



W. Marshall Taylor Jr., Acting Director

Promoting and protecting the health of the public and the environment

April 17, 2015

Heather McTeer Toney
Regional Administrator
US EPA Region 4
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, GA 30303-8909

**Re: Revision to South Carolina Air Quality Implementation Plan:
2008 8-Hour Ozone Redesignation Demonstration and Maintenance Plan for the
portion of York County, SC within the Rock Hill-Fort Mill Area Transportation
Study Metropolitan Planning Organization, part of the Charlotte-Gastonia-Rock
Hill NC-SC 8-Hour Ozone Nonattainment Area**

Dear Ms. Toney:

The South Carolina Department of Health and Environmental Control (Department) is pleased to submit the Redesignation Demonstration and Maintenance Plan for the York County portion of the Charlotte-Gastonia-Rock Hill NC-SC 8-hour Ozone (Charlotte) Nonattainment Area. Attached is the complete package containing the redesignation demonstration for the York County portion of the Charlotte nonattainment area, along with certified air quality data, and a maintenance plan which fulfills the requirements of Section 175A of the Clean Air Act as amended.

South Carolina has the necessary legal authority for amending the State Implementation Plan (SIP) and carrying out the responsibilities of the CAA as shown in Appendix F. A public notice to revise the SIP was published in the *State Register* on February 27, 2015, and a public hearing on this issue was held on March 30, 2015, as required by 40 CFR 51.102. The Department received EPA's comment regarding the pre-hearing document on March 24, 2015, and has responded to it in Appendix H. No other comments were received. A notice of final amendment of the SIP was filed on April 10, 2015, and will be published in the *State Register* on April 24, 2015, included here as Appendix J.

As you know on February 10, 2015 (80 FR 7333), the EPA published revisions to 40 CFR 51.103 that allow states to make formal requests for SIP approval via the EPA's eSIP submission system. Given the effective date of this revision (March 15, 2015), the Department has elected to submit this request via the eSIP submission system and is providing this electronic copy merely for convenience to fellow recipients.

We appreciate the assistance provided by you and your staff regarding the formulation of this plan. Should you or your staff have any questions or comments concerning this SIP revision, please contact Myra Reece of the Bureau of Air Quality at 803-898-4102, or reecemc@dhec.sc.gov.

Sincerely,



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Area Transportation Study

File Attachments in Adobe PDF format:

2008 8-Hour Ozone Redesignation Demonstration and Maintenance Plan
Appendix A: Point Source Inventory Documentation
Appendix B: Area Source Inventory Documentation
Appendix C: On-road Mobile Source Inventory Documentation
Appendix D: Nonroad Mobile Source Emissions Inventory Documentation
Appendix E: Events Source Inventory Documentation
Appendix F: Copy of Legal Authority
Appendix G: Public Notice as published in the *State Register*, Feb. 27, 2015
Appendix H: EPA Comments on the Pre-Hearing document, received Mar. 24, 2015
Appendix I: Transcript and Sign-In Sheet, Public Hearing, March 30, 2015
Appendix J: Notice of Final Amendment of the SC Air Quality SIP

MOVES2014 files in zipped folder

South Carolina
2008 8-Hour Ozone
Redesignation Demonstration and Maintenance Plan

**For the Portion of York County, South Carolina Within the
Rock Hill-Fort Mill Area Transportation Study (RFATS)
Metropolitan Planning Organization (MPO)**

**Part of the
Charlotte-Gastonia-Rock Hill, NC-SC
8-Hour Ozone Nonattainment Area**

**Prepared by the
South Carolina Department of Health and Environmental Control**



Bureau of Air Quality

April 17, 2015

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EXECUTIVE SUMMARY

2008 8-HOUR OZONE REDESIGNATION DEMONSTRATION AND MAINTENANCE PLAN RFATS MPO

I. Introduction

The 2008 8-hour ozone national ambient air quality standard (NAAQS) is 0.075 parts per million (ppm). A violation of this NAAQS occurs when the average of the annual 4th highest daily maximum 8-hour ozone values over three consecutive years is greater than 0.075 ppm. This three-year average is termed the “design value” for the monitor. The design value for a nonattainment area is the highest monitor design value in the area. Based on 2008-2010 ambient air monitoring data from several monitors in the North Carolina portion of the Charlotte-Gastonia-Rock Hill, NC-SC area (Charlotte nonattainment area), on May 21, 2012, the United States Environmental Protection Agency (EPA) designated and classified that portion of York County, South Carolina within the Rock Hill Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization (MPO) as a marginal nonattainment area for the 2008 8-hour ozone NAAQS.

II. Current Air Quality

There is currently one ozone monitor located in the western part of York County, South Carolina, outside the nonattainment area. The nonattainment designation for the eastern part of York County was due to EPA's belief that this area contributed to nonattainment in the North Carolina portion. The latest design value (2012-2014) for this monitor is 0.060 ppm. In addition, the latest design value for all of the monitors within the Charlotte nonattainment area have attained the 2008 8-hour ozone NAAQS. Therefore, the area is eligible to be considered for redesignation to attainment as per Section 107(d)(3)(E) of the Clean Air Act (CAA).

