications

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

Emissions from lawn and garden pesticide applications are calculated using county level lawn and garden pesticide use.

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

1. 2016 County totals of lawn & garden pesticide applications, AGRI (lbs) [2]
2. Uncontrolled Emission Factors for Pesticide Active Ingredients, EFA
   VOC = 1160 lb/ton pest applied = 0.58 lb/lb pest applied [3]
3. Average VOC Content of Pesticide Inert Ingredient Portion, by Formulation Type, EFI
   VOC = 66% lb/lb pest applied [3]
4. Amount inert portion in relation to active portion: 1.45*AGRI [3]
5. Overall Emission factor in relation to AGRI, EF (lbs/lb pest applied)[3]
   EF = EFA + 1.45*EFI
   EF = 0.58 + 1.45*0.66
   EF = 1.537
6. Weekly activity, WAF=6 days/week [4]
7. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

Ep_a = AGRI*EF/CF
Ep_s = 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
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor
CF = Conversion factor for units = 2,000 lbs/ton

Assumptions:
1. Assume that the inert portion of the pesticide applied is 1.45 times the active ingredient. [3]
2. Assume that the average VOC content of the pesticide inert ingredient portion, by formulation type represents 66% which represents the highest % weight of inert portion included in Table 9.4-3 from reference [3].
3. Assume that all pesticides are applied to the surface and have a vapor pressure of $>1 \times 10^{-4}$ as referenced in table 9.4-4 from reference [3].

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey 2016 Lawn Care Pesticide Use Survey the Bureau of Pesticide Operations, New Jersey Department of Environmental Protection, Pesticide Control Program, West Trenton, NJ

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 9 - Pesticides - Agricultural and Nonagricultural, December 1997, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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, EPA-454/R-97-004c4.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Pesticide Application, Mosquito Control – Combined into SCC 246180001 (Commercial Pesticides)
SCC: 2461850099

Note: *The following SCCs were estimated individually and then combined and reported as one SCC (2461800001) for the 2017 Area Source Inventory: 2461800001, 2461870999, 2461800002, 2461850099, 2461870999.*

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 areas for pesticide applications

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

Emissions from mosquito control pesticide applications are calculated using county level mosquito control pesticide use.

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

1. 2016 County totals of mosquito control pesticide applications, AGRI (lbs) [2]
2. Uncontrolled Emission Factors for Pesticide Active Ingredients, EFA
   VOC = 1160 lb/ton pest applied = 0.58 lb/lb pest applied [3]
3. Average VOC Content of Pesticide Inert Ingredient Portion, by Formulation Type, EFI
   VOC = 66% lb/lb pest applied [3]
4. Amount inert portion in relation to active portion: 1.45*AGRI [3]
5. Overall Emission factor in relation to AGRI, EF (lbs/lb pest applied)[3]
   EF = EFA + 1.45*EFI
   EF = 0.58 + 1.45*0.66
   EF = 1.537
6. Weekly activity, WAF=6 days/week [4]
7. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

Ep_a = AGRI*EF/CF
Ep_s = 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
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor
CF = Conversion factor for units = 2,000 lbs/ton

Assumptions:
1. Assume that the inert portion of the pesticide applied is 1.45 times the active ingredient. [3]
2. Assume that the average VOC content of the pesticide inert ingredient portion, by formulation type represents 66% which represents the highest % weight of inert portion included in Table 9.4-3 from reference [3].
3. Assume that all pesticides are applied to the surface and have a vapor pressure of >1 x 10^{-4} as referenced in table 9.4-4 from reference [3].

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey 2016 Mosquito Control Pesticide Use Survey the Bureau of Pesticide Operations, New Jersey Department of Environmental Protection, Pesticide Control Program, West Trenton, NJ

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 9 - Pesticides - Agricultural and Nonagricultural, December 1997, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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, EPA-454/R-97-004c4.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Pesticide Application, Right-of-Way – Combined into SCC 246180001 (Commercial Pesticides)
SCC: 2461870999

Note: *The following SCCs were estimated individually and then combined and reported as one SCC (2461800001) for the 2017 Area Source Inventory: 2461800001, 2461870999, 2461800002, 2461850099, 2461870999.*

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 areas for pesticide applications

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

Emissions from right-of-way pesticide applications are calculated using statewide right-of-way pesticide use, allocated to the county level using population.

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

1. 2015 Statewide totals of right-of-way pesticide applications, AGRI (lbs) [2]
2. County and state population, CPOP, SPOP [3]
2. Uncontrolled Emission Factors for Pesticide Active Ingredients, EFA
   VOC = 1160 lb/ton pest applied = 0.58 lb/lb pest applied [3]
3. Average VOC Content of Pesticide Inert Ingredient Portion, by Formulation Type, EFI
   VOC = 66% lb/lb pest applied [3]
4. Amount inert portion in relation to active portion: 1.45*AGRI [3]
5. Overall Emission factor in relation to AGRI, EF (lbs/lb pest applied) [4]
   EF = EFA + 1.45*EFI
   EF = 0.58 + 1.45*0.66
   EF = 1.537
6. Weekly activity, WAF=6 days/week [4]
7. Seasonal adjustment factor, SAF [4]

Summer Season Adjustment Factor	1.32
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

Ep_a = AGRI*EF*(CPOP/SPOP)/CF
Ep_s = 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
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor
CF = Conversion factor for units = 2,000 lbs/ton

Assumptions:
1. Assume that the inert portion of the pesticide applied is 1.45 times the active ingredient. [3]
2. Assume that the average VOC content of the pesticide inert ingredient portion, by formulation type represents 66% which represents the highest % weight of inert portion included in Table 9.4-3 from reference [3].
3. Assume that all pesticides are applied to the surface and have a vapor pressure of >1 x 10^{-4} as referenced in table 9.4-4 from reference [3].

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey 2015 Right-of-Way Pesticide Use Survey the Bureau of Pesticide Operations, New Jersey Department of Environmental Protection, Pesticide Control Program, West Trenton, NJ

3. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 9 - Pesticides - Agricultural and Nonagricultural, December 1997, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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-97-004c4.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Portable Fuel Containers
SCC: 2501011011

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 used for this source category:

1. CARB methodology and survey modified for the OTC [1, 2]

Portable fuel container emission are calculated by accounting for emissions from five different components related to gas container use: permeation, diurnal, transport-spillage, refueling spillage and refueling vapor displacement emissions. The permeation, diurnal emissions (associated with storage) and transport-spillage (associated with filling the can) emissions are included in the area source inventory. The equipment refueling spillage and refueling vapor displacement emissions are calculated from the non-road model and are included in the non-road inventory.

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

1. Number of occupied residential housing units 2017 by county, N [3]
2. Number of commercial businesses 2017 expected to have at least one gas can by county, NAICS 111*, 112*, 113*,114*, 115*, 23*, 311119, 326212, 4411*, 447*, 452990, 488410, 5321*, 541320, 541620, 541690, 81111* 812930 [4]
3. Control Efficiency, CE; CE = 81% [5]
4. Rule Effectiveness, RE; RE = 80% [6]
5. Rule Penetration, RP; RP = 100%

6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factors, SAF = 1

Process:
The following equations are used to calculate the emissions without control for this source category [1, 2]

The residential-gas-can population is calculated as follows:

$$Pop_R = (N)(A)(Count_R) \quad \text{(Eq. 1)}$$

where:
- Pop_R = Statewide Residential-Gas-Can Population
- N = Number of Occupied-Housing Units in OTC State
- A = Percentage of Households with Gas Cans (46%)
- $Count_R$ = Average Number of Residential-Gas Cans per Household

Statewide residential-gas-can-permeation emissions are computed as follows:

$$HC_{PR} = \Sigma \; (Pop_R)(S)(EF_P)(B_R)(Size_R)(Level)/CF \quad \text{(Eq. 2)}$$

where:
- HC_{PR} = Permeation Emissions in tons per day (tpd)
- Pop_R = Statewide Residential-Gas-Can Population
- EF_P = Appropriate Permeation-Emission Factor (g/gal-day)
- S = Percentage of Gas Cans Stored with Fuel (70%)
- B_R = Percentage of Cans Stored in Closed Condition with respect to Material (Plastic 53%; Metal 13%)
- $Size_R$ = Weighted Average Capacity of Residential-Gas Cans (2.34 gal.)
- Level = Weighted Average Amount of Stored Fuel (49%)

CF = 908,105 g/ton

Diurnal emissions from both open- and closed-system-residential-gas cans are calculated as follows:

$HC_{DR} = (Pop_R)(S)(EF_D)(B_R)(Size_R)(Level)$ (Eq. 3)

where:
- HC_{DR} = Diurnal Emissions (tpd) for Residential-Gas Cans with respect to Storage Condition (Open or Closed) and Material (Plastic or Metal)
- Pop_R = Statewide Residential-Gas-Can Population
- S = Percentage of Gas-Can Population Stored with Fuel (70%)
- EF_D = Appropriate Diurnal-Emission Factor with respect to Storage Condition and Material (g/gal-day or g/day)
- B_R = Percentage of Gas-Can Population with respect to Storage Condition and Material
- $Size_R$ = Weighted Average Capacity of Residential-Gas Cans (2.34 gal.)
- Level = Weighted Average Amount of Stored Fuel (49%)
- CF = 908,105 g/ton

Residential-transport-spillage emissions are determined as:

$HC_{TR} = (Pop_R)(S)(Refill_R)(EF_T)(B_R)$ (Eq. 4)

where:
- HC_{TR} = Residential-Gas-Can-Transport-Spillage Emissions (tpd)
- Pop_R = Statewide Residential-Gas-Can Population
- S = Percentage of Gas Cans Stored with Fuel (70%)
- $Refill_R$ = Average Number of Residential-Gas-Cans-Pump-Refills per Day per Can (refill/day from survey)
- EF_T = Transport-Emission Factor with respect to Storage Condition (g/refill)
- B_R = Percentage of Gas Cans with respect to Storage Condition and Material
- CF = 908,105 g/ton

The commercial-gas-can population is calculated as follows:

$Pop_C = (N_C)(Count_C)$ (Eq. 5)

where:
- Pop_C = Statewide Commercial-Gas-Can Population
- N_C = Number of Occupied Businesses in State
- $Count_C$ = Average Number of Gas Cans per Business

Statewide commercial-gas-can-permeation emissions are computed as follows:

$HC_{PC} = \Sigma (Pop_C)(S)(EF_P)(B_C)(Size_C)(Level)$ (Eq. 6)

where:
- HC_{PC} = Permeation Emissions (tpd)
- Pop_C = Statewide Commercial-Gas-Can Population
- EF_P = Appropriate Permeation-Emission Factor (g/gal-day)
- S = Percentage of Gas Cans Stored with Fuel (70% for Residential Survey)
- B_C = Percentage of Applicable Gas Cans Stored in Closed Condition
- $Size_C$ = Weighted Average Capacity of Commercial-Gas Cans (3.43 gal)
- Level = Weighted Average Amount of Stored Fuel (49% from Residential Survey)
- CF = 908,105 g/ton

The amount of diurnal emissions from both open- and closed-system commercial-gas cans is calculated as follows:

$HC_{DC} = (Pop_C)(S)(EF_D)(B_C)(Size_C)(Level)$ (Eq. 7)

where:
- HC_{DC} = Diurnal Emissions (tpd) for Commercial-Gas Cans with respect to Storage

Condition (Open or Closed) and Material (Plastic or Metal)

Pop_C = Statewide Commercial-Gas-Can Population

EF_D = Appropriate Diurnal-Emission Factor with respect to Storage Condition and Material (g/gal-day or g/day)

S = Percentage of Gas Cans Stored with Fuel (70% from Residential Survey)

B_C = Percentage of Gas Cans with respect to Storage Condition and Material

$Size_C$ = Weighted Average Capacity of Commercial-Gas Cans (3.43 gal.)

Level = Weighted Average Amount of Stored Fuel (49% from Residential Survey)

CF = 908,105 g/ton

The non-lawn-and-garden-equipment commercial-gas-can refills at the pump is derived as follows:

$$Refill_C = \frac{(\Sigma \text{ Fuel})}{(Size_C)(POP_{NON})(S)} \quad \text{(Eq. 8)}$$

where: $Refill_C$ = Average Number of Non-Lawn-and-Garden Equipment Commercial-Gas-Cans Pump Refills per Day per Can (refill/day)

Fuel = Non-Lawn-and-Garden Equipment Fuel Consumption (gal/day) for 2000

$Size_C$ = Weighted Average Capacity of Commercial-Gas Cans (3.43 gal/can-refill)

POP_{NON} = Statewide Commercial-Gas-Can Population with respect to Non-Lawn-and-Garden Businesses

S = Percentage of Gas Cans Stored with Fuel (70% from Residential Survey)

CF = 908,105 g/ton

The commercial-transport-spillage emissions are determined as:

$$HC_{TC} = (Pop_C)(S)(B_C)(Refill_C)(EF_{TC}) \quad \text{(Eq. 9)}$$

where: HC_{TC} = Commercial-Gas-Can-Transport-Spillage Emissions (tpd)

Pop_C = Statewide Commercial-Gas-Can Population

S = Percentage of Gas Cans Stored with Fuel (70% from Residential Survey)

B_C = Percentage of Gas Cans with respect to Storage Condition and Material

$Refill_C$ = Average Number of Gas-Cans Pump Refills per Day per Can

EF_{TC} = Transport-Spillage Emission Factor (g/refill) with respect to Storage Condition

CF = 908,105 g/ton

The total area source portable fuel container emissions are summed as follows:

Ep_a = HCPR+HCDR+HCTR+HCPC+HCDC+HCTC

Ep_s = Ep_a*SAF//ADDF

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

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 24, New Jersey State Department of Environmental Protection, effective May 3, 2004, amended December 1, 2008

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

References:

1. ARB's Mailout MSC 99-25, "Public Meeting to Consider Approval of CA's Portable Gasoline-Container Emissions Inventory," (ARB, 1999b)

2. Control Measure Development Support Analysis of Ozone Transport Commission Model Rules, E.H. Pechan & Associates, Inc., 5528-B Hempstead Way, Springfield, VA 22151, March 31, 2001.

3. Occupied Residential Housing Units 2017, US Census Bureau

4. Total 2017 Employment and business establishments by 6 digit NAICS code and by county, New Jersey Department of Labor.

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

6a. 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

6b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Gasoline Service Stations Stage I
SCC: 2501070053

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 gasoline service stations
2. Gasoline throughput analysis

The gasoline throughput analysis is selected because the input data elements are more readily available.

Emissions from gasoline tank truck unloading are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. NJ gasoline consumption, GAS (10^3 gallons) [2]
2. State and County Daily Vehicle Miles Travelled, SVMT, CVMT [3]
3. Emission factor, EF, (lbs/10^3 gallons) [4]
   VOC=7.6
3. Control Efficiencies, CE = 98% [5]
4. Rule Effectiveness, RE = 80% [1]
5. Rule Penetration, RP = 100%
4. Weekly activity, WAF=7 days/week [6]
5. Seasonal adjustment factor, SAF=1

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = GAS*EF*(CVMT/SVMT) *(1- (CE*RE*RP)/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. 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 16, N.J.A.C. 7:27-16.3, New Jersey State Department of Environmental Protection, May 15, 2000, amended July 2, 2004

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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2016 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. New Jersey's Roadway Mileage and Daily VMT by Functional Classification Distributed by County, 2017, New Jersey Department of Transportation, http://www.state.nj.us/transportation/refdata/roadway/vmt.shtm.