III. Maintenance Plan Requirements

The State of South Carolina has implemented several state rules that have resulted in permanent and enforceable reductions in ozone precursor emissions statewide. These actions include a regulation to control oxides of nitrogen (NO_x) (Regulation 61.62.5, Standard 5.2) and an open burning ban during the ozone season (Regulation 61-62.2). In addition, there are several federal actions that have resulted in lower emissions throughout the eastern portion of the country. These federal actions include the Tier 2 and Tier 3 vehicle standards, heavy-duty gasoline and diesel highway vehicles standards, and the large non-road diesel engines rule.

This combination of state and federal actions have resulted in cleaner air in the area, and the anticipated future benefits from these programs are expected to result in continued maintenance of the 2008 8-hour ozone NAAQS in this area. Since the design value for the 2012-2014 period for all monitors in the Charlotte nonattainment area showed attainment of the 2008 8-hour ozone NAAQS, a baseline year emissions inventory for NO_x and volatile organic compounds (VOCs) was developed for 2014 for South Carolina. Future year emissions inventories were also developed for the interim years 2018 and 2022, and a final year emission inventory was developed for 2026. The total man-made future year emissions as shown in Table III-8 were lower than the 2014 emissions in all cases. This demonstrates that the York County portion of the Charlotte nonattainment area is expected to maintain the 2008 8-hour ozone NAAQS through 2026. The area is also in compliance with Section 110 and Part D requirements of the Clean Air Act (CAA).

IV. Conclusion and Request for Redesignation

Based on the information above and criteria established in Section 107(d)(3)(E) of the CAA, South Carolina is requesting that the EPA redesignate that portion of York County, South Carolina within the Charlotte nonattainment area to attainment. The monitoring data shows that the Charlotte nonattainment area has attained the 2008 8-hour ozone NAAQS and the maintenance demonstration shows that the future emissions inventories are expected to be lower than the attainment year inventory through the implementation of the various control measures listed above.

SECTION I. Introduction

A. Ground-Level (Tropospheric) Ozone

Ozone is a colorless gas that occurs naturally in the atmosphere and can be found in the air we breathe. Ozone is composed of three atoms of oxygen (O₃), one more than the common oxygen molecule (O₂) we need to breathe to sustain life. The additional oxygen atom makes ozone extremely reactive. Ozone in the Earth's upper atmosphere, known as stratospheric ozone, shields the Earth from the harmful effects of the sun's ultraviolet rays. Ozone found in the atmosphere closer to the Earth's surface (tropospheric ozone) is considered a harmful air pollutant due to its adverse impacts on human health and welfare.

Tropospheric ozone is commonly referred to as ground-level ozone and sometimes called smog. Ozone is not emitted directly by the combustion of fuels. Ozone is formed in the atmosphere by the reaction of volatile organic compounds (VOC) and oxides of nitrogen (NO_x) in the presence of sunlight. These air pollutants, often referred to as ozone precursors, are emitted by many types of pollution sources, including on-road and off-road motor vehicles and engines, power plants and industrial facilities, and smaller sources, collectively referred to as area sources. Ozone is predominately a summertime air pollutant. Changing weather patterns contribute to yearly differences in ozone concentrations from region to region. Ozone and the pollutants that form ozone also can be transported into an area from pollution sources found hundreds of miles upwind.

B. National Ambient Air Quality Standards (NAAQS)

The Clean Air Act (CAA) requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. National primary and secondary ambient air quality standards under Section 109 of the CAA are set forth in Title 40 of the Code of Federal Regulations, Part 50. NAAQS are subject to revision, and additional primary and secondary standards may be promulgated as the EPA deems necessary to protect the public health and welfare. The EPA has promulgated primary and secondary NAAQS for carbon monoxide (no secondary standard for carbon monoxide), lead, nitrogen dioxide, particulate matter, sulfur oxides, and ground-level ozone. The EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels. For each pollutant, a health-based or "primary" standard has been set to protect public health in general, and a welfare-based or "secondary" standard may be set to protect quality of life and the environment. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

C. 2008 8-Hour Ozone NAAQS

In 2008, the EPA revised the NAAQS for ground-level ozone, setting the standard at 0.075 parts per million (ppm) averaged over an 8-hour period. At every ozone monitoring site, hourly average concentrations are recorded in ppm. Running 8-hour averages are computed from the hourly ozone concentration data for each hour of the year. The daily maximum 8-hour concentration for a given calendar day is the highest of the 24 possible 8-hour average concentrations computed for that day. The design value is the statistic to compare the 2008 8-hour ozone NAAQS and is a three-year average using the three most recent, consecutive calendar years of monitoring data. A violation of the 2008 8-hour ozone NAAQS occurs when the computed design value is greater than 0.075 ppm.

D. 2008 8-Hour Ozone Designations

CAA requires the EPA to designate areas as attaining or not attaining that NAAQS. The EPA area designations were generally based on air quality monitoring data collected during the 2008, 2009, and 2010 ozone seasons. The highest monitor design value in an area was used to determine its designation. The CAA then specifies requirements for areas based on whether such areas are or are not attaining the NAAQS.

Because of EPA's belief that it was contributing to ozone nonattainment for the Charlotte area, that portion of York County, South Carolina within the Rock Hill Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization (MPO) was designated nonattainment. At that time, several monitors in the North Carolina portion of the Charlotte area had design values above the 2008 8-hour ozone NAAQS. However, the monitor located in York County had a design value of 0.067 ppm, which is below the 2008 8-hour ozone NAAQS. The Charlotte area was classified as a Subpart 2 marginal nonattainment area.

On August 22, 2014, the South Carolina Department of Health and Environmental Control (henceforth referred to as SCDHEC or Department) submitted its required State Implementation Plan for the RFATS MPO 2008 8-hour ozone NAAQS nonattainment area.

E. Clean Air Act Redesignation Criteria

Section 107(d)(3)(E) of the CAA, as amended, states an area can be redesignated to attainment if the following conditions are met:

1. The EPA has determined that the NAAQS have been attained. For ozone, the areas must show that the average of the 4th highest 8-hour ozone values from three (3) complete, consecutive calendar years of quality-assured air quality monitoring data must be equal to or below 0.075 ppm.
2. The applicable implementation plan has been fully approved by the EPA under section 110(k).
3. The EPA has determined that the improvement in air quality is due to permanent and enforceable reductions in emissions. To demonstrate this, the State should estimate the percent reduction (from the year used to determine the design value for designation and classification) achieved from federal, state, and local measures.
4. The EPA has fully approved a maintenance plan, including a contingency plan, for the areas under section 175A.
5. The State has met all applicable requirements for the area under section 110 and Part D.

In the sections to follow, the Department will provide the technical data necessary to show that the portion of York County, South Carolina within the RFATS MPO designated as a moderate nonattainment area for the 2008 8-hour ozone NAAQS as part of the Charlotte nonattainment area has attained and is expected to maintain the 2008 8-hour ozone NAAQS, and has met the requirements for redesignation set forth above. The North Carolina Department of Environment and Natural Resources, Division of Air Quality (NCDAQ) has developed its own separate maintenance plan for the North Carolina portion of the Charlotte nonattainment area.

SECTION II. CHARLOTTE-GASTONIA-ROCK HILL, NC-SC (CHARLOTTE) AIR QUALITY

A. Monitors in the Charlotte Nonattainment Area

In South Carolina, near the Charlotte nonattainment area, there is one monitoring site (York CMS) which is located in south-central York County, just west of the nonattainment area. This site is important for forecasting ozone concentrations in the Charlotte nonattainment area. Figure II-1: “Monitors in the Charlotte-Gastonia-Rock Hill, NC-SC Area” displays the monitor locations. The York County monitor is included in the SCDHEC 2015 Annual Network Description and Ambient Air Network Monitoring Plan which was completed in 2014. There were no changes proposed for this monitor for 2015.