4. CARB Uncontrolled Vapor Emission Factor at Gasoline Dispensing Facilities, January 5, 2000

5. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16.3, New Jersey State Department of Environmental Protection

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-97-004c4.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Gasoline Service Stations Stage II
SCC: 2501060100

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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:

This source category was calculated as a part of the NJDEP 2017 onroad inventory.[1]

VOC emissions from refueling from gasoline (SCC 2201000062), diesel (SCC 2202000062) and ethanol (E85) (SCC 2205000062) were estimated by USEPA for the 2017 NEI onroad inventory. These SCCs were removed from New Jersey's 2017 onroad inventory and added to the 2017 area source inventory.

Additional details are included In the USEPA 2017 NEI Technical Support Document.[1]

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

References:

1. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Gasoline Handling & Marketing, Tank Breathing
SCC: 2501060201

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 gasoline service stations
2. Gasoline throughput analysis

The gasoline throughput analysis is selected because the input data elements are more readily available.

Emissions from gasoline tank breathing are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

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

1. NJ gasoline consumption, GAS (10^3 gallons) [2]
2. State and County Vehicle Miles Travelled, SVMT, CVMT [3]
3. Emission factor, EF, (lbs/10^3 gallons) [4]
   VOC=1.0
4. Weekly activity, WAF=7 days/week [5]
5. Seasonal adjustment factor, SAF=1 [5]

Summer Season Adjustment Factor	0.94
Fall Season Adjustment Factor	1.02
Winter Season Adjustment Factor	1.02
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*EF*(CVMT/SVMT)/CF
Ep_s = 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
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 16, N.J.A.C. 7:27-16, 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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2016 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. New Jersey's Roadway Mileage and Daily VMT by Functional Classification Distributed by County, 2016, New Jersey Department of Transportation, http://www.state.nj.us/transportation/refdata/roadway/vmt.shtm.

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 11 – Gasoline Marketing (Stage I and Stage II), 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

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 2017 Periodic Emission Inventory

Gasoline Handling & Marketing, Transport by Rail Tank Car and Truck
SCC: 2505030120

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 the transport industry
2. Gasoline throughput analysis

The gasoline throughput analysis is selected because the input data elements are more readily available.

Emissions from gasoline tank truck and rail car transport are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

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

1. New Jersey gasoline consumption, GAS (10^3 gallons) [2]
2. State and County Daily Vehicle Miles Travelled, SVMT, CVMT [3]
3. A gasoline transportation adjustment factor (GTAF) of 1.25 is applied to account for gasoline resale [4]
4. Emission factor, EF, (lbs/10^3 gallons) [4]
   VOC=0.06
5. Control Efficiencies, CE
   $CE_{procedures}$ = 90.0% [5]
6. Rule Effectiveness, RE; RE = 80% [1]
7. Rule Penetration, RP = 100%
8. Weekly activity, WAF=7 days/week [6]
9. Seasonal adjustment factor, SAF=1

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = 1.25*GAS*(CVMT/SVMT)*EF*(1- (CE*RE*RP))/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
2. Railcar and truck transport were incorporated into one category because NJDEP was unable to distingusih the amount of gasoline carried by each.
3. All gasoline transported to individual facilities are either taken by truck or railcar.
4. Assume a seasonal adjustment factor of 1
5. Assume a rule penetration 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 16, N.J.A.C. 7:27-16, 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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Energy Data 2016 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. New Jersey's Roadway Mileage and Daily VMT by Functional Classification Distributed by County, 2017, New Jersey Department of Transportation, http://www.state.nj.us/transportation/refdata/roadway/vmt.shtm.

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 11 – Gasoline Marketing (Stage I and Stage II), 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

5. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16, New Jersey State Department of Environmental Protection, May 15, 2000

6. EIIP Volume III, Chapter 1, 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 2017 Periodic Emission Inventory

Pipeline Gasoline
SCC: 2505040120

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 was used for this source category: [1]

1. USEPA 2017 National Emissions Inventory Calculations[1]

Emissions from gasoline pipelines are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

Process:

The calculations for estimating VOC and HAP emissions from pipelines involve first multiplying the 1998 national VOC emissions developed in support of the Gasoline Distribution MACT standard by the 2017 to 1998 ratio of national volume of wholesale gasoline supplied.

The national-level emissions are allocated to the PAD Districts based on data on the movement of finished motor gasoline by pipeline between PAD Districts from the EIA. The emissions in each PAD District are distributed to the counties based on employment in NAICS 42471.

Additional details are included In the USEPA 2017 NEI Technical Support Document.[1]

Double Counting:

NJDEP submitted point source subtraction data to USEPA via the USEPA Gasoline Distribution Input Templates on July 22, 2019.[3]

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

References:

1. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020.

2. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

3. USEPA Public Gasoline Distribution Input Templates, submitted by NJDEP to USEPA on July 22, 2019.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Crude Oil Loading
SCC: 2505020030

Note: Petroleum Transport, Marine Vessel Crude Oil Loading, Ballasting and Transit were added together and submitted as one SCC (25020030) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from crude oil loading onto marine vessels are calculated using tons of crude oil loaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Crude oil exported from each port (see item 3 below in assumption section), [FUEL in 10^3 tons] [2]
2. Number of ships and barges at each port, [S, B][2]
3. Fuel oil storage capacity of all docks within municipality within port, [MUNSTOR in barrels] [3,4]
4. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
5. Emission factor, [EFS in lbs/10^3 gallons transported by ships] [5]
   [EFB in lbs/10^3 gallons transported by barges] [5]
   [PER = portion of EFS and EFB represents VOC emissions] [6]

   VOCS=EFS*PER. = 0.61*0.85 = 0.5185
   VOCB=EFB*PER = 1.00*0.85 = 0.85

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

Summer Season Adjustment Factor	1.2
Fall Season Adjustment Factor	0.93
Winter Season Adjustment Factor	0.93
Spring Season Adjustment Factor	0.93

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

Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((B/(B+S))*EFB*PER + (S/(S+B))*EFS*PER)/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units =[7.1 lb/gal] [7]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All crude oil exported from a port is loaded at that port.
2. Barges are defined as non-self propelled vessels.
3. Foreign and Canadian exports, coastwise and lakewise shipments, internal shipments, internal outbound (Upbnd & Downbnd) internal intra (Upbnd & Downbnd), internal intraport and intra-territory shipments from port freight traffic sheets included in reference 2 constitutes marine fuel loading or export activity. [8]

4. Crude oil marine vessel loading includes crude petroleum loading activities from port freight traffic sheets included in reference 2. [9]
5. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
6. Assume that ship/ocean going vessel contribution to overall waterborne commerce (ships and barges) emissions is correctly proportioned by multiplication of the ship/ocean going vessel emission factor (EFS) with the ratio of the total number of ships divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFS. Similarly, the barge contribution to overall waterborne commerce is correctly proportioned by multiplication of the barge emission factor (EFB) with the ratio of the total number of barges divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFB.
7. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
8. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports[10] :

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

9. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ.[11] Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
11. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
12. Assume a weekly activity factor of 7 days per week.
13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2017, US Army Corp of Engineers, Water Resources Support Center.

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Footnote c, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

7. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

10. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

11. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Petroleum Transport, Marine Vessel-Residual Oil Loading
SCC: 2505020060

Note: Petroleum Transport, Marine Vessel Residual Oil Loading and Transit were added together and submitted as one SCC (2505020060) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from residual oil loading onto marine vessels are calculated using tons of residual oil loaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Residual oil exported from each port (see item 3 below in assumption section), [FUEL in 10^3 tons] [2]
2. Number of ships and barges at each port,[S, B] [2]
3. Fuel oil storage capacity of all docks within municipality within port, [MUNSTOR in barrels][3,4]
4. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
5. Emission factor, [EFS in lbs/10^3 gallons transported by ships] [5]
   [EFB in lbs/10^3 gallons transported by barges] [5]
   VOCS=0.00004
   VOCB=0.00009
6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factor, SAF [5a]

Summer Season Adjustment Factor	1.41
Fall Season Adjustment Factor	0.86
Winter Season Adjustment Factor	0.86
Spring Season Adjustment Factor	0.86

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

$Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((B/(B+S))*EFB + (S/(S+B))*EFS)/CF$

$Ep_s = Ep_a*SAF/AADF$

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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units =[7.9 lb/gal] [6]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All residual oil exported from a port is loaded at that port.
2. Barges are defined as non-self propelled vessels.
3. Foreign and Canadian exports, coastwise and lakewise shipments, internal shipments, internal outbound (Upbnd & Downbnd) internal intra (Upbnd & Downbnd), internal intraport and intra-territory shipments from port freight traffic sheets included in reference 2 constitutes marine fuel loading or export activity. [7]
4. Residual oil marine vessel loading includes residual fuel oil, asphalt, tar, and pitch, and petroleum coke loading activities from port freight traffic sheets included in reference 2. [8]
5. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels

included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
6. Assume that ship/ocean going vessel contribution to overall waterborne commerce (ships and barges) emissions is correctly proportioned by multiplication of the ship/ocean going vessel emission factor (EFS) with the ratio of the total number of ships divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFS. Similarly, the barge contribution to overall waterborne commerce is correctly proportioned by multiplication of the barge emission factor (EFB) with the ratio of the total number of barges divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFB.
7. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
8. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[9]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

9. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ.[10] Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
10. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
11. Assume a weekly activity factor of 7 days per week.
12. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center.

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8,

US Army Corps of Engineers, Revised 1984

5. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

6. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids,

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

9. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

10. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Distillate Oil Loading
SCC: 2505020090

Note: Petroleum Transport, Marine Vessel Distillate Oil Loading and Transit were added together and submitted as one SCC (2505020090) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from distillate oil loading onto marine vessels are calculated using tons of distillate oil loaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Distillate oil exported from each port (see item 3 below in assumption section), [FUEL in 10^3 tons] [2]
2. Number of ships and barges at each port, [S, B] [2]
3. Fuel oil storage capacity of all docks within municipality within port,[MUNSTOR in barrels] [3,4]
4. Total port storage capacity of fuel oil (barrels), [TOTSTOR in barrels] [3,4]
5. Emission factor, [EFS in lbs/10^3 gallons transported by ships] [5]
   [EFB in lbs/10^3 gallons transported by barges] [5]
   VOCS=0.005
   VOCB=0.012
6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factor, SAF [5a]

Summer Season Adjustment Factor	1.34
Fall Season Adjustment Factor	0.89
Winter Season Adjustment Factor	0.89
Spring Season Adjustment Factor	0.89

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

$Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((B/(B+S))*EFB + (S/(S+B))*EFS)/CF$

$Ep_s = Ep_a*SAF/AADF$

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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = [7.1 lb/gal][6]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All distillate oil exported from a port is loaded at that port.
2. Barges are defined as non-self propelled vessels.
3. Foreign and Canadian exports, coastwise and lakewise shipments, internal shipments, internal outbound (Upbnd & Downbnd) internal intra (Upbnd & Downbnd), internal intraport and intra-territory shipments from port freight traffic sheets included in reference 2 constitutes marine fuel loading or export activity. [7]
4. Distillate oil marine vessel loading includes distillate fuel oil, lube oil and greases, and petro, jelly and waxes loading activities from port freight traffic sheets included in reference 2. [8]
5. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels

included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
6. Assume that ship/ocean going vessel contribution to overall waterborne commerce (ships and barges) emissions is correctly proportioned by multiplication of the ship/ocean going vessel emission factor (EFS) with the ratio of the total number of ships divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFS. Similarly, the barge contribution to overall waterborne commerce is correctly proportioned by multiplication of the barge emission factor (EFB) with the ratio of the total number of barges divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFB.
7. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
8. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[9]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

9. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ[10]. Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
10. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
11. Assume that all point source marine vessel loading operations included in the emission statement program constitutes gas loading operations where control is indicated. While all point source marine vessel loading operations without controls represents distillate fuel loading unless otherwise noted in the emission statement record.
12. Assume a weekly activity factor of 7 days per week.
13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center.

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

6. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

9. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

10. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Gasoline Loading
SCC: 2505020120

Note: Petroleum Transport, Marine Vessel Gasoline Ballasting, Loading and Transit were added together and submitted as one SCC (2505020120) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from gasoline oil loading onto marine vessels are calculated using tons of gasoline oil loaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Gasoline exported from each port (see item 3 below in assumption section), [FUEL in 10^3 tons] [2]
2. Number of ships and barges at each port,[S, B] [2]
3. Fuel oil storage capacity of all docks within a specific municipality within the designated port, [MUNSTOR in barrels] [3,4]
4. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
5. Emission factor, [EFS in lbs/10^3 gallons transported by ships] [5]
   [EFB in lbs/10^3 gallons transported by barges] [5]
   VOCS=1.8
   VOCB=3.4
6. Control Efficiencies, CE [6] = 95.0%
7. Rule Effectiveness, RE [3] = 80%
8. Rule Penetration, RP = 100%
9. Weekly activity, WAF=7 days/week
10. Seasonal adjustment factor, SAF [6a]

Summer Season Adjustment Factor	0.82
Fall Season Adjustment Factor	1.06
Winter Season Adjustment Factor	1.06
Spring Season Adjustment Factor	1.06

Process:
The following equations are used to calculate the emissions with control for this source category.

$$Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((B/(B+S))*EFB+(S/(S+B))*EFS)*(1-(RP*RE*CE))/CF$$

$$Ep_s = Ep_a/AADF*SAF$$

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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = [5.6 lb/gal][7]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All gasoline exported from a port is loaded at that port.
2. Barges are defined as non-self propelled vessels included in reference 2.
3. Foreign and Canadian exports, coastwise and lakewise shipments, internal shipments, internal outbound

(Upbnd & Downbnd) internal intra (Upbnd & Downbnd), internal intraport and intra-territory shipments from port freight traffic sheets included in reference 2 constitutes marine fuel loading or exporting activity. [8]
4. Gasoline marine vessel loading includes gasoline and liquid nautral gas loading activities from port freight traffic sheets included in reference 2. [9]
5. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
6. Assume that ship/ocean going vessel contribution to overall waterborne commerce (ships and barges) emissions is correctly proportioned by multiplication of the ship/ocean going vessel emission factor (EFS) with the ratio of the total number of ships divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFS. Similarly, the barge contribution to overall waterborne commerce is correctly proportioned by multiplication of the barge emission factor (EFB) with the ratio of the total number of barges divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFB.
7. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
8. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports: [10]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

9. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ[11]. Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
10. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
11. Assume that every marine vessel gasoline loading and ballasting activity installs and operates a control apparatus in accordance with N.J.A.C. 7:27-16.5, Marine tank vessel loading and ballasting operations.
12. Assume that all point source marine vessel fuel transfer operations included in the emission statement program constitutes gas loading operations where control is indicated. While all point source marine vessel fuel transfer operations without controls represents distillate fuel loading unless otherwise noted in the emission statement record.
13. Assume a rule penetration factor of 100%.
14. Assume a weekly activity factor of 7 days per week.
15. Assume a 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 16, 7:27-16.5, Marine tank vessel loading and ballasting operations, June 20, 1994

Double Counting:
Emissions for this source category may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards, Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy, Appendix V: Rate-of-Progress Plan Benefits Calculations, Section VIII. Marine Barge and Tanker Loading, The State of New Jersey, Department of Environmental Protection, December 31, 1996