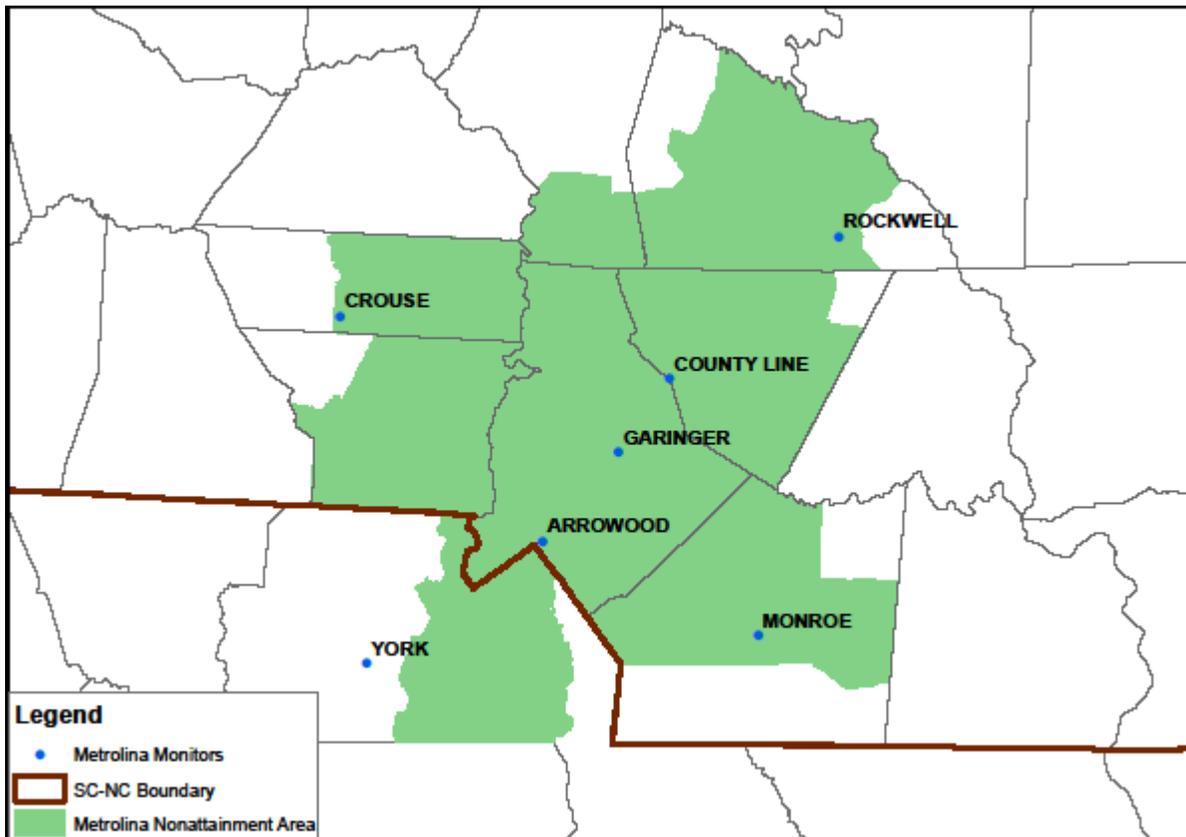


Figure II-1: Monitors in the Charlotte-Gastonia-Rock Hill, NC-SC Area

B. Historic Air Quality (2002- 2014)

The 4th highest daily maximum 8-hour ozone concentrations listed in Table II-1 were used to calculate the design values shown in Table II-2. Design values were calculated from the 2002-2004 design value period through the 2012-2014 design value period for each monitor in the Charlotte nonattainment area. Design values were calculated in accordance with the procedures found in 40 CFR Appendix I to Part 50. As shown in Table II-2, the design value at the York County monitoring site has not violated the 2008 8-hour ozone NAAQS since it was promulgated.

Table II- 1: Historic 4th Highest 8-Hour Ozone Values (ppm) for Charlotte-Gastonia-Rock Hill, NC-SC Nonattainment Area

Monitoring Site	County	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Crouse	Lincoln, NC	0.095	0.089	0.074	0.082	0.082	0.085	0.079	0.065	0.072	0.077	0.076	0.064	0.064
Arrowood	Mecklenburg, NC	0.094	0.073	0.077	0.085	0.078	0.087	0.073	0.068	0.078	0.082	0.073	0.062	0.063
County Line	Mecklenburg, NC	0.107	0.088	0.083	0.090	0.093	0.096	0.093	0.071	0.082	0.083	0.085	0.066	0.068
Garinger	Mecklenburg, NC	0.103	0.086	0.085	0.088	0.091	0.093	0.085	0.069	0.082	0.088	0.080	0.067	0.065
Rockwell	Rowan, NC	0.106	0.098	0.080	0.086	0.085	0.096	0.084	0.071	0.077	0.077	0.080	0.062	0.064
Monroe	Union, NC	0.100	0.083	0.074	0.082	0.080	0.082	0.080	0.067	0.071	0.073	0.075	0.062	0.067
York	York County, SC	0.096	0.076	0.071	0.079	0.078	0.080	0.075	0.062	0.066	0.065	0.065	0.061	0.056

NOTES: Values displayed in bold represent violations of the 2008 8-hour ozone National Ambient Air Quality Standard.

Table II- 2: Historic 8-Hour Ozone Design Values (ppm) for Charlotte-Gastonia-Rock Hill, NC-SC Nonattainment Area

Monitoring Sites	County	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014
Crouse	Lincoln, NC	0.086	0.081	0.079	0.083	0.082	0.076	0.072	0.071	0.075	0.072	0.068
Arrowood	Mecklenburg, NC	0.081	0.078	0.080	0.083	0.079	0.076	0.073	0.076	0.077	0.072	0.066
County Line	Mecklenburg, NC	0.092	0.087	0.088	0.093	0.094	0.086	0.082	0.078	0.083	0.078	0.073
Garinger	Mecklenburg, NC	0.091	0.086	0.088	0.090	0.089	0.082	0.078	0.079	0.083	0.078	0.070
Rockwell	Rowan, NC	0.094	0.088	0.083	0.089	0.088	0.083	0.077	0.075	0.078	0.073	0.068
Monroe	Union, NC	0.085	0.079	0.078	0.081	0.080	0.076	0.072	0.070	0.073	0.070	0.068
York	York County, SC	0.081	0.075	0.076	0.079	0.077	0.072	0.067	0.064	0.065	0.063	0.060

NOTES: Values displayed in bold represent violations of the 2008 8-hour ozone National Ambient Air Quality Standard.

C. Current Design Values (2012-2014)

The most recent three years of ozone monitoring data (2012-2014) for the Charlotte nonattainment area demonstrates compliance with the 2008 8-hour ozone NAAQS. Table II-3: 2014 Design Values lists the annual 4th highest daily maximum 8-hour average ozone concentration and calculated design values for all of the monitors within the Charlotte nonattainment area. Consistent with the requirements of 40 CFR 58.15, the 2014 8-hour ozone monitoring data for South Carolina has been fully quality assured and was officially submitted to the EPA Region 4 on February 23, 2015.

Table II- 3: 2014 Design Values

Monitor	County	4 th Highest 8-hour Ozone Value			2014 Design Value
		2012	2013	2014	
Crouse	Lincoln, NC	0.076	0.064	0.064	0.068
Arrowood	Mecklenburg, NC	0.073	0.062	0.063	0.066
County Line	Mecklenburg, NC	0.085	0.066	0.068	0.073
Garinger	Mecklenburg, NC	0.080	0.067	0.065	0.070
Rockwell	Rowan, NC	0.080	0.062	0.064	0.068
Monroe	Union, NC	0.075	0.062	0.067	0.068
York	York, SC	0.065	0.061	0.056	0.060

D. Permanent and Enforceable Emissions Reductions

There are federal and state measures that have been enacted in recent years that are resulting in permanent and enforceable emissions reductions. A list of those measures that contributed to the permanent and enforceable emissions reductions are listed below and more fully described in Section III. B. The federal measures that have been implemented include:

- Tier 2 vehicle standards: Implementation began in 2004 and will require all passenger vehicles in any manufacturer’s fleet to meet an average standard of 0.07 grams of NO_x per mile. The Tier 2 rule also reduced the sulfur content of gasoline to 30 ppm starting in January of 2006. Tier 3 standards apply beginning in model year 2017, and are phased in through 2025. Sulfur content of gasoline will be further reduced to 10 ppm by January 1, 2017, and NO_x emissions are estimated to be reduced by 25% by 2030 relative to 2014 levels.
- Heavy-duty gasoline and diesel highway vehicle standards: EPA standards designed to reduce NO_x and VOC emissions from heavy-duty gasoline and diesel highway vehicles commenced implementation in 2004. A second phase of standards and testing procedures, which began in 2007, is reducing particulate matter from heavy-duty highway engines and has reduced highway diesel fuel sulfur content to 15 ppm. In addition, the Heavy-Duty National Program reduces criteria pollutant emissions as a co-benefit of lower CO₂ emissions. This program applies to the 2014-2018 model years, and will be further extended beyond model year 2018.

- Light-duty National Program for greenhouse gas emissions and fuel standards: the first phase applies to model years 2012-2016, and is being extended to the second phase applicable to model years 2017-2025. By 2025, these programs are expected to increase the industry fleet-wide level to an equivalent of 54.5 miles per gallon if achieved exclusively through fuel economy requirements. As with the Heavy-Duty National Program, the reduction in ozone-forming criteria pollutants such as NO_x is a co-benefit of the CO₂ reductions aimed at by the regulation.
- Nonroad spark-ignition engines: Effective in 2003 and will reduce NO_x and hydrocarbon emissions. For nonroad compression-ignition engines, Tier 4 exhaust emission standards will apply to the largest engines (>900 kW) beginning in 2015.
- NO_x SIP Call and CAIR: The NO_x SIP Call created the NO_x Budget Trading Program designed to reduce the amount of ozone that crosses state lines. Subsequently the Clean Air Interstate Rule (CAIR) was also implemented to address NO_x emission reductions across state lines, but which was succeeded by the Cross-State Air Pollution Rule (CSAPR) on January 1, 2015. More information on CSAPR is discussed in Section III.

The state measures that have been implemented include:

- The Celanese Acetate Celriver Plant closed in 2006. This plant, which included six coal-fired boilers, the largest of which was rated at 320 MMBtu/hr, was the largest stationary source of NO_x in the York County portion of the Charlotte nonattainment area. As a result, we retired 2,493 tons of NO_x and 1,686 tons of VOCs. There are no coal-fired electrical generating units in York or its bordering South Carolina counties.
- Prohibition of Open Burning: Effective in 2004, the revision of Regulation 61-62.2, *Prohibition of Open Burning*, includes a ban of certain open burning during the ozone season for additional control of NO_x emissions.
- Control of Oxides of Nitrogen: Effective in 2004, R. 61.62.5 Standard 5.2 *Control of Oxides of Nitrogen*, applies to new and existing stationary sources that emit or have the potential to emit NO_x generated from fuel combustion. This regulation sets standards for new construction based on Best Available Control Technology (BACT) standards from the national RACT/BACT/LAER Clearinghouse. For new sources, the regulation is primarily directed at smaller sources that fall below the Prevention of Significant Deterioration (PSD) thresholds and therefore would otherwise be exempt for NO_x controls altogether.
- Idling Restrictions for Commercial Diesel Vehicles: Effective in 2008, SC Code Title 56, Section 35 forbids extended idling of diesel engines unless covered by specific exemptions having to do with health, safety and refrigeration of perishables.

The above mentioned state controls and programs have been included in the federally approved South Carolina Air Quality SIP.

South Carolina's two neighboring states have also adopted measures to improve regional air quality. North Carolina has implemented measures in the North Carolina portion of the Charlotte nonattainment area to include the state-wide Clean Smokestacks Act. The legislation sets a cap on NO_x and sulfur dioxide emissions, which public utilities cannot meet by purchasing emission credits. Georgia has promulgated a state level CAIR rule as a SIP revision, including limitations on NO_x emissions from affected sources (Georgia Rule 391-3-1-.02(12)).