6a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

7. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

10. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

11. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Jet Naphtha Loading
SCC: 2505020150

Note: Petroleum Transport, Marine Vessel Jet Naphtha Loading and Transit were added together and submitted as one SCC (2505020150) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from jet naphtha loading onto marine vessels are calculated using tons of jet naphtha loaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Jet naphtha exported from each port (see item 3 below in assumption section), [FUEL in 10^3 tons] [2]
2. Number of ships and barges at each port, [S, B] [2]
3. Fuel oil storage capacity of all docks within municipality within port, [MUNSTOR in barrels] [3,4]
4. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
5. Emission factor, [EFS in lbs/10^3 gallons transported by ships] [5]
   [EFB in lbs/10^3 gallons transported by barges] [5]
   VOCS=0.50
   VOCB=1.20
6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factor, SAF [5a]

Summer Season Adjustment Factor	1.22
Fall Season Adjustment Factor	0.93
Winter Season Adjustment Factor	0.93
Spring Season Adjustment Factor	0.93

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

Ep_a= (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((B/(B+S))*EFB + (S/(S+B))*EFS)/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = [6.4 lb/gal][6]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All jet naptha exported from a port is loaded at that port.
2. Barges are defined as non-self propelled vessels.
3. Foreign and Canadian exports, coastwise and lakewise shipments, internal shipments, internal outbound (Upbnd & Downbnd) internal intra (Upbnd & Downbnd), internal intraport and intra-territory shipments from port freight traffic sheets included in reference 2 constitutes marine fuel loading or export activity. [7]
4. Jet Naptha marine vessel loading includes naptha and solvents and petroleum products not elsewhere classified activities from port freight traffic sheets included in reference 2. [8]

5. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
6. Assume that ship/ocean going vessel contribution to overall waterborne commerce (ships and barges) emissions is correctly proportioned by multiplication of the ship/ocean going vessel emission factor (EFS) with the ratio of the total number of ships divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFS. Similarly, the barge contribution to overall waterborne commerce is correctly proportioned by multiplication of the barge emission factor (EFB) with the ratio of the total number of barges divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFB.
7. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
8. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports: [9]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

9. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ[10]. Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
10. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
11. Assume a weekly activity factor of 7 days per week.
12. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8,

US Army Corps of Engineers, Revised 1984

5. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

6. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

9. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

10. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Kerosene Loading
SCC: 2505020180

Note: Petroleum Transport, Marine Vessel Kerosene Loading and Transit were added together and submitted as one SCC (2505020180) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from kerosene loading onto marine vessels are calculated using tons of kerosene loaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Kerosene exported from each port (see item 3 below in assumption section), FUEL [10^3 tons] [2]
2. Number of ships and barges at each port, [S, B] [2]
3. Fuel oil storage capacity of all docks within municipality within port, [MUNSTOR in barrels] [3,4]
4. Total port storage capacity of fuel oil (barrels),[TOTSTOR in barrels] [3,4]
5. Emission factor, [EFS in lbs/10^3 gallons transported by ships] [5]
   [EFB in lbs/10^3 gallons transported by barges] [5]
   VOCS=0.005
   VOCB=0.013
6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factor, SAF [5a]

Summer Season Adjustment Factor	1.35
Fall Season Adjustment Factor	0.88
Winter Season Adjustment Factor	0.88
Spring Season Adjustment Factor	0.88

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

$Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((B/(B+S))*EFB + (S/(S+B))*EFS)/CF$
$Ep_s = Ep_a*SAF/AADF$

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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = [7 lb/gal][6]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All kerosene oil exported from a port is loaded at that port.
2. Barges are defined as non-self propelled vessels.
3. Foreign and Canadian exports, coastwise and lakewise shipments, internal shipments, internal outbound (Upbnd & Downbnd) internal intra (Upbnd & Downbnd), internal intraport and intra-territory shipments from port freight traffic sheets included in reference 2 constitutes marine fuel loading or export activity. [7]
4. kerosene oil marine vessel loading includes kerosene fuel oil loading activities from port freight traffic sheets included in reference 2. [8]
5. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels

included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
6. Assume that ship/ocean going vessel contribution to overall waterborne commerce (ships and barges) emissions is correctly proportioned by multiplication of the ship/ocean going vessel emission factor (EFS) with the ratio of the total number of ships divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFS. Similarly, the barge contribution to overall waterborne commerce is correctly proportioned by multiplication of the barge emission factor (EFB) with the ratio of the total number of barges divided by the total number of ships and barges, ie (Ships/(Ships+Barges))*EFB.
7. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
8. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[9]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

9. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ[10]. Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
10. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
11. Assume that all point source marine vessel loading operations included in the emission statement program constitutes gas loading operations where control is indicated. While all point source marine vessel loading operations without controls represents distillate fuel loading unless otherwise noted in the emission statement record.
12. Assume a weekly activity factor of 7 days per week.
13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of

Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

5a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

6. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

9. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

10. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport Marine Vessel-Crude Oil Transit
SCC: 2505020030

Note: Petroleum Transport, Marine Vessel Crude Oil Loading, Ballasting and Transit were added together and submitted as one SCC (25020030) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from marine vessel crude oil transit are calculated using tons of crude oil in transit at each port, allocated to the county level by the total fuel storage capacity of each docking facility and the mileage facing waterfront.

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

1. Crude oil imported & exported from each port, [FUEL in 10^3 tons] [2]
2. Water front length of a municipality downstream of advancing shipping in port, [D in miles] [3,4,5]
3. Fuel oil storage capacity of individual docks within port, [DOCSTOR in barrels] [3,4]
4. Sum of the fuel oil storage capacity of all docks downstream of advancing shipping within port, [□DOCSTOR in barrels] [3,4]
5. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
6. Time of transit in each port, [TIME=0.275*D in hours] [6]
7. Emission factor, [EF in lbs/week-10^3 gallons] [7]
   [PER = portion of EF represents VOC emissions] [8]
   VOC= EF*PER
   VOC= 1.3*0.85
   VOC= 1.105 lbs/week-10^3 gallons
8. Weekly activity, WAF=7 days/week
9. Seasonal adjustment factor, SAF [8a]

Summer Season Adjustment Factor	1.40
Fall Season Adjustment Factor	0.86
Winter Season Adjustment Factor	0.86
Spring Season Adjustment Factor	0.86

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

Ep_a=((FUEL*CF/CF2)*((TOTSTOR - □DOCSTOR)/TOTSTOR)*(TIME/CF1)*((PER*EF)/CF)

Ep_s= 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = 168 hrs/week
CF2 = Conversion factor for units = [7.1 lb/gal] [9]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:

1. Ships only enter and leave ports for import/export purposes.
2. All marine vessel traffic from port freight traffic sheets (see reference 2) constitutes marine vessel import/export fuel transit activity. [10]
3. Crude oil marine vessel loading includes crude petroleum loading activities from port freight traffic sheets included in reference 2. [11]
4. Assume that the average travel time in hours for vessels using the port is computed by the equation: t = 0.275*d. [6]
5. Assume a valid allocation of port emissions from fuel oil activities to a municipal basis includes the subtraction of the fuel oil storage capacity of all docks downstream of advancing shipping (□DOCSTOR) from the total fuel oil storage capacity within the port (TOTSTOR) followed by division by TOTSTOR. After which this amount is multiplied by the equation that converts distance traveled to time where distance is represented by the length in miles a municipality faces on the waterfront route taken by ships/barges in transit.
6. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports: [12]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ: 52.6% port emissions to NJ

7. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea) and Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound shipping, ie upbound or inbound, to NJ[13]. Assume emissions allocation to NJ achieved from dividing upbound port S & B by total port S & B shipping, ie (upbd S or upbdB)/(downbd & upbd S + downbd & upbd B). The following allocation of emissions has been achieved for ports on the Delaware river.

Delaware River (Phila to the Sea)=(1313+4361)/11318 = 0.501325
Delaware River (Phila to Trenton)=(122+473)/1178 = 0.5051
Trenton= (1+6)/12 = 0.58333

8. Distinct NJ municipalities located on opposite sides of a waterway receive 50% of the total emissions determined for that portion of a waterway that each town shares with another town. [6] Specifically, the ports with distinct NJ towns located on opposite sides of their waterway include the ports of: 1) Newark except for the last mile which is entirely within the boundary of the City of Newark 2) Hackensack River 3)Raritan River except for the 1st mile which is entirely within the boundaries of the City of South Amboy 3) Portions of Mantua Creek 4) Portions of Intracoastal Waterway.
9. Transit from Delaware River (Phila to the Sea) includes the Port of Camden. [2] Therefore no adjustment is made to make allowance for a separate Camden calculation based on shipping data to Camden. Camden is just included as one more dock station on the Delaware River Port (Phila to the Sea).
10. Transit from Delaware River (Phila to Trenton) includes through traffic to Trenton but not the port of Trenton. The port of Trenton is only a single dock which is the last stop on the River. Which means it does not receive any through shipping from any other port or upstream docks but only shipping directed to the Port of Trenton. For this reason the fuel oil storage capacity of Trenton docks have not been included in the Delaware River (Phila to Trenton) to allocate port emissions to municipality level (see item 5 above). Moreover, the small amount of ships and barges traveling just to the single dock in the port of Trenton have not been deducted from the total number of shipping indicated for the Delaware River (Phila to Trenton) port which is used to determine NJ and Penn shipping proportions. Whereas the small amount of shipping traveling to Trenton from the second to last port on the Delaware River is used only to apportion NJ/Penn traffic from the second to last port in Burlington Twp to the last port on the river in Trenton. (see item 7 above)
11. Assume that all shipping traveling to ports upstream of other designated ports must first travel through the waterways of the downstream port. This requires that emissions caused by this through travel have to be included with the regular emissions associated with travel in the designated port.
12. Assume a weekly activity factor of 7 days per week.
13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. County Maps by Hagstrom or Alfred B. Patton.

6. Memorandum from James Labanowski of Radian Corporation, Spatial Allocation of Commercial Marine Vessel Emissions for SIP Base Year Inventories, June 9, 1993

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Footnote c, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

8a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

9. 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 Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

11. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

12. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

13. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Residual Oil Transit
SCC: 2505020060

Note: Petroleum Transport, Marine Vessel Residual Oil Loading and Transit were added together and submitted as one SCC (2505020060) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from marine vessel residual oil transit are calculated using tons of residual oil in transit at each port, allocated to the county level by the total fuel storage capacity of each docking facility and the mileage facing waterfront.

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

1. Residual oil imported & exported from each port, [FUEL in 10^3 tons] [2]
2. Water front length of a municipality downstream of advancing shipping in port [D in miles] [3,4,5]
3. Fuel oil storage capacity of individual docks within port, [DOCSTOR in barrels] [3,4]
4. Sum of the fuel oil storage capacity of all docks downstream of advancing shipping within port □DOCSTOR [3,4]
5. Total port storage capacity of fuel oil,[TOTSTOR in barrels] [3,4]
6. Time of transit in each port, [TIME=0.275*D in hours] [6]
7. Emission factor,[EF in lbs/week-10^3 gallons] [7]
   VOC=0.00003
8. Weekly activity, [WAF=7 days/week]
9. Seasonal adjustment factor, SAF [7a]

Summer Season Adjustment Factor	1.6
Fall Season Adjustment Factor	0.8
Winter Season Adjustment Factor	0.8
Spring Season Adjustment Factor	0.8

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

Ep_a=((FUEL*CF/CF2)*((TOTSTOR - □DOCSTOR)/TOTSTOR)*(TIME/CF1)*(EF/CF)
Ep_s= 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = 168 hrs/week
CF2 = Conversion factor for units = [7.9 lb/gal][8]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Ships only enter and leave ports for import/export purposes.
2. All marine vessel traffic from port freight traffic sheets (see reference 2) constitutes marine vessel import/export fuel transit activity. [9]
3. Residual oil marine vessel loading includes residual fuel oil, asphalt, tar, and pitch, and petroleum coke loading activities from port freight traffic sheets included in reference 2. [10]
4. Assume that the average travel time in hours for vessels using the port is computed by the equation: t =

0.275*d. [6]

5. Assume a valid allocation of port emissions from fuel oil activities to a municipal basis includes the subtraction of the fuel oil storage capacity of all docks downstream of advancing shipping (□DOCSTOR) from the total fuel oil storage capacity within the port (TOTSTOR) followed by division by TOTSTOR. After which this amount is multiplied by the equation that converts distance traveled to time where distance is represented by the length in miles a municipality faces on the waterfront route taken by ships/barges in transit.

6. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[11]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ: 52.6% port emissions to NJ

7. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea) and Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound shipping, ie upbound or inbound, to NJ[12]. Assume emissions allocation to NJ achieved from dividing upbound port S & B by total port S & B shipping, ie (upbd S or upbdB)/(downbd & upbd S + downbd & upbd B). The following allocation of emissions has been achieved for ports on the Delaware river.

Delaware River (Phila to the Sea)=(1313+4361)/11318 = 0.501325
Delaware River (Phila to Trenton)=(122+473)/1178 = 0.5051
Trenton= (1+6)/12 = 0.58333

8. Distinct NJ municipalities located on opposite sides of a waterway receive 50% of the total emissions determined for that portion of a waterway that each town shares with another town. [6] Specifically, the ports with distinct NJ towns located on opposite sides of their waterway include the ports of: 1) Newark except for the last mile which is entirely within the boundary of the City of Newark 2) Hackensack River 3)Raritan River except for the 1st mile which is entirely within the boundaries of the City of South Amboy 3) Portions of Mantua Creek 4) Portions of Intracoastal Waterway.

9. Transit from Delaware River (Phila to the Sea) includes the Port of Camden. [2] Therefore no adjustment is made to make allowance for a separate Camden calculation based on shipping data to Camden. Camden is just included as one more dock station on the Delaware River Port (Phila to the Sea).

10. Transit from Delaware River (Phila to Trenton) includes through traffic to Trenton but not the port of Trenton. The port of Trenton is only a single dock which is the last stop on the River. Which means it does not receive any through shipping from any other port or upstream docks but only shipping directed to the Port of Trenton. For this reason the fuel oil storage capacity of Trenton docks have not been included in the Delaware River (Phila to Trenton) to allocate port emissions to municipality level (see item 5 above). Moreover, the small amount of ships and barges traveling just to the single dock in the port of Trenton have not been deducted from the total number of shipping indicated for the Delaware River (Phila to Trenton) port which is used to determine NJ and Penn shipping proportions. Whereas the small amount of shipping traveling to Trenton from the second to last port on the Delaware River is used only to apportion NJ/Penn traffic from the second to last port in Burlington Twp to the last port on the river in Trenton. (see item 7 above)

11. Assume that all shipping traveling to ports upstream of other designated ports must first travel through the waterways of the downstream port. This requires that emissions caused by this through travel have to be included with the regular emissions associated with travel in the designated port.

12. Assume a weekly activity factor of 7 days per week.

13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. County Maps by Hagstrom or Alfred B. Patton.

6. Memorandum from James Labanowski of Radian Corporation, Spatial Allocation of Commercial Marine Vessel Emissions for SIP Base Year Inventories, June 9, 1993

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

7a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

11. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

12. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Distillate Oil Transit
SCC: 2505020090

Note: Petroleum Transport, Marine Vessel Distillate Oil Loading and Transit were added together and submitted as one SCC (2505020090) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from marine vessel distillate oil transit are calculated using tons of distillate oil in transit at each port, allocated to the county level by the total fuel storage capacity of each docking facility and the mileage facing waterfront.

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

1. Distillate oil imported & exported from each port,[FUEL in 10^3 tons] [2]
2. Water front length of a municipality downstream of advancing shipping in port [D in miles] [3,4,5]
3. Fuel oil storage capacity of individual docks within port, [DOCSTOR in barrels] [3,4]
4. Sum of the fuel oil storage capacity of all docks downstream of advancing shipping within port □DOCSTOR [3,4]
5. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
6. Time of transit in each port, [$TIME_{port}$=.275*D in hours] [6]
7. Emission factor, [EF in lbs/week - 10^3 gallons] [7]
   VOC=0.005
8. Weekly activity, WAF=7 days/week
9. Seasonal adjustment factor, SAF [7a]

Summer Season Adjustment Factor	1.54
Fall Season Adjustment Factor	0.82
Winter Season Adjustment Factor	0.82
Spring Season Adjustment Factor	0.82

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

Ep_a=((FUEL*CF/CF2)*((TOTSTOR - □DOCSTOR)/TOTSTOR)*(TIME/CF1)*(EF/CF)
Ep_s= 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = 168 hrs/week
CF2 = Conversion factor for units = [7.1 lb/gal] [8]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Ships only enter and leave ports for import/export purposes.
2. All marine vessel traffic from port freight traffic sheets (see reference 2) constitutes marine vessel import/export fuel transit activity. [9]
3. Distillate oil marine vessel loading includes distillate fuel oil, lube oil and greases, and petro, jelly and waxes loading activities from port freight traffic sheets included in reference 2. [10]
4. Assume that the average travel time in hours for vessels using the port is computed by the equation: t =

0.275*d. [6]

5. Assume a valid allocation of port emissions from fuel oil activities to a municipal basis includes the subtraction of the fuel oil storage capacity of all docks downstream of advancing shipping (□DOCSTOR) from the total fuel oil storage capacity within the port (TOTSTOR) followed by division by TOTSTOR. After which this amount is multiplied by the equation that converts distance traveled to time where distance is represented by the length in miles a municipality faces on the waterfront route taken by ships/barges in transit.

6. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[11]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ: 52.6% port emissions to NJ

7. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea) and Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound shipping, ie upbound or inbound, to NJ[12]. Assume emissions allocation to NJ achieved from dividing upbound port S & B by total port S & B shipping, ie (upbd S or upbdB)/(downbd & upbd S + downbd & upbd B). The following allocation of emissions has been achieved for ports on the Delaware river.

Delaware River (Phila to the Sea)=(1313+4361)/11318 = 0.501325
Delaware River (Phila to Trenton)=(122+473)/1178 = 0.5051
Trenton= (1+6)/12 = 0.58333

8. Distinct NJ municipalities located on opposite sides of a waterway receive 50% of the total emissions determined for that portion of a waterway that each town shares with another town. [6] Specifically, the ports with distinct NJ towns located on opposite sides of their waterway include the ports of: 1) Newark except for the last mile which is entirely within the boundary of the City of Newark 2) Hackensack River 3)Raritan River except for the 1st mile which is entirely within the boundaries of the City of South Amboy 3) Portions of Mantua Creek 4) Portions of Intracoastal Waterway.

9. Transit from Delaware River (Phila to the Sea) includes the Port of Camden. [2] Therefore no adjustment is made to make allowance for a separate Camden calculation based on shipping data to Camden. Camden is just included as one more dock station on the Delaware River Port (Phila to the Sea).

10. Transit from Delaware River (Phila to Trenton) includes through traffic to Trenton but not the port of Trenton. The port of Trenton is only a single dock which is the last stop on the River. Which means it does not receive any through shipping from any other port or upstream docks but only shipping directed to the Port of Trenton. For this reason the fuel oil storage capacity of Trenton docks have not been included in the Delaware River (Phila to Trenton) to allocate port emissions to municipality level (see item 5 above). Moreover, the small amount of ships and barges traveling just to the single dock in the port of Trenton have not been deducted from the total number of shipping indicated for the Delaware River (Phila to Trenton) port which is used to determine NJ and Penn shipping proportions. Whereas the small amount of shipping traveling to Trenton from the second to last port on the Delaware River is used only to apportion NJ/Penn traffic from the second to last port in Burlington Twp to the last port on the river in Trenton. (see item 7 above)

11. Assume that all shipping traveling to ports upstream of other designated ports must first travel through the waterways of the downstream port. This requires that emissions caused by this through travel have to be included with the regular emissions associated with travel in the designated port.

12. Assume a weekly activity factor of 7 days per week.

13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. County Maps by Hagstrom or Alfred B. Patton.

6. Memorandum from James Labanowski of Radian Corporation, Spatial Allocation of Commercial Marine Vessel Emissions for SIP Base Year Inventories, June 9, 1993

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

7a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

11. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

12. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Gasoline Transit
SCC: 2505020120

Note: Petroleum Transport, Marine Vessel Gasoline Ballasting, Loading and Transit were added together and submitted as one SCC (2505020120) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from marine vessel gasoline oil transit are calculated using tons of gasoline oil in transit at each port, allocated to the county level by the total fuel storage capacity of each docking facility and the mileage facing waterfront.

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

1. Gasoline imported & exported from each port,[FUEL in 10^3 tons] [2]
2. Water front length of a municipality downstream of advancing shipping in port [D in miles] [3,4,5]
3. Fuel oil storage capacity of individual docks within port, [DOCSTOR in barrels] [3,4]
4. Sum of the fuel oil storage capacity of all docks downstream of advancing shipping within port [□DOCSTOR in barrels] [3,4]
5. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
6. Time of transit in each port, [TIME=.275*D in hours] [6]
7. Emission factor, [EF in lbs/week - 10^3 gallons] [7]
   VOC=2.7
8. Weekly activity, WAF=7 days/week
9. Seasonal adjustment factor, SAF [7a]

Summer Season Adjustment Factor	0.90
Fall Season Adjustment Factor	1.03
Winter Season Adjustment Factor	1.03
Spring Season Adjustment Factor	1.03

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

Ep_a=((FUEL*CF/CF2)*((TOTSTOR - □DOCSTOR)/TOTSTOR)*(TIME/CF1)*(EF/CF)
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = 168 hrs/week
CF2 = Conversion factor for units = [5.6 lb/gal][8]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Ships only enter and leave ports for import/export purposes.
2. All marine vessel traffic from port freight traffic sheets (see reference 2) constitutes marine vessel import/export fuel transit activity. [9]
3. Gasoline marine vessel loading includes gasoline and liquid nautral gas loading activities from port freight traffic sheets included in reference 2. [10]

4. Assume that the average travel time in hours for vessels using the port is computed by the equation: t = 0.275*d. [6]
5. Assume a valid allocation of port emissions from fuel oil activities to a municipal basis includes the subtraction of the fuel oil storage capacity of all docks downstream of advancing shipping (□DOCSTOR) from the total fuel oil storage capacity within the port (TOTSTOR) followed by division by TOTSTOR. After which this amount is multiplied by the equation that converts distance traveled to time where distance is represented by the length in miles a municipality faces on the waterfront route taken by ships/barges in transit.
6. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[11]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ: 52.6% port emissions to NJ

7. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea) and Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound shipping, ie upbound or inbound, to NJ[12]. Assume emissions allocation to NJ achieved from dividing upbound port S & B by total port S & B shipping, ie (upbd S or upbdB)/(downbd & upbd S + downbd & upbd B). The following allocation of emissions has been achieved for ports on the Delaware river.

Delaware River (Phila to the Sea)=(1313+4361)/11318 = 0.501325
Delaware River (Phila to Trenton)=(122+473)/1178 = 0.5051
Trenton= (1+6)/12 = 0.58333

8. Distinct NJ municipalities located on opposite sides of a waterway receive 50% of the total emissions determined for that portion of a waterway that each town shares with another town. [6] Specifically, the ports with distinct
NJ towns located on opposite sides of their waterway include the ports of: 1) Newark except for the last mile which is entirely within the boundary of the City of Newark 2) Hackensack River 3)Raritan River except for the 1st mile which is entirely within the boundaries of the City of South Amboy 3) Portions of Mantua Creek 4) Portions of Intracoastal Waterway.
9. Transit from Delaware River (Phila to the Sea) includes the Port of Camden. [2] Therefore no adjustment is made to make allowance for a separate Camden calculation based on shipping data to Camden. Camden is just included as one more dock station on the Delaware River Port (Phila to the Sea).
10. Transit from Delaware River (Phila to Trenton) includes through traffic to Trenton but not the port of Trenton. The port of Trenton is only a single dock which is the last stop on the River. Which means it does not receive any through shipping from any other port or upstream docks but only shipping directed to the Port of Trenton. For this reason the fuel oil storage capacity of Trenton docks have not been included in the Delaware River (Phila to Trenton) to allocate port emissions to municipality level (see item 5 above). Moreover, the small amount of ships and barges traveling just to the single dock in the port of Trenton have not been deducted from the total number of shipping indicated for the Delaware River (Phila to Trenton) port which is used to determine NJ and Penn shipping proportions. Whereas the small amount of shipping traveling to Trenton from the second to last port on the Delaware River is used only to apportion NJ/Penn traffic from the second to last port in Burlington Twp to the last port on the river in Trenton. (see item 7 above)
11. Assume that all shipping traveling to ports upstream of other designated ports must first travel through the waterways of the downstream port. This requires that emissions caused by this through travel have to be included with the regular emissions associated with travel in the designated port.

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

Double Counting:
Emissions for this source category may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. County Maps by Hagstrom or Alfred B. Patton.

6. Memorandum from James Labanowski of Radian Corporation, Spatial Allocation of Commercial Marine Vessel Emissions for SIP Base Year Inventories, June 9, 1993

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

7a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

11. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

12. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Jet Naphtha Transit
SCC: 2505020150

Note: Petroleum Transport, Marine Vessel Jet Naphtha Loading and Transit were added together and submitted as one SCC (2505020150) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from marine vessel jet naphtha transit are calculated using tons of jet naphtha in transit at each port, allocated to the county level by the total fuel storage capacity of each docking facility and the mileage facing waterfront.

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

1. Jet naphtha imported & exported from each port, [FUEL in 10^3 tons] [2]
2. Water front length of a municipality downstream of advancing shipping in port [D in miles] [3,4,5]
3. Fuel oil storage capacity of individual docks within port, [DOCSTOR in barrels] [3,4]
4. Sum of the fuel oil storage capacity of all docks downstream of advancing shipping within port [□DOCSTOR in barrels] [3,4]
5. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
6. Time of transit in each port, [TIME=.275*D in hours] [6]
7. Emission factor, [EF in lbs/week - 10^3 gallons] [7]
   VOC=0.7
8. Weekly activity, WAF=7 days/week
9. Seasonal adjustment factor, SAF [7a]

Summer Season Adjustment Factor	1.4
Fall Season Adjustment Factor	0.86
Winter Season Adjustment Factor	0.86
Spring Season Adjustment Factor	0.86

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

Ep_a = ((FUEL*CF/CF2)*((TOTSTOR - □DOCSTOR)/TOTSTOR)*(TIME/CF1)*(EF/CF)
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = 168 hrs/week
CF2 = Conversion factor for units = [6.4 lb/gal] [8]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Ships only enter and leave ports for import/export purposes.
2. All marine vessel traffic from port freight traffic sheets (see reference 2) constitutes marine vessel import/export fuel transit activity. [9]
3. Jet Naptha marine vessel loading includes naptha and solvents and petroleum products not elsewhere

classified activities from port freight traffic sheets included in reference 2.[10]
4. Assume that the average travel time in hours for vessels using the port is computed by the equation: t = 0.275*d. [6]
5. Assume a valid allocation of port emissions from fuel oil activities to a municipal basis includes the subtraction of the fuel oil storage capacity of all docks downstream of advancing shipping (□DOCSTOR) from the total fuel oil storage capacity within the port (TOTSTOR) followed by division by TOTSTOR. After which this amount is multiplied by the equation that converts distance traveled to time where distance is represented by the length in miles a municipality faces on the waterfront route taken by ships/barges in transit.
6. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports: [11]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ: 52.6% port emissions to NJ

7. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea) and Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound shipping, ie upbound or inbound, to NJ[12]. Assume emissions allocation to NJ achieved from dividing upbound port S & B by total port S & B shipping, ie (upbd S or upbdB)/(downbd & upbd S + downbd & upbd B). The following allocation of emissions has been achieved for ports on the Delaware river.

Delaware River (Phila to the Sea)=(1313+4361)/11318 = 0.501325
Delaware River (Phila to Trenton)=(122+473)/1178 = 0.5051
Trenton= (1+6)/12 = 0.58333

8. Distinct NJ municipalities located on opposite sides of a waterway receive 50% of the total emissions determined for that portion of a waterway that each town shares with another town. [6] Specifically, the ports with distinct NJ towns located on opposite sides of their waterway include the ports of: 1) Newark except for the last mile which is entirely within the boundary of the City of Newark 2) Hackensack River 3)Raritan River except for the 1st mile which is entirely within the boundaries of the City of South Amboy 3) Portions of Mantua Creek 4) Portions of Intracoastal Waterway.
9. Transit from Delaware River (Phila to the Sea) includes the Port of Camden. [2] Therefore no adjustment is made to make allowance for a separate Camden calculation based on shipping data to Camden. Camden is just included as one more dock station on the Delaware River Port (Phila to the Sea).
10. Transit from Delaware River (Phila to Trenton) includes through traffic to Trenton but not the port of Trenton. The port of Trenton is only a single dock which is the last stop on the River. Which means it does not receive any through shipping from any other port or upstream docks but only shipping directed to the Port of Trenton. For this reason the fuel oil storage capacity of Trenton docks have not been included in the Delaware River (Phila to Trenton) to allocate port emissions to municipality level (see item 5 above). Moreover, the small amount of ships and barges traveling just to the single dock in the port of Trenton have not been deducted from the total number of shipping indicated for the Delaware River (Phila to Trenton) port which is used to determine NJ and Penn shipping proportions. Whereas the small amount of shipping traveling to Trenton from the second to last port on the Delaware River is used only to apportion NJ/Penn traffic from the second to last port in Burlington Twp to the last port on the river in Trenton. (see item 7 above)
11. Assume that all shipping traveling to ports upstream of other designated ports must first travel through the waterways of the downstream port. This requires that emissions caused by this through travel have to be included with the regular emissions associated with travel in the designated port.

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

Double Counting:
Emissions for this source category may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. County Maps by Hagstrom or Alfred B. Patton.

6. Memorandum from James Labanowski of Radian Corporation, Spatial Allocation of Commercial Marine Vessel Emissions for SIP Base Year Inventories, June 9, 1993

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

7a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

11. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

12. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Kerosene Transit
SCC: 2505020180

Note: Petroleum Transport, Marine Vessel Kerosene Loading and Transit were added together and submitted as one SCC (2505020180) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from marine vessel kerosene transit are calculated using tons of kerosene in transit at each port, allocated to the county level by the total fuel storage capacity of each docking facility and the mileage facing waterfront.