South Carolina utilities retired 10 coal/oil fired EGUs in 2012 and 2013. By the end of 2018, two additional coal/oil fired EGUs will be retired, and two others switched to natural gas operation. Further, two nuclear EGUs are under construction in Jenkinsville, SC.

South Carolina believes that the improvement in air quality in the Charlotte nonattainment area is due to real, permanent and enforceable reduction in NO_x emissions resulting from state and federal measures.

SECTION III. MAINTENANCE PLAN

A. Concept of South Carolina's Maintenance Plan

South Carolina's plan for maintaining compliance with 2008 8-hour ozone NAAQS in the South Carolina portion of the Charlotte nonattainment area includes three major parts: established control measures, a maintenance demonstration, and a contingency plan. The established control measures consists of the current federal and state control measures already in effect, as well as the future benefits of the cleaner engine programs, and Transport Rule.

The Department has implemented programs that will remain enforceable and are hereby submitted as the plan to ensure that maintenance of the 2008 8-hour ozone NAAQS will continue. Sources are prohibited from reducing emission controls (anti-backsliding) following the redesignation of the area unless such a change is first approved by the EPA as a revision to the South Carolina SIP that is consistent with Section 110(l) of the CAA.

For the maintenance demonstration the base year of 2014 was chosen since it is one of the most recent 3 years (2012, 2013 and 2014) for which the Charlotte area has clean air quality data for the 2008 8-hour ozone NAAQS. The interim years chosen are 2018 and 2022. The final year of the maintenance demonstration is 2026, since the CAA requires maintenance for at least ten years after redesignation. The maintenance demonstration consists of a comparison between the 2014 baseline emissions inventory and the projected emissions inventories (for 2018, 2022, and 2026), which consider economic and population growth. The comparison shows that the total emissions in each of the interim years and the final year will be lower than in the base year, demonstrating maintenance of the 2008 8-hour ozone NAAQS. The reductions in emissions are due to the established control measures outlined below.

The South Carolina contingency plan involves tracking and triggering mechanisms to determine when contingency measures are needed and a process of implementing appropriate control measures. A quality assured/quality controlled (QA/QC) design value that exceeds the 2008 8-hour ozone NAAQS at any monitor within the Charlotte nonattainment area will trigger evaluation of the contingency plan. In conjunction with the South Carolina maintenance plan, the NCDAQ has developed its own separate maintenance plan for the North Carolina portion of the Charlotte nonattainment area.

B. Established Control Measures

1. Federal Control Measures

a. Tier 2 and Tier 3 Vehicle Standards

Federal Tier 2 vehicle standards require all passenger vehicles in a manufacturer's fleet, including light-duty trucks and sport utility vehicles (SUVs), to meet an average standard of 0.07 grams of NO_x per mile. Implementation began in 2004, with full compliance required by 2007. The Tier 2 standards also cover passenger vehicles over 8,500 pounds gross vehicle weight rating (the larger pickup trucks and SUVs), which were not covered by Tier 1 regulations. For these vehicles, the standards were phased in beginning in 2008, with full compliance in 2009. The new standards require vehicles to be 77 percent to 95 percent cleaner than those made prior to these dates. The Tier 2 rule also reduced the sulfur content of gasoline to 30 ppm starting in January of 2006. Most gasoline sold in South Carolina prior to January 2006 had a sulfur content of about 300 ppm. Sulfur occurs naturally in gasoline but interferes with the operation of catalytic converters on vehicles, resulting in higher NO_x emissions. Lower-sulfur gasoline is necessary to achieve the Tier 2 vehicle emission standards.

Tier 3 standards apply beginning in model year 2017, and are phased in through 2025. Sulfur content of gasoline will be further reduced to 10 ppm by January 1, 2017, and NO_x emissions are estimated to be reduced by 25 percent by 2030 relative to 2014 levels. EPA is setting new tailpipe standards for the sum of non-methane organic gases (NMOG) and nitrogen oxides (NO_x), presented as NMOG+NO_x, and for particulate matter (PM) that apply to all light-duty vehicles and some heavy-duty vehicles. Tier 3 standards also reduce evaporative emissions thus lowering VOCs.

b. Heavy-Duty Gasoline and Diesel Highway Vehicles Standards

New EPA standards designed to reduce NO_x and VOC emissions from heavy-duty gasoline and diesel highway vehicles commenced implementation in 2004. A second phase of standards and testing procedures, which began in 2007, reduces particulate matter from heavy-duty highway engines and has reduced highway diesel fuel sulfur content to 15 ppm. The total program for these new engines using ultra-low sulfur diesel is expected to achieve a 90 percent reduction in PM emissions and a 95 percent reduction in NO_x emissions (as compared to existing engines using higher-content sulfur diesel).

c. Large Non-road Diesel Engines Rule

In May 2004, the EPA promulgated new rules for large non-road diesel engines (such as those used in construction, agricultural, and industrial equipment) to be phased in between 2008 and 2014. The non-road diesel rules also reduce the allowable sulfur in non-road diesel fuel by over 99 percent. At that time, non-road diesel fuel averaged about 3,400 ppm in sulfur. The rule limited non-road diesel sulfur content to 500 ppm in 2006 and 15 ppm in 2010. The combined engine and fuel rules have reduced NO_x and PM emissions from large non-road diesel engines by over 90 percent. For nonroad diesel engines, Tier 4 exhaust emission standards will apply to the largest engines (>900 kW) beginning in 2015.