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

1. Kerosene imported & exported from each port, [FUEL in 10^3 tons] [2]
2. Water front length of a municipality downstream of advancing shipping in port [D in miles] [3,4,5]
3. Fuel oil storage capacity of individual docks within port, [DOCSTOR in barrels] [3,4]
4. Sum of the fuel oil storage capacity of all docks downstream of advancing shipping within port [□DOCSTOR in barrels] [3,4]
5. Total port storage capacity of fuel oil, [TOTSTOR in barrels] [3,4]
6. Time of transit in each port, [TIME=.275*D in hours] [6]
7. Emission factor, [EF in lbs/week-10^3 gallons] [5]
   VOC= 0.005
8. Weekly activity, WAF=7 days/week
9. Seasonal adjustment factor, SAF [6a]

Summer Season Adjustment Factor	1.54
Fall Season Adjustment Factor	0.82
Winter Season Adjustment Factor	0.82
Spring Season Adjustment Factor	0.82

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

Ep_a = ((FUEL*CF/CF2)*((TOTSTOR - □DOCSTOR)/TOTSTOR)*(TIME/CF1)*(EF/CF)
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = 168 hrs/week
CF2 = Conversion factor for units = [7 lb/gal] [8]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Ships only enter and leave ports for import/export purposes.
2. All marine vessel traffic from port freight traffic sheets (see reference 2) constitutes marine vessel import/export fuel transit activity. [9]
3. Kerosene oil marine vessel loading includes kerosene fuel oil loading activities from port freight traffic sheets included in reference 2. [8]

4. Assume that the average travel time in hours for vessels using the port is computed by the equation: t = 0.275*d.[6]
5. Assume that the average travel time in hours for vessels traveling outside the port is computed by the equation: t=0.125*d. [6]
6. Assume a valid allocation of port emissions from fuel oil activities to a municipal basis includes the subtraction of the fuel oil storage capacity of all docks downstream of advancing shipping (□DOCSTOR) from the total fuel oil storage capacity within the port (TOTSTOR) followed by division by TOTSTOR. After which this amount is multiplied by the equation that converts distance traveled to time where distance is represented by the length in miles a municipality faces on the waterfront route taken by ships/barges in transit.
7. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports:[11]

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ: 52.6% port emissions to NJ

8. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea) and Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound shipping, ie upbound or inbound, to NJ[12]. Assume emissions allocation to NJ achieved from dividing upbound port S & B by total port S & B shipping, ie (upbd S or upbdB)/(downbd & upbd S + downbd & upbd B). The following allocation of emissions has been achieved for ports on the Delaware river.

Delaware River (Phila to the Sea)=(1313+4361)/11318 = 0.501325
Delaware River (Phila to Trenton)=(122+473)/1178 = 0.5051
Trenton= (1+6)/12 = 0.58333

9. Distinct NJ municipalities located on opposite sides of a waterway receive 50% of the total emissions determined for that portion of a waterway that each town shares with another town. [6] Specifically, the ports with distinct NJ towns located on opposite sides of their waterway include the ports of: 1) Newark except for the last mile which is entirely within the boundary of the City of Newark 2) Hackensack River 3)Raritan River except for the 1st mile which is entirely within the boundaries of the City of South Amboy 3) Portions of Mantua Creek 4) Portions of Intracoastal Waterway.
10. Transit from Delaware River (Phila to the Sea) includes the Port of Camden. [2] Therefore no adjustment is made to make allowance for a separate Camden calculation based on shipping data to Camden. Camden is just included as one more dock station on the Delaware River Port (Phila to the Sea).
11. Transit from Delaware River (Phila to Trenton) includes through traffic to Trenton but not the port of Trenton. The port of Trenton is only a single dock which is the last stop on the River. Which means it does not receive any through shipping from any other port or upstream docks but only shipping directed to the Port of Trenton. For this reason the fuel oil storage capacity of Trenton docks have not been included in the Delaware River (Phila to Trenton) to allocate port emissions to municipality level (see item 5 above). Moreover, the small amount of ships and barges traveling just to the single dock in the port of Trenton have not been deducted from the total number of shipping indicated for the Delaware River (Phila to Trenton) port which is used to determine NJ and Penn shipping proportions. Whereas the small amount of shipping traveling to Trenton from the second to last port on the Delaware River is used only to apportion NJ/Penn traffic from the second to last port in Burlington Twp to the last port on the river in Trenton. (see item 7 above)
12. Assume that all shipping traveling to ports upstream of other designated ports must first travel through the waterways of the downstream port. This requires that emissions caused by this through travel have to be included with the regular emissions associated with travel in the designated port.

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

Double Counting:
Emissions for this source category may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. County Maps by Hagstrom or Alfred B. Patton.

6. Memorandum from James Labanowski of Radian Corporation, Spatial Allocation of Commercial Marine Vessel Emissions for SIP Base Year Inventories, June 9, 1993

6a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

7. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

11. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

12. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Crude Oil Ballasting
SCC: 2505020030

Note: Petroleum Transport, Marine Vessel Crude Oil Loading, Ballasting and Transit were added together and submitted as one SCC (25020030) in the 2017 Area Source Inventory.2502006

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from crude oil ballasting of marine vessels are calculated using tons of crude oil unloaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Crude oil unloaded at each port (see item 5 below in Assumptions section), [FUEL in 10^3 tons] [2]
2. Fuel oil storage capacity of all docks within municipality within port, [MUNSTOR in barrels] [3,4]
3. Total port storage capacity of fuel oil (barrels), [TOTSTOR in barrels] [3,4]
4. Ballast water - 40% of capacity, [BAL=40%] [5]
5. Emission factor, [EF in lbs/10^3 gallons of ballast water] [6]
   [PER = portion of EF represents VOC emissions] [7]
   VOCS=EF*PER*BAL = 1.1*0.85*0.4 = 0.374
6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factor, SAF [7a]

Summer Season Adjustment Factor	1.2
Fall Season Adjustment Factor	0.93
Winter Season Adjustment Factor	0.93
Spring Season Adjustment Factor	0.93

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

Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*((BAL*EF*PER)/CF)
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = [7.1 lb/gal] [8]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:

1. Only crude oil imported into the port is unloaded at the port
2. All tankers carry crude oil at maximum capacity
3. Barges are defined as non-self propelled vessels.
4. Assume that total vessels are ballasted at a conservative 40% of capacity. [5]
5. Foreign and canadian imports and coastwise, lakewise and internal receipts and internal inbound (Upbnd & Downbnd), internal intra (Upbnd & Downbnd), internal intraport and intra-territory receipts from port freight traffic sheets included in reference 2 constitutes fuel unloading or marine ballasting activity.[9]
6. Crude oil marine vessel ballasting includes crude petroleum ballasting activities from port freight traffic sheets included in reference 2. [10]

7. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
8. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
9. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports [11] :

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

10. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ.[12] Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
11. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
12. Assume a weekly activity factor of 7 days per week.
13. 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 may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2.2.1.2, Ballasting Losses, page 5.2-9, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

7. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2-14, Table 5.2-6. Total Organic Emission Factors for Petroleum Marine Vessel Sources, Footnote c

7a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

8. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

10. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

11. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

12. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Petroleum Transport, Marine Vessel-Gasoline Ballasting
SCC: 2505020120

Note: Petroleum Transport, Marine Vessel Gasoline Ballasting, Loading and Transit were added together and submitted as one SCC (2505020120) in the 2017 Area Source Inventory.

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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 shipping companies
2. Fuel transported analysis

The fuel transported analysis is selected because the input data elements are more readily available.

Emissions from gasoline ballasting of marine vessels are calculated using tons of gasoline unloaded at each port, allocated to the county level by the total fuel storage capacity of each docking facility.

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

1. Gasoline unloaded at each port (see item 5 below in assumption section), [FUEL in 10^3 tons] [2]
2. Fuel oil storage capacity of all docks within municipality within port,[MUNSTOR in barrels] [3,4]
3. Total port storage capacity of fuel oil (barrels), [TOTSTOR in barrels] [3,4]
4. Ballast water - 40% of capacity, [BAL=40%] [5]
5. Emission factor, [EF in lbs/10^3 gallons of ballast water] [6]
   VOC=EF*BAL = 0.8*0.4 = 0.32
6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factor, SAF [6a]

Summer Season Adjustment Factor	0.82
Fall Season Adjustment Factor	1.06
Winter Season Adjustment Factor	1.06
Spring Season Adjustment Factor	1.06

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = (FUEL*CF/CF1)*(MUNSTOR/TOTSTOR)*BAL*EF*(1 - (RP*RE*CE))/CF
Ep_s = 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
CF = Conversion factor for units = 2000 lbs/ton
CF1 = Conversion factor for units = [5.6 lb/gal] [7]
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:

1. Only gasoline imported into the port is unloaded at the port.
2. All tankers carry gasoline at maximum capacity.
3. Barges are defined as non-self propelled vessels.
4. Assume that total vessels are ballasted at a conservative 40% of capacity. [5]

5. Foreign and canadian imports and coastwise, lakewise and internal receipts and internal inbound (Upbnd & Downbnd), internal intra (Upbnd & Downbnd), internal intraport and intra-territory receipts from port freight traffic sheets included in reference 2 constitutes fuel unloading or marine ballasting activity. [8]

6. gasoline marine vessel ballasting includes gasoline and liquid natural gas ballasting activities from port freight traffic sheets included in reference 2. [9]

7. Assume that the number of ships (S) and barges (B) specified for all ports from trips and drafts of vessels

included in reference 2 includes both upbound and downbound shipping except as noted in item 10 below.
8. Assume that the municipal fuel oil storage capacity of all docks within a municipality within a port (MUNSTOR) divided by the total fuel oil storage capacity within the port (TOTSTOR) allocates port emissions from fuel oil activities to a municipal basis.
9. % emissions to NJ from shipping activity to Ports shared by NJ or New York are allocated as follows for each of these respective ports [10] :

Upper Bay NY Harbor, NY & NJ : 54.3% port emissions to NJ
Hudson River Channel, NY & NJ : 50.0% port emissions to NJ
New York & New Jersey Channel,NY & NJ : 52.6% port emissions to NJ

10. % emissions to NJ from shipping activity to Ports shared by Pennsylannia and New Jersey, ie Delaware River (Phila to sea), Delaware River (Phila to Trenton), Camden and Trenton is allocated by crediting all northbound (upbound or inbound) ships(S) and barges(B) to NJ.[11] Assume this emission allocation is accomplished by including only upbound or inbound shipping in the top portion of the emission equation related to S & B loading but including both upbound and downbound shipping in its bottom portion for every port shared by Pennsylannia and New Jersey, ie upbd S/(downbd S & upbd S + downbd B & upbd B) or upbd B/(downbd S & upbd S + downbd B & upbd B).
11. Fuel and shipping (S & B) amounts for the Port of Camden are subtracted from those amounts obtained for the Port of Delaware River (Phila to the sea) because this port includes Camden and loading data for Camden has been obtained separately without allocation from this larger port.
12. Assume that every marine vessel gasoline loading and ballasting activity installs and operates a control apparatus in accordance with N.J.A.C. 7:27-16.5, Marine tank vessel loading and ballasting operations.
13. Assume a weekly activity factor of 7 days per week.
14. Assume a 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 16, 7:27-16.5, Marine tank vessel loading and ballasting operations, June 20, 1994

Double Counting:
Emissions for this source category may have been reported in the point source inventory, however, based on the descriptions given by the point source facilities it cannot be determined. Therefore, to be conservative, no adjustment of the area source emissions was conducted.

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

References:

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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Waterborne Commerce of the United States, Part 1, Waterways and Harbors Atlantic Coast, Calendar Year 2016, US Army Corp of Engineers, Water Resources Support Center

3. The Ports of New York, NY and NJ and Ports on Long Island, NY, Port Series No. 5, US Army Corps of Engineers, Revised 1988

4. The Ports of Philadelphia, Pa, Camden, NJ, Wilmington, De, and Ports on Delaware River, Port Series No. 8, US Army Corps of Engineers, Revised 1984

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 5.2.2.1.2, Ballasting Losses, page

5.2-9, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-5, Uncontrolled VOC Emission Factors for Petroleum Carrying Marine Vessels , Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

6a. Based on monthly – temperature adjusted true vapor pressures obtained from USEPA Tanks 4.09b model for Newark, New Jersey.

7. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 7.1-83, Table 7.1-2. Properties (M_V,W_{VC}, P_{VA},W_L) of Selected Petroleum Liquids

8. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit, Table 12.4-1, Emission Points for Petroleum Vessel Traffic Classifications

9. EIIP Volume III, Chapter 12 - Marine Vessel Loading, Ballasting, and Transit Table 12.4-1, Product Type Classifications for Common Petroleum Vessel Commodities

10. Fax from Julie Tucker of Radian Corporation, Spatial Allocation of Waterways Shared by New York and New Jersey, November 13, 1992

11. Memorandum from Whitney Gadsby of the State of Delaware, Department of Natural Resources & Environmental Control, Division of Air & Waste Management, October 9, 1992

Area Sources Calculation Methodology Sheets for the 2017 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 2017 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 2017 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 2017 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.

Landfills
SCC: 2620030000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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, 12]

1. Required Reporting
2. Guidelines for using assumptions with landfill data
3. Regression model
4. Population-based waste generation factor

The regression model is selected because it is considered more accurate than the population-based waste generation factor. Emissions from landfills are calculated using landfill specific estimated emissions.

The USEPA Landfil2 and the updated Landgems 3.02 models were both used to calculate estimated emissions in tons/yr out to 2017. Originally the USEPA Landfil2 model was applied to calculate emissions for 373 landfills. The Landgems 3.02 model was applied to the 17 major municipal solid waste landfills to determine their actual emissions with this updated model. In addition, a sensitivity analysis was conducted to compare results between the two models. This sensitivity analysis determined that the updated Landgems 3.02 model increased emissions by approximately 8.95 percent. Accordingly a scaled factor was applied to the balance of the landfill emissions by this amount to approximate application of the updated Landgems 3.02 model to the rest of the landfills.

Required Input Parameters:
The following input data is required to calculate emissions for this source category:
1. Year the landfill was opened [2,3,4]
2. Year landfill was or will be closed [2,3,4]
3. The total capacity of the landfill [2,3,4,12]
4. Type of wastes in the landfill [2,3,4]
5. Nonmethane organic compounds concentration (NMOC) [5,6, 11]
6. Methane generation rate constant (k) [5,6,11]
7. Potential methane generation capacity (L_o) [5,6,11]
8. Discounted non-reactive VOC emissions from total NMHC landfill emissions [5,6]

The following additional data is required to calculate emissions for this source category:
9. Weekly activity, WAF=7 days/week
10. Seasonal adjustment factor, SAF=1 [6a]

Process:
The following equations are used to calculate emissions for this source category:

Seasonal emissions in tons/day were calculated as follows:

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

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

Assumptions:
1. The 1993 annual operating tonnage (tons) is assumed to be representative of all previous years of landfill operations.

2. The permit issuance date was assumed to be the date of opening.
3. An average lifespan of 20 years will be used if no opening date data is available. [8,9]
4. NMOC is assumed to be 2,400 ppmv as hexane if the landfill received large amounts of industrial wastes. Otherwise NMOC is 600 ppmv as hexane. [5,6,11,12]
5. k is assumed to be 0.04/yr because New Jersey has normal to above average precipitation [5,6,111,12]
6. L_o is assumed to be 100 m^3/ug [5,6, 11, 12]
7. Assume that active VOC emissions represent only 39 percent (%) of the total NMHC emissions from municipal waste landfills and 85 percent (%) of all NMHC emissions from industrial or hazardous waste landfills which accepted liquid solvents. [5,6]
8. Assume that landfill gas consists of 50% by volume CO_2 and 50% by volume CH_4.[5,6, 11, 12]
9. Assume that the landfills which accepted significant quantities of liquid solvents are included in the NJDEP document "Publicly Funded Cleanup Site Status Report" or indicated to have done so by phone survey conducted by NJDEP. Otherwise all other landfills are considered to not have accepted significant quantities of liquid solvents.[4,7]
10. Assume the default density factors of 20,000 tons/acre or 1160 pounds per cubic yards if only landfill surface area can be determined. [8,9,12]
11. Assume that the average annual acceptance rate in megagrams per year represents the total capacity of the landfill divided by the number of years the landfill operated.

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 8, N.J.A.C. 7:27-8, Permits and Certificates for Minor Facilities, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. [10] If so the Landfill 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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Annual Operating Statements for a Solid Waste Facility, Bureau of Registration, New Jersey Department of Environmental Protection

3. Landfill Inventory, Bureau of Landfill Engineering, New Jersey Department of Environmental Protection and Energy

4. Tabulation of major solid waste landfill design parameters obtained from phone survey and information from annual operating statements and Landfill inventory, 1997

5. Landfill Air Emissions Estimation Model User's Manual, Control Technology Center, Air and Energy Engineering Research Laboratory, Office of Research and Development, United States Environmental Protection Agency, Research Triangle Park, NC, 1997

6. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition,, Section 2.4, January 1997, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

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

7. Revision to the New Jersey 15 Percent Rate of Progress Plan, Appendix II:Landfill Emission Inventory Updates, February 8, 1999, The State of New Jersey, Department of Environmental Protection

8. Memorandum from Titus Magnanao, Bureau of Landfill Engineering, New Jersey, Department of Environmental Protection and Energy, June 29, 1992

9. Update to Bureau of Landfill Engineering Memorandum

10. NJ Point Source Emission Inventory for 2014, New Jersey Department of Environmental Protection

11. Landgems 3.02 Model, USEPA, May 2005

12. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 15 - Landfills, 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, January 2001

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Industrial Treatment Works (ITWS)
SCC: 2630010000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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. Using the EPA Surface Impoundment Modeling System (SIMS)
3. Using the EPA default emission factor

The SIMS model is selected because 1) the input parameters are readily available and 2) the SIMS model is considered more accurate than the EPA default emission factor.

Emissions from industrial treatment works are calculated using ITWS specific estimated emissions.

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

1. Wastewater flowrates for each facility, FLOW (meters^3/second) [2]
2. Type of industrial process at each facility [2,3]
3. ITW classification [2,4]
4. Surface area of the impoundment (see assumption 2 below)
5. Water depth of the impoundment (see assumption 2 below)
6. Industrial pollutants entering the ITW [2]

The following additional data is required to calculate emissions for this source category:

7. Weekly activity, WAF=7 days/week
8. Seasonal adjustment factor, SAF=1
9. Growth factors [4a, 4b]

	1996-1999	1999-2002	2002-2007	2007-2011
Growth factors, Atlantic City Air Quality Control Region	1.0377	1.055	1.0322	1.0154
Growth factors, Northern New Jersey Air Quality Control Region	1.027	1.0472	1.0322	1.0154
Growth factors, Southern New Jersey Air Quality Control Region	1.0236	1.0434	1.0322	1.0154

	2011-2014	2014-2017
Growth factors, Atlantic City Air Quality Control Region	0.9938	1.0030
Growth factors, Northern New Jersey Air Quality Control Region	0.9938	1.0030
Growth factors, Southern New Jersey Air Quality Control Region	0.9938	1.0030

Process:

The following equations are used to calculate emissions for this source category:

The USEPA SIMS model was used to calculate estimated 1996 emissions in tons/yr. The SIMS model uses Henry's Law in determining volatilization of the influent. [3] The emissions were then grown to 2002 as follows:

= (1996 estimated emissions) * (county growth factors 1996-1999)* (county growth factors 1999-2002)* (county growth factors 2002-2007)*(county growth factors 2007-2011)*(county growth factors 2011-2014)

Seasonal emissions in tons/day were calculated as follows:

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

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

Assumptions:
1. All ITWS are classified as either mechanically aerated with no biodegradation or mechanically aerated, activated sludge. This was dependent of the flowrate. If the flowrate was greater than 5 million gallons per day, the ITW was classified as mechanically aerated and activated sludge. If the flowrate was less than or equal to 5 million gallons per day, the ITW was classified as mechanically aerated with no biodegradation. [5,6,7]
2. An educated guess was used to determine the initial surface area of the impoundment. This figure was then adjusted in order to obtain a reasonable depth of 2-5 meters.
3. Assumed industrial wastewater factor of 100%

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 8, N.J.A.C. 7:27-8, Permits and Certificates for Minor Facilities, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. [8] If so the ITW 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

References:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. New Jersey Pollution Discharge Elimination System, Bureau of Water Resources, New Jersey Department of Environmental Protection and Energy, Trenton, NJ

3. Background Document for the Surface Impoundment Modeling System (SIMS) Version 2.0", United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

4. Memorandum from RADIAN Corp to SIP Inventory Preparers and EPA regions concerning Inventory Guidance and Evaluation Section, April 24, 1992

4a. The State of New Jersey Department of Environmental Protection, State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard (NAAQS) New Jersey 1996 Actual Emission Inventory and Rate of Progress (ROP) Plans for 2002, 2005 and 2007, Appendix II, March 31, 2001

4b. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

5. Telephone conversation with Lucy Adams, Radian Corporation, Research Triangle Park, 1992

6. Telephone conversation with Joe Wang, Water Technical Programs, NJDEP, 1992

7. Memorandum to File concerning conversation with Chris of Bureau of Construction Permits

8. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Public Owned Treatment Works (POTWS)
SCC: 2630020000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC) 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. USEPA 2017 National Emissions Inventory Calculations

Required Input Parameters:

The calculations for estimating the emissions from POTWs involve multiplying the wastewater flow rate by emissions factors for VOCs and NH_3.

The activity data for this source category is the wastewater flow rate. The EPA Clean Watersheds Needs Survey provides flow rate by facility and estimates the national POTW flow rate in 2012 for all facilities as 32,822 million gallons per day (MMGD). To estimate flow rates in 2017, facility-level daily flow rates in 2012 are multiplied by the ratio of 2017 to 2012 population in the county where the facility resides. County-level annual 2017 wastewater flow rates are calculated by summing the daily flow rates for all POTWs within the county and multiplying by 365 days in a year.

Process:

Emissions are estimated by multiplying an emissions factor by the county flow rate. A conversion factor was used to convert pounds to tons.

$$Ep,c,2017 = FRc,2017 \times EFp \times \frac{1 \text{ ton}}{2{,}000 \text{ lbs}}$$

Where:
Ep,c,2017 = Nonpoint emissions in 2017 of pollutant *p* in county *c*, in tons
$FRc,2017$ = Flow rate in 2017 in county *c*, in MMGY
EFp = Emissions factor for pollutant *p*, in lbs. per MMGAL

Control Measures:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 8, N.J.A.C. 7:27-8, Permits and Certificates for Minor Facilities, New Jersey State Department of Environmental Protection

Double Counting:
Emissions for this source category have also been reported in the point source inventory. [2] If so the POTW was deleted from the area source inventory prior to calculation of area source emissions.NJDEP submitted point source data to the USEPA for subtraction via the USEPA Public Owned Treatment Works (POTW) Input Templates the on July 22, 2019.[3]

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

References:

1. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020.

2. NJ Point Source Emission Inventory for 2017, New Jersey Department of Environmental Protection

3. USEPA Public Owned Treatment Works (POTW) Input Templates, submitted by NJDEP to USEPA on July 22, 2019.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Leaking Underground Storage Tanks
SCC: 2660000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). 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. Apply a default emission factor to the total number of underground storage tank remediations which involved soil removal.
2. Survey all the underground storage tank remediations which involved soil removal to determine the quantity of soil removed and the gasoline concentration in the soil.

Application of a default value to the total number of leaking underground storage tank remediations (LUST) which involved soil removal was used because that information is more readily available.

Emissions from LUSTs are calculated using estimated number of LUST remediations which involve soil, allocated to the county level using vehicle miles travelled.

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

1. Annual number of LUST remediations which involve soil, USTOT [2]
   USTOT = 1018
2. Emission factors, EF (lbs/remediation-day) [1]
   VOC = 28 lbs VOC/remediation-day
3. Remediation-day, RD = 1.5 [3]
4. State and County Daily Vehicle Miles Travelled, SVMT, CVMT [4]
5. Weekly activity, WAF=7 days/week
6. Seasonal adjustment factor, SAF=1

Process:
The following equations were used to calculate the 2011 emissions without control for this source category:

Ep_a = USTOT*EF*RD*((CVMT)/(SVMT))/CF

Seasonal emissions in tons/day were calculated as follows:

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. The default emission rate represents events with 50 yd^3 of soil removed and 10,000 ppmw of total petroleum hydrocarbons (TPH) or 500 yd^3 of soil removed and 1000 ppmw of TPH. [1]
2. The total amount of VOC found in contaminated soil evolves during excavation activities. [3]
3. The average excavation activities will be completed within 1.5 days. [3]
4. Assume weekly activity factor of 7 days per week
5. Assume 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.

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

References:

1. Memorandum from RADIAN Corp to SIP Inventory Preparers and EPA regions concerning Inventory Guidance and Evaluation Section, May 6, 1992.

2. Confirmed Releases from Federally Regulated Underground Storage Tanks (UST), New Jersey Department of Environmental Protection, Accessed from NJDEP Data Miner, May 31, 2019

3. Memo to File on telephone conversation with Joseph Miller of the Bureau of Leaking Underground Storage Tanks (LUST), May 28, 1999.

4. New Jersey's Roadway Mileage and Daily VMT by Functional Classification Distributed by County, 2017, New Jersey Department of Transportation, http://www.state.nj.us/transportation/refdata/roadway/vmt.shtm.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Agricultural Field Burning, Infested (Reported to EPA Category Agricultural Burning - Unspecified Method and Crop)
SCC: 2801500000

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, 8c]

VOC=Non Methane Hydrocarbons (NMHC):	18
NOx:	5 (add footnote EPA 2014)
CO:	117
PM10:	21
PM2.5:	21
SO2:	2 (add footnote EPA 2014)
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

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. NJDEP Division A Permit Log for 2017 by County, November 2018
3. NJDEP Division B Permit Log for 2017 by Township, November 2018
4. NJDEP Division C Permit Log for 2017 by Section, November 2018

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.

8c. 2014 National Emissions Inventory, Version 2 Technical Support Document, June 2018, 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.

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 2017 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, 8c]

VOC=Non Methane Hydrocarbons (NMHC):	9
CO:	85
NOx:	5
PM10:	15
PM2.5:	15
SO2:	2
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

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. NJDEP Division A Permit Log for 2017 by County, November 2018

3. NJDEP Division B Permit Log for 2017 by Township, November 2018

4. NJDEP Division C Permit Log for 2017 by Section, November 2018

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.

8c. 2014 National Emissions Inventory, Version 2 Technical Support Document, June 2018, 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.

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

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, 8c]

VOC=Non Methane Hydrocarbons (NMHC):	8
CO:	52
NOx:	5
PM10:	6
PM2.5:	6
SO2:	2
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

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. NJDEP Division A Permit Log for 2017 by County, August 2015

3. NJDEP Division B Permit Log for 2017 by Township, August 2015

4. NJDEP Division C Permit Log for 2017 by Section, August 2015

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.

8c. 2014 National Emissions Inventory, Version 2 Technical Support Document, June 2018, 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.

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 2017 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]

b 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, 8c]

VOC=Non Methane Hydrocarbons (NMHC):	19
CO:	140
NOx:	2
PM10:	17
PM2.5:	17
SO2:	2
NH3:	1.3

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

Summer Season Adjustment Factor	0.7
Fall Season Adjustment Factor	0.0
Winter Season Adjustment Factor	2.6
Spring Season Adjustment Factor	0.7

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

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. NJDEP Division A Permit Log for 2017 by County, November 2018

3. NJDEP Division B Permit Log for 2017 by Township, November 2018

4. NJDEP Division C Permit Log for 2017 by Section, November 2018

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.

8c. 2014 National Emissions Inventory, Version 2 Technical Support Document, June 2018, 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.

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 2017 Periodic Emission Inventory

Commercial Cooking: Conveyorized Charbroiling, Underfired Charbroiling, Deep Fat Frying, Flat Griddle Frying, Clamshell Griddle Frying
SCC: 2302002100, 2302002200, 2302003000, 2302003100, 2302003200

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 methodology was used this source category: [1]

1. USEPA 2017 National Emissions Inventory Calculations

Emissions from commercial cooking were calculated by the USEPA for the 2017 National Emissions Inventory.

Required Input Parameters:

The activity data for this source category is the amount of meat and potatoes cooked on each type of cooking device in each county. These amounts are estimated based on the number of restaurants in a county that use commercial cooking equipment, the percent of restaurants with each type of cooking device, the average number of cooking devices per restaurant, and the average amount of meat or potatoes cooked on each device.

Emissions factors for CAPs from commercial cooking are reported in Table 6 in the Commercial Cooking NEMO FINAL document on the 2017 NEI Supplemental data FTP site.[2]

Process:

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

To calculate emissions of VOC, CO, PM10 and PM2.5, the total amount of meat and potatoes cooked on each cooking device in each county is multiplied by the appropriate emissions factor. The amount of french fries cooked is converted from pounds to tons, and all emissions are converted to tons.

$$Ep,i,d,c = Mi,d,c \times EFp,i,d \div 2000\ lbs\ per\ ton$$

$$Ep,f,d,c = Fall,c \times EFp,f,d \div 2000\ lbs\ per\ ton$$

Where:
Ep,i,d,c = Annual emissions of pollutant p from cooking meat type i on device d in county c, in tons
Ep,f,d,c = Annual emissions of pollutant p from cooking french fries, f, on device d in county c, in tons
Mi,d,c = Total amount of meat type i cooked on device d in county c, in tons
Fall,c = Total amount of french fries cooked in county c, in tons
EFp,i,d = Emissions factor for pollutant p, in lbs. of pollutant per ton of meat type i cooked on device d
EFp,f,d = Emissions factor for pollutant p, in lbs. of pollutant per ton of french fries cooked on device d

Additional details are included In the USEPA 2017 NEI Technical Support Document.[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
PM10	tons/yr	tons/day	tons/day
PM2.5	tons/yr	tons/day	tons/day
CO	tons/yr	tons/day	tons/day

References:

1. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020.

2. USEPA Commercial Cooking Nonpoint Emissions Methodology and Operator Instructions (NEMO) Final (4-2 Update) Accessed from: ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonpoint/.

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 2013, 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:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Fire in New Jersey 2015, June 2016, New Jersey Division of Fire Safety

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 2013, 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:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. Fire in New Jersey 2015, June 2016, New Jersey Division of Fire Safety

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

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

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 2017, 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:

1a. 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

1b. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, July 2017 U.S. Environmental Protection Agency, office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park. NC, EPA-454/B-17-003

2. State Tobacco Activities Tracking and Evaluation (STATE) System. Cigarette Sales New Jersey 2017. Centers for Disease Control and Prevention (CDC). Accessed from http://apps.nccd.cdc.gov/StateSystem.