d. Non-road Spark-Ignition Engines and Recreational Engines Standard

This standard, effective in July 2003, regulates NO_x, hydrocarbons (HC), and carbon monoxide (CO) for groups of previously unregulated non-road engines. The standard applies to all new engines imported into or sold within the United States after these standards begin. It applies to large spark-ignition engines (e.g. forklifts and airport ground service equipment), recreational vehicles (e.g. off-highway motorcycles and all-terrain-vehicles), and recreational marine engines. The regulation varies based upon the type of engine or vehicle.

The large spark-ignition engines contribute to ozone formation and ambient CO and PM levels in urban areas. Tier 1 of this standard was implemented in 2004, and Tier 2 in 2007. Like the large spark-ignition, recreational vehicles contribute to ozone formation and ambient CO and PM levels. For all model-year 2006 off-highway motorcycles and all-terrain-vehicles, the new exhaust emissions standard was phased-in at 50 percent; for model years 2007 and later, the standard was phased-in at 100 percent. Recreational marine diesel engines over 37 kilowatts (used in yachts, cruisers, and other types of pleasure craft) contribute to ozone formation and PM levels, especially in marinas. For certain recreational marine diesel engine sizes, the standard began to be phased-in in 2006.

When all of the non-road spark-ignition engines and recreational engines standards are fully implemented, overall reductions of 72 percent in HC, 80 percent in NO_x, and 56 percent in CO emissions are expected by 2020. These controls will help reduce ambient concentrations of ozone, CO, and fine PM.

e. NO_x SIP Call, CAIR and CSAPR

In October 1998, the EPA issued the “Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone” (63 FR 57356; October 27, 1998), commonly called the “NO_x SIP Call.” The NO_x SIP Call created the NO_x Budget Trading Program, an emissions allowance trading program designed to reduce the amount of ozone that crosses state lines by limiting NO_x emissions from utilities and large industrial sources in the eastern United States. The NO_x Budget Trading Program was effective in reducing NO_x emissions, including those from local sources.

In 2005, the EPA issued the Clean Air Interstate Rule (CAIR) (70 FR 25162; May 12, 2005), which was intended to supplant the NO_x SIP Call. The DC Court of Appeals subsequently remanded CAIR without vacatur, leaving it in place pending further EPA regulatory action. The EPA developed the Transport Rule: CSAPR (75 FR 45210, August 2, 2010) as a replacement. CSAPR's air pollution limits, based on the 1997 Ozone NAAQS, are defined as maximum statewide budgets for emissions of annual NO_x, and/or ozone-season NO_x by each state's large electricity generating units (EGUs). On December 31, 2011, the DC Circuit Court stayed CSAPR, leaving CAIR in place, pending review. The Supreme Court, on April 29, 2014, reversed the DC Circuit's ruling, and reinstated CSAPR. The DC Circuit lifted the stay on October 23, 2014, and allowed the EPA to toll the deadlines by three years. CSAPR, as a FIP, went into effect on January 1, 2015. The rule contains provisions that sunset CAIR compliance requirements on a schedule coordinated with the implementation of CSAPR compliance requirements. CAIR will be fully replaced by CSAPR in mid-2015, after the 2015 Annual Ozone Season.

The implementation of CAIR and other regulations, and the rationalization of the coal-fired EGU fleet by South Carolina utilities, have lead to the retirement (or switch to natural gas) of all older, smaller units. The remaining newer, larger coal units now have a full suite of emission controls, leading to significant emission reductions, including NO_x.

f. Control Technique Guidelines (CTGs)

In the York County portion of the Charlotte nonattainment area, there are currently no VOC sources subject to CTGs. The Department provided certifications to this effect to the EPA within the 1997 ozone attainment demonstration (August 31, 2007) and on February 23, 2009 (Group III, 72 FR 57215), and July 9, 2009 (Group IV, 73 FR 40230), respectively. The Department will continue to evaluate the applicability of CTGs as new groups are added and promulgated.

2. State Control Measures

a. New Source Review Regulations

On December 31, 2002, the EPA finalized revisions to the New Source Review (NSR) program. The major NSR program is a preconstruction review and permitting program applicable to new or modified major stationary sources of air pollutants. In areas not meeting health-based NAAQS, the program is referred to as the Prevention of Significant Deterioration (PSD) program. Collectively, these programs are commonly referred to as the major NSR program.

In accordance with the EPA's final rule revisions, state agency programs must adopt and submit revisions to their SIPs to include the minimum program elements outlined in the final rules. States may choose to adopt provisions that differ from the final rules; however, to be approvable under the SIP, the state must show that the regulations are at least as stringent as the EPA's amendments.