3. Estimate of 2017 Total Resident Population by County, NJDOT, December 2018.

Paved Roads
SCC: 2294000000

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA 2017 National Emissions Inventory Calculations/State specific VMT [1,]

The paved road dust category includes emissions of fugitive dust particulate matter entrained by vehicular travel on paved roads.

Required Input Parameters:

NJDEP submitted 2017 VMT inputs to USEPA via the USEPA Road Dust Input Template on March 4, 2019.[2]

Process:
The following equations are used by the USEPA to calculate the emissions without control for this source category. [1,]

Uncontrolled paved road emissions were calculated at the county level by roadway type for the year 2017. This was done by multiplying the county/roadway class paved road vehicle miles traveled (VMT) by the appropriate paved road emission factor.

Re-entrained road dust emissions for paved roads were estimated using paved road VMT and the emission factor equation from AP-42:

$E = [k \times (sL)0.91 \times (W)1.02]$

Where:
E = paved road dust emission factor (g/VMT)
k = particle size multiplier (g/VMT)
sL = road surface silt loading (g/ m2) (dimensionless in eq.)
W = average weight (tons) of all vehicles traveling the road (dimensionless in eq.)

The particle size multipliers for both PM10-PRI/-FIL and PM25-PRI/-FIL for paved roads came from AP-42. Paved road silt loadings were assigned to each of the fourteen functional roadway classes (seven urban and seven rural) based on the average annual daily traffic volume (ADTV) of each functional system by county. The silt loading values per average daily traffic volume come from the ubiquitous baseline values from Section 13.2.1 of AP-42.

Average daily traffic volume (ADTV) was calculated by dividing an estimate of VMT by functional road length and then by 365. State FHWA road length by functional road type data was broken down to the county level by multiplying by the ratio of county VMT to state VMT for each FHWA road type.

Additional details are included In the USEPA 2017 NEI Technical Support Document.[1]

Assumptions:
1. Assume a weekly activity of 7 days

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

References

1. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020.

2. USEPA Road Dust Input Template, submitted by NJDEP to USEPA on March 4, 2019.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Unpaved Roads
SCC: 2296000000

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA 2017 National Emissions Inventory Calculations [1, 2]

This source category provides estimates of the entrained geologic particulate matter emissions that result from vehicular travel over non-agricultural unpaved roads. The emissions result from the mechanical disturbance of the roadway and the vehicle generated air turbulence effects.

Required Input Parameters:

NJDEP submitted 2017 VMT inputs to USEPA via the USEPA Road Dust Input Template on March 4, 2019.[2]

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

Re-entrained road dust emissions for unpaved roads were estimated using paved road VMT and the emission factor equation from AP-42:

$E = [k \times (s/12)1 \times (SPD/30)0.5] / (M/0.5)0.2 – C$

Where k and C are empirical constants given in Table 4-96, with:
E = unpaved road dust emission factor (lb/VMT)
k = particle size multiplier (lb/VMT)
s = surface material silt content (%)
SPD = mean vehicle speed (mph)
M = surface material moisture content (%)
C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (lb/VMT)

Values used for the particle size multiplier and the 1980's vehicle fleet exhaust, brake wear, and tire wear are provided in Table 4-96, and come from AP-42 defaults.

Average State-level unpaved road silt content values, developed as part of the 1985 NAPAP Inventory, were obtained from the Illinois State Water Survey. The silt content value used for New Jersey was:

Surface Material Silt Content: 3.9%

Additional details are included In the USEPA 2017 NEI Technical Support Document.[1]

Assumptions:
1. Assume a weekly activity of 7 days

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

References

1. United States Environmental Protection Agency (USEPA), “2017 National Emissions Inventory Complete Release, Technical Support Document”, April 2020.

2. USEPA Road Dust Input Template, submitted by NJDEP to USEPA on March 4, 2019.

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Construction - Residential
SCC: 2311010000

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA Methodology [1]

Residential building construction includes the construction of single-family units, two family units, and apartments buildings. The emissions result predominantly from site preparation work which may include scraping, grading, loading, digging, compacting, light-duty vehicle travel, and other operations.

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

1. The county-level number of housing permits issued for single-family units, two-family units, and apartment buildings, $B_{p\text{-single}}$, $B_{p\text{-two}}$, $B_{p\text{-apartment}}$ [2]

2. The regional-level percentage of new single-family units that do not have basements, %NOBM = 30% [3]
3. The regional-level percentage of new single-family units that have basements, %BM = 70% [3]

4. Building-to-acre conversion factor [1]
   - f_{single} = 1/4 acre/building
   - f_{two} = 1/3 acre/building
   - $f_{apartment}$ = 1/2 acre/building

5. Emission factors, EF [1]

$PM10_{single\ and\ two,\ no\ basement}$ =	0.032	tons/acre-month
$PM10_{single\ and\ two,\ basement}$ =	0.011	tons/acre-month
$PM10_{apartment}$ =	0.11	tons/acre-month
$PM2.5_{single\ and\ two,\ no\ basement}$ = PM10*0.2=	0.0064	tons/acre-month
$PM2.5_{single\ and\ two,\ basement}$ = PM10*0.2=	0.0022	tons/acre-month
$PM2.5_{apartment}$ = PM10*0.2=	0.022	tons/acre-month
$PM10_{dirt}$ =	0.058	tons/1,000 cubic yards dirt moved
$PM2.5_{dirt}$ = PM10*0.2 =	0.0118	tons/1,000 cubic yards dirt moved

6. Duration of construction activity [1]
   - $m_{single\ and\ two}$ = 6 months
   - $m_{apartment}$ = 12 months

7. Quantity of dirt moved during single-family unit basement construction, d = 652 cubic yards/building [1]

8. Precipitation-Evaporation Value (PE) = 124 [4]

4. Silt Content percentage (s) = 18% [5]

6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factors, SAF

Summer Season Adjustment Factor	1.45
Fall Season Adjustment Factor	0.86
Winter Season Adjustment Factor	0.62
Spring Season Adjustment Factor	0.86

SAF based on activity and precipitation variations. Activity variations for summer, fall, winter and spring are as follows: 1.45, 0.86, 0.62 and 0.86 [6]. Precipitation variations based on number of days with at least 0.01 inches of precipitation and the precipitation control portion of Equation 2 of AP-42 Section 13.2.2 [7]. This equation = ((total days - p) / total days), where the total days is equal to the number of days for each season and p is the number of days with at least 0.01 inches of precipitation. [8] The precipitation variations for summer, fall, winter and spring are as follows: 0.95, 1.11, 1.03 and 0.92. The total SAF is the product of the activity SAF and the precipitation SAF (summer SAF = 1.45 * 0.95; fall SAF = 0.86 *1.11; winter SAF = 0.62 * 1.03; and spring SAF = 0.86 *0.92).

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

Single and two family, no basement, (tons/yr) for an annual emission of pollutant by county:

$$Ep_{\text{single and two, no basement}} = [((B_{p\text{-single}} * f + B_{p\text{-two}} * f) * \%NOBM) * EF * m * (24/PE) * (s/9)] * DAF$$

Single and two family, with basement, (tons/yr) for an annual emission of pollutant by county:

$$Ep_{\text{single and two, basement}} = [(((B_{p\text{-single}} * f + B_{p\text{-two}} * f) * \%BM) * EF * m * (24/PE) * (s/9)) + ((B_{p\text{-single}} + B_{p\text{-two}}) * \%BM) * EFdirt * d/1000)] * DAF$$

Apartment, (tons/yr) for an annual emission of pollutant by county:

$$Ep_{\text{apartment}} = [((B_{p\text{-apartment}} * f) * EF * m * (24/PE) * (s/9)] * DAF$$

$$Ep_a = [Ep_{\text{single and two, no basement}} + Ep_{\text{single and two, basement}} + Ep_{\text{apartment}}] * DAF$$

$$Ep_s = [Ep_a * SAF/AADF] * DAF$$
$$Ep_w = [Ep_a * SAF/AADF] * DAF$$

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

DAF = Dust adjustment factor, see “Fugitive Dust” discussion in 2017 Periodic Emission Inventory Report.

Assumptions:
1. Assume a weekly activity of 7 days

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

References

1. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Section 4.8.1.7.2.2. March 2001.

2. Bureau of the Census. Building Permits website - http://censtats.census.gov/bldg/bldgprmt.shtml. Annual data for New Jersey by county.

3. Bureau of the Census. Characteristics of New Housing website
- http://www.census.gov/const/www/charindex.html Characteristics of New One-Family Houses Completed, Type of Foundation history table. Annual data for the Northeast Region.

4. Estimating Particulate Matter Emissions From Construction Operations, Final Report, Midwest Research Institute, for Eastern Research Group, for USEPA, September 30, 1999.

5. Summary of Approaches Available for Fugitive Dust Sources Technical Memorandum, E.H. Pechan & Associates, for MARAMA, May 21, 2004.

6. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

7. 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, Section 13.2.2, Unpaved Roads, December 2003.

8. Local Climatological Data 2017, National Climatic Data Center, Newark and Atlantic City, NJ

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Construction - Commercial
SCC: 2311020000

Note: Commercial and Institutional Construction emissions are added together as one SCC (2311020000) in the 2017 Area Source Inventory

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA Methodology/State specific construction square footage [1]

Commercial construction includes the construction of Assembly buildings, education buildings, factories, office buildings, storage facilities, hazardous uses, hotels, motels and guest houses, retail buildings, signs, fences. The emissions result predominantly from site preparation work which may include scraping, grading, loading, digging, compacting, light-duty vehicle travel, and other operations.

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

1. Construction activity from permits, new and additions, by construction type and county (square feet) CON [2]

   Commercial construction includes the construction of Assembly buildings, education buildings, factories, office buildings, storage facilities, hazardous uses, hotels, motels and guest houses, retail buildings, signs, fences.

2. Project Duration, m: [1]

Signs, fences, misc	1	months
Retail	6	months
Other	12	months

3. Precipitation-Evaporation Value (PE) = 124 [3]

4. Silt Content percentage (s) = 18% [4]

5. Emission factors, EF (tons/acres/month) [1]

PM10 =	0.19
PM2.5 = PM10*0.2 =	0.038

6. Weekly activity, WAF=7 days/week
7. Seasonal adjustment factors, SAF

Summer Season Adjustment Factor	1.70
Fall Season Adjustment Factor	0.96
Winter Season Adjustment Factor	0.49
Spring Season Adjustment Factor	0.96

SAF based on activity and precipitation variations. Activitiy variations for summer, fall, winter and spring are as follows: 1.70, 0.96, 0.49 and 0.96 [5]. Precipitation variations based on number of days with at least 0.01 inches of precipitation and the precipitation control portion of Equation 2 of AP-42 Section 13.2.2 [6]. This equation = ((total days - p) / total days), where the total days is equal to the number of days for each season and p is the number of days with at least 0.01 inches of precipitation. [7] The precipitation variations for summer, fall, winter and spring are as follows: 1.11, 1.04, 0.82 and 1.02. The total SAF is the product of the activity SAF and the precipitation SAF (summer SAF = 1.70 * 1.11; fall SAF = 0.96 *1.04; winter SAF = 0.49 * 0.82; and spring SAF = 0.96 *1.02).

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

$Ep_a = [CON/CF * m * EF * (24/PE) *(s/9)] * DAF$

$Ep_s = [Ep_a*SAF/AADF] * DAF$
$Ep_w = [Ep_a*SAF/AADF] * DAF$

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 = 43,560 sf/acre
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

DAF = Dust adjustment factor, see "Fugitive Dust" discussion in 2017 Periodic Emission Inventory Report.

Assumptions:
1. Assume a weekly activity of 7 days
2. Assume a project duration of one month for signs and fences, 6 months for retail facilities and 12 months for all other.

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

References

1. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Section 4.8.1.7.2.2. March 2001.

2. 2017 Construction activity from permits, new and additions, by construction type and county (square feet), New Jersey Department of Community Affairs.

3. Estimating Particulate Matter Emissions From Construction Operations, Final Report, Midwest Research Institute, for Eastern Research Group, for USEPA, September 30, 1999.

4. Summary of Approaches Available for Fugitive Dust Sources Technical Memorandum, E.H. Pechan & Associates, for MARAMA, May 21, 2004.

5. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

6. 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, Section 13.2.2, Unpaved Roads, December 2003.

7. Local Climatological Data 2014, National Climatic Data Center, Newark and Atlantic City, NJ

Construction - Institutional
SCC: 2311020000

Note: Commercial and Institutional Construction emissions are added together as one SCC (2311020000) in the 2017 Area Source Inventory

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA Methodology [1]

Heavy miscellaneous construction includes consturction of private driveways and parking areas, bridges, tunnels and elevated highways, sewers, water mains, pipelines other than sewer and water, power plants, sewage treatment plants, water treatement plants and other. The emissions result predominantly from site preparation work which may include scraping, grading, loading, digging, compacting, light-duty vehicle travel, and other operations.

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

1. Value of Construction Work in New Jersey, $CON: [2]

	New $1000	Additions, alterations or reconstruction $1000	Total $
private driveways and parking areas	149,296	109,854	259,150,000
bridges and elevated highways	493,936	491,609	985,545,000
tunnels	D	220,456	220,456,000
sewers, water mains and related facilities	558,723	203,618	762,341,000
sewers, sewer lines, septic systems, and related facilities	283,060	111,388	394,448,000
water mains, storage, wells and related facilities	275,663	92,230	367,893,000
power and communication transmission lines, cables, towers, and related facilities	482,033	92,134	574,167,000
other	120,800	88,583	209,383,000
Total	**2,363,511**	**1,409,872**	**3,773,383,000**

Notes:
D: Withheld to avoid disclosing data for individual companies; data are included in higher level totals

2. County and state construction employment other than residential, commercial and roadway for NAICs 236210, 237110, 237120, 237130, 237310, 237990, CEMP, SEMP. [3]

3. Dollars-to-acres conversion factor, f = 1.6 acres/$1,000,000 [4]

4. Duration of construction activity, m = 12 months/year [1]

5. Precipitation-Evaporation Value (PE) = 124 [5]

6. Silt Content percentage (s) = 18% [4]

7. Emission factors, EF(tons/acre-month) [1]
   PM-10 = 0.19
   PM-2.5 = PM10*0.2= 0.038

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

Summer Season Adjustment Factor	1.70
Fall Season Adjustment Factor	0.96
Winter Season Adjustment Factor	0.49
Spring Season Adjustment Factor	0.96

SAF based on activity and precipitation variations. Activitiy variations for summer, fall, winter and spring are as follows: 1.70, 0.96, 0.49 and 0.96 [5]. Precipitation variations based on number of days with at least 0.01 inches of precipitation and the precipitation control portion of Equation 2 of AP-42 Section 13.2.2 [6]. This equation = ((total days - p) / total days), where the total days is equal to the number of days for each season and p is the number of days with at least 0.01 inches of precipitation. [7] The precipitation variations for summer, fall, winter and spring are as follows: 1.11, 1.04, 0.82 and 1.02. The total SAF is the product of the activity SAF and the precipitation SAF (summer SAF = 1.70 * 1.11; fall SAF = 0.96 *1.04; winter SAF = 0.49 * 0.82; and spring SAF = 0.96 *1.02).

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

$$Ep_a = [CON/\$1000000) * (CEMP/SEMP) * f * m * EF * (24/PE) * (s/9)] * DAF$$

$$Ep_s = [Ep_a * SAF/AADF] * DAF$$
$$Ep_w = [Ep_a * SAF/AADF] * DAF$$

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

DAF = Dust adjustment factor, see “Fugitive Dust” discussion in 2017 Periodic Emission Inventory Report.

Assumptions:
1. Assume a weekly activity of 7 days
2. Assume a project duration of 12 months.

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

References

1. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Section 4.8.1.7.2.2. March 2001.

2. New Jersey 2012 Economic Census, Construction, US Census Bureau, August 2016.

3. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

4. Summary of Approaches Available for Fugitive Dust Sources Technical Memorandum, E.H. Pechan & Associates, for MARAMA, May 21, 2004.

5. Estimating Particulate Matter Emissions From Construction Operations, Final Report, Midwest Research Institute, for Eastern Research Group, for USEPA, September 30, 1999.

6. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

7. 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, Section 13.2.2, Unpaved Roads, Revised November 2006.

8. Local Climatological Data 2014, National Climatic Data Center, Newark and Atlantic City, NJ

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Construction - Roadway
SCC: 2311030000

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA Methodology/State specific roadway mileage [1]

The road construction dust source category provides estimates of the fugitive dust particulate matter due to construction activities while building roads. The emissions result from site preparation work which may include scraping, grading, loading, digging, compacting, light-duty vehicle travel, and other operations.

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

1. New Jersey roadway mileage 2016 by county and roadway type, RM2016 [2]
2. New Jersey roadway mileage 2017 by county and roadway type, RM2017 [2]

3. Conversion of miles to acres for each road type using estimates of acres disturbed per mile (f): [1]

Interstate, urban and rural; Other arterial, urban, RC1 -	15.2 acres/mile
Other arterial, rural, RC2 -	12.7 acres/mile
Collectors, urban, RC3 -	9.8 acres/mile
Collectors, rural, RC4 -	7.9 acres/mile

4. Emission factors, EF (tons/acres/month) [1]
   PM-10 = 0.42
   PM-2.5 = 0.0840

5. Duration of construction activity m , = 12 months [1]

6. Precipitation-Evaporation Value (PE) = 124 [3]

7. Silt Content percentage (s) = 18% [4]

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

Summer Season Adjustment Factor	1.45
Fall Season Adjustment Factor	0.86
Winter Season Adjustment Factor	0.62
Spring Season Adjustment Factor	0.86

SAF based on activity and precipitation variations. Activitiy variations for summer, fall, winter and spring are as follows: 1.45, 0.86, 0.62 and 0.86 [5]. Precipitation variations based on number of days with at least 0.01 inches of precipitation and the precipitation control portion of Equation 2 of AP-42 Section 13.2.2 [6]. This equation = ((total days - p) / total days), where the total days is equal to the number of days for each season and p is the number of days with at least 0.01 inches of precipitation. [7] The precipitation variations for summer, fall, winter and spring are as follows: 0.95, 1.11, 1.03 and 0.92. The total SAF is the product of the activity SAF and the precipitation SAF (summer SAF = 1.45 * 0.95; fall SAF = 0.86 *1.11; winter SAF = 0.62 * 1.03; and spring SAF = 0.86 *0.92).

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

$$Ep_{RC} = [(RM2011-RM2010) * f * EF * m * (24/PE) * (s/9)] * DAF$$

Ep_a = [Ep_{RC1} + Ep_{RC2} + Ep_{RC3} + Ep_{RC4}] * DAF

Ep_s = [Ep_a*SAF/AADF] * DAF
Ep_w = [Ep_a*SAF/AADF] * DAF

Where:
Ep_{RC} = (tons/yr) for an annual emission of pollutant by roadway category and county
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

DAF = Dust adjustment factor, see "Fugitive Dust" discussion in 2017 Periodic Emission Inventory Report.

Assumptions:
1. Assume a weekly activity of 7 days

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

References

1. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Section 4.8.1.7.2.2. March 2001.

2. New Jersey's Roadway Mileage and Daily VMT by Functional Classification Distributed by County, 2016 and 2017, New Jersey Department of Transportation, http://www.state.nj.us/transportation/refdata/roadway/vmt.shtm.

3. Estimating Particulate Matter Emissions From Construction Operations, Final Report, Midwest Research Institute, for Eastern Research Group, for USEPA, September 30, 1999.

4. Summary of Approaches Available for Fugitive Dust Sources Technical Memorandum, E.H. Pechan & Associates, for MARAMA, May 21, 2004.

5. Seasonal and Monthly Activity Allocation Fractions for Nonroad Engine Emissions Modeling, EPA 420-P-02-010, Table 4, Mid-Atlantic Region.

6. 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, Section 13.2.2, Unpaved Roads, Revised November 2006.

7. Local Climatological Data 2017, National Climatic Data Center, Newark and Atlantic City, NJ

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Mining and Quarrying - Sand and Gravel – (Combined with SCC 2325020000 into 2325000000: Mining Stone, Sand and Gravel)
SCC: 2325030000

Note: *Emissions from SCC 2325020000 and SCC 2325030000 were added together and reported as one SCC (2325000000) in the 2017 Area Source Inventory.*

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA Methodology [1, 2]

Emissions for mining and quarrying for sand and gravel include: overburden removal, loading and unloading, and overburden replacement. According to the USEPA, "Transfer and conveyance operations, crushing and screening operations, storage and travel on haul roads are not included because these activities are the most likely to have some type of control implemented." [1] In addition, NJDEP has determined that the majority of these types of emissions are included in the point source inventory.

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

1. New Jersey statewide sand and gravel production 2013, SAND&GRAVEL [3]
   = 14,482 thousand metric tons*1000*1.1023113 = 15,963,672 tons

2. County and state sand and gravel mining employment for NAICS: 21232x, CEMP, SEMP. [4]

3. Moisture content %, M = 7.9% [2]

4. Emission Factors, EF lb/ton : [1, 2]

	TSP lb/ton (AP-42 Table 11.9-4**)**	**PM10 equation** (AP-42 Table 11.9-1)	**PM2.5 equation (**AP-42 Table 11.9-1**)**	**PM10 lb/ton**	**PM2.5 lb/ton**
Overburden removal, OB	0.058	PM10 = TSP * (bulldozing overburden scaling factor, 0.75)	PM2.5 = TSP * (bulldozing overburden scaling factor, 0.105)	0.0435	0.0061
Loading, L		PM10 = (0.119/(M)^0.9*)*0.75	PM2.5 = (1.16/(M^1.2*)*0.019	0.014	0.002
Unloading end dump, ULED	0.007	PM10 = TSP * (bulldozing overburden scaling factor, 0.75)	PM2.5 = TSP * (bulldozing overburden scaling factor, 0.105)	0.00525	0.0007
Unloading bottom dump, ULBD	0.066	PM10 = TSP * (bulldozing overburden scaling factor, 0.75)	PM2.5 = TSP * (bulldozing overburden scaling factor, 0.105)	0.0495	0.0069

5. Weekly activity, WAF=7 days/week
6. Seasonal adjustment factors, SAF

Summer Season Adjustment Factor	0.95
Fall Season Adjustment Factor	1.11
Winter Season Adjustment Factor	1.03
Spring Season Adjustment Factor	0.92

Seasonal production is assumed to be constant throughout the year. Factor based on number of days with at least 0.01 inches of precipitation and the precipitation control portion of Equation 2 of AP-42 Section 13.2.2. [5] This equation = ((total days - p) / total days), where the total days is equal to the number of days during each season and p is the number of days with at least 0.01 inches of precipitation. [6] The precipitation variations for summer, fall, winter and spring are as follows: 0.95, 1.11, 1.03 and 0.92.

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

Equation 4.8-19: [1]

$$Epa = [SAND\&GRAVEL * (CEMP/SEMP) * (OB + L + 0.5*ULED + ULBD)/CF] * DAF$$

$$Ep_s = [Ep_a*SAF/AADF] * DAF$$
$$Ep_w = [Ep_a*SAF/AADF] * DAF$$

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

DAF = Dust adjustment factor, see “Fugitive Dust” discussion in 2017 Periodic Emission Inventory Report.

Assumptions:
1. Assume a weekly activity of 7 days
2. Blasting does not occur for sand and gravel mining based on conversations with William Layton of the New Jersey Concrete & Aggregate Association.

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

Double Counting:
Emissions for this source category regarding overburden removal, drilling and blasting, loading and unloading, and overburden replacement, have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required. Transfer and conveyance operations, crushing and screening operations, storage and travel on haul roads are included in the point source inventory.

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

Pollutant	Annual	Summer day	Winter day
Fugitive Dust PM10	tons/yr	tons/day	tons/day
Fugitive Dust PM2.5	tons/yr	tons/day	tons/day

References

1. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Section 4.8.1.7.2.2. March 2001.

2. 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, Section 11.9, Western Surface Coal Mining October 1998.

3. U.S. Geological Survey Minerals Yearbook, 2013.

4. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

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, Section 13.2.2, Unpaved Roads, December 2003.

6. Local Climatological Data 2017, National Climatic Data Center, Newark and Atlantic City, NJ

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Mining and Quarrying - Stone (Combined with SCC 2325030000 into 2325000000: Mining Stone, Sand and Gravel)

SCC: 2325020000

Note: *Emissions from SCC 2325020000 and SCC 2325030000 were added together and reported as one SCC (2325000000) in the 2017 Area Source Inventory.*

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA Methodology [1, 2]

Emissions for mining and quarrying of stone include: overburden removal, drilling and blasting, loading and unloading, and overburden replacement. According to the USEPA, "Transfer and conveyance operations, crushing and screening operations, storage and travel on haul roads are not included because these activities are the most likely to have some type of control implemented." [1] In addition, NJDEP has determined that the majority of these types of emissions are included in the point source inventory.

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

1. New Jersey statewide stone production 2013, STONE [3]
   = 17,200 thousand metric tons*1000*1.1023113 = 18,959,754 tons

2. County and state stone mining employment for NAICS: 21231x, 213115, CEMP, SEMP. [4]

3. Moisture content %, M = 7.9% [2]

4. Area of blast, AB = 16,000 sf [2]
5. Depth of blast. DB = 5 ft
6. # blasts = (STONE * 2000lb/ton) / AB * DB * 163lb/cf = 4700 blasts

7. Emission Factors, EF lb/ton : [1, 2]

	TSP lb/ton (AP-42 Table 11.9-4**)**	**PM10 equation** (AP-42 Table 11.9-1)	**PM2.5 equation** (AP-42 Table 11.9-1**)**	**PM10 lb/ton**	**PM2.5 lb/ton**
Overburden removal, OB	0.058	PM10 = TSP * (bulldozing overburden scaling factor, 0.75)	PM2.5 = TSP * (bulldozing overburden scaling factor, 0.105)	0.0435	0.0061
Blasting, B		PM10 = (0.000014 * (AB)^1.5) * 0.52 * #blasts	PM2.5 = (0.000014 * (AB)^1.5) * 0.03 * #blasts	0.020	0.001
Loading, L		PM10 = (0.119/(M)^0.9*)*0.75	PM2.5 = (1.16/(M^1.2*)*0.019	0.014	0.002
Unloading end dump, ULED	0.007	PM10 = TSP * (bulldozing overburden scaling factor, 0.75)	PM2.5 = TSP * (bulldozing overburden scaling factor, 0.105)	0.00525	0.0007
Unloading bottom dump, ULBD	0.066	PM10 = TSP * (bulldozing overburden scaling factor, 0.75)	PM2.5 = TSP * (bulldozing overburden scaling factor, 0.105)	0.0495	0.0069

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

Summer Season Adjustment Factor	0.95
Fall Season Adjustment Factor	1.11
Winter Season Adjustment Factor	1.03
Spring Season Adjustment Factor	0.92

Seasonal production is assumed to be constant throughout the year. Factor based on number of days with at least 0.01 inches of precipitation and the precipitation control portion of Equation 2 of AP-42 Section 13.2.2. [5] This equation = ((total days - p) / total days), where the total days is equal to the number of days during each season and p is the number of days with at least 0.01 inches of precipitation. [6] The precipitation variations for summer, fall, winter and spring are as follows: 0.95, 1.11, 1.03 and 0.92.

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

Equation 4.8-19: [1]

$$Epa = [STONE * (CEMP/SEMP) * (OB + B + L + 0.5*ULED + ULBD)/CF] * DAF$$

$$Ep_s = [Ep_a*SAF/AADF] * DAF$$
$$Ep_w = [Ep_a*SAF/AADF] * DAF$$

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

DAF = Dust adjustment factor, see “Fugitive Dust” discussion in 2017 Periodic Emission Inventory Report.

Assumptions:
1. Assume a weekly activity of 7 days
2. Assume depth of blast equal to 5 feet based on conversations with William Layton of the New Jersey Concrete & Aggregate Association and an area of blast based on AP-42. The size and # of blasts is conservatively overestimated.

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

Double Counting:
Emissions for this source category regarding overburden removal, drilling and blasting, loading and unloading, and overburden replacement, have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required. Transfer and conveyance operations, crushing and screening operations, storage and travel on haul roads are included in the point source inventory.

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

Pollutant	Annual	Summer day	Winter day
Fugitive Dust PM10	tons/yr	tons/day	tons/day
Fugitive Dust PM2.5	tons/yr	tons/day	tons/day

References

1. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Section 4.8.1.7.2.2. March 2001.

2. 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, Section 11.9, Western Surface Coal Mining October 1998.

3. U.S. Geological Survey Minerals Yearbook, 2013.

4. Total 2017 Employment by 6 digit NAICS code and by county, New Jersey Department of Labor.

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, Section 13.2.2, Unpaved Roads, December 2003.

6. Local Climatological Data 2017, National Climatic Data Center, Newark and Atlantic City, NJ

Area Sources Calculation Methodology Sheets for the 2017 Periodic Emission Inventory

Agricultural Tilling
SCC: 2801000003

The following describes the emission calculation methodology for this source category for the following pollutants: fugitive dust particulate matter less than or equal to 10 microns (PM10) and fugitive dust 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 was used for this source category:

1. USEPA 2017 National Emissions Inventory Calculations [1]

Fugitive dust emissions are produced by the mechanical disturbance of the soil during tilling operations.

USEPA Calculation Overview:
The following input data is required to calculate emissions for this source category:

The county-level emission factors for agricultural tilling (in lbs per acre) are specific to the crop type and tilling method (e.g., conventional tillage corn, no-till soybean, etc.) and were calculated using the following equation:

$$EFp,t,x,c = c \times k \times sc0.6 \times pt$$

Where:

EFp,t,x,c = Emissions factor for pollutant p, crop tilling type t, and crop type x in county c, in lbs./acre
c = Constant 4.8 lbs./acre-pass
k = Dimensionless particle size multiplier (PM10-FIL and PM10-PRI = 0.21; PM25-FIL and PM25-PRI = 0.042)
sc = Percent silt content of surface soil (%) in county c, defined as the mass fraction of particles smaller than 50 µm diameter found in surface soil
pt = Number of passes or tillings in a year by crop tilling type, t

Additional details are included In the USEPA 2017 NEI Technical Support Document.[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
Fugitive Dust PM10	tons/yr	tons/day	tons/day
Fugitive Dust PM2.5	tons/yr	tons/day	tons/day

References

1. United States Environmental Protection Agency (USEPA), "2017 National Emissions Inventory Complete Release, Technical Support Document", April 2020.