After a lengthy stakeholder process, SCDHEC submitted revisions to the Legislature in January 2005 to comply with the EPA requirements. The revisions adopted by SCDHEC differ from the federal revisions in several key respects and have the effect of being more stringent than the federal rules. These revisions were approved by the General Assembly and became state-effective upon publication in the *State Register* on June 24, 2005. The final regulations promulgated amendments to Regulations 61-62.1, *Definitions and General Requirements*, and R. 61-62.5, Standard No. 7, *Prevention of Significant Deterioration*, and also promulgated a new regulation, R. 61-62.5, Standard No. 7.1, *Nonattainment New Source Review*.

- **South Carolina Air Pollution Control Regulation 61-62.1, *Definitions and General Requirements*, Section II - Permit Requirements**

This regulation implements a program for the minor new source review permitting program, which enhances the state's prevention of significant deterioration of air quality initiatives.

- **South Carolina Air Pollution Control Regulation 61-62.5, Standard No. 7, *Prevention of Significant Deterioration***

This regulation implements a program for the prevention of significant deterioration of air quality for sources located in or whose construction is proposed in an unclassifiable/attainment area of the state.

- **South Carolina Air Pollution Control Regulation 61-62.5, No. 7.1 - *Nonattainment New Source Review***

This regulation implements a program whereby sources located in or whose construction is proposed in nonattainment areas are subject to the requirements of R. 61-62.5, Standard No. 7.1.

b. NO_x Regulations

These regulations specify the requirements for controlling NO_x and for demonstrating compliance with NO_x limitations.

- **South Carolina Air Pollution Control Regulation 61-62.5, Standard No. 2 - *Ambient Air Quality Standards***

This regulation contains the state of South Carolina ambient air quality standards, which include the 8-hour ozone standards.

- **South Carolina Air Pollution Control Regulation 61-62.5, Standard No. 5.2 - *Control of Oxides of Nitrogen (NO_x)***

This regulation contains the NO_x control standards applicable to affected stationary sources that emit or have the potential to emit NO_x generated from fuel combustion.

- **South Carolina Air Pollution Control Regulation 61-62.96 - *Nitrogen Oxides (NO_x) and Sulfur Dioxide (SO₂) Budget Trading Program***

This regulation contains South Carolina's adoption of federal CAIR regulations.

- **South Carolina Air Pollution Control Regulation 61-62.99 - Nitrogen Oxides Budget Program Requirements for Stationary Sources Not in the Trading Program**

This regulation details requirements for controlling NO_x emissions from cement manufacturing.

- **South Carolina Air Pollution Control Regulation 61-62.2 - Prohibition of Open Burning**

R. 61-62.2, *Prohibition of Open Burning*, includes a ban of certain open burning during the ozone season for additional control of NO_x emissions.

- c. **VOC Regulations: South Carolina Air Pollution Control Regulation 61-62.5, Standard No. 5 - Volatile Organic Compounds**

This regulation contains requirements for controlling VOCs.

- d. **Emissions Inventory: South Carolina Regulation 61-62.1, Definitions and General Requirements, Section III - Emissions Inventory**

This regulation requires the submittal of emissions inventory information by affected sources.

- e. **Reasonably Available Control Measures (RACM)**

Reasonably Available Control Measures is a broadly defined term referring to technologies and other measures that can be used to control pollution, including Reasonably Available Control Technology and other measures. Pursuant to section 172(c)(1) of the CAA and "[t]o ensure compliance with the Act, EPA will review each attainment demonstration submission for the ozone NAAQS to determine whether it provides for all RACM necessary to attain the standard as expeditiously as practicable and provides for implementation of those measures as expeditiously as practicable." ("Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas." John S. Seitz, Director, OAQPS, November 30, 1999) In addition, the EPA's RACM policy indicates that areas should consider all candidate measures that are potentially available, including any that have been suggested for the particular nonattainment area. Although areas should consider all available measures, areas need only adopt measures if they are both economically and technologically feasible and will contribute to timely attainment or are necessary for RFP. Measures that might be available but would not advance attainment or contribute to RFP need not be considered RACM. A number of emissions controls programs were implemented in South Carolina following the CAA Amendments of 1990, and substantial further emissions reductions have since occurred in the state as well as the Charlotte nonattainment area. SCDHEC intends to continue to investigate and, where appropriate, adopt additional measures that would reduce emissions of ozone precursors even further. Such measures may help the state in the future as it maintains the 2008 8-hour ozone NAAQS. The source categories emitting the vast preponderance of ozone precursor emissions in the state are already subject to control requirements.

C. Emissions Inventory

There are two basic approaches used to demonstrate continued maintenance. The first is the comparison of a projected emissions inventory with a baseline emissions inventory. The second approach involves complex analysis using gridded dispersion modeling. The approach used by the SCDHEC is the

comparison of emissions inventories for the years 2014 and 2026.

For the maintenance demonstration, the base year of 2014 was chosen since it is a year that falls within the attaining design value period of 2012-2014 and some emissions inventory data was already developed for this year. The maintenance demonstration is made by comparing the 2014 baseline emissions inventory to the 2026 projected emissions inventory. The baseline emissions inventory represents an emission level for a period when the ambient air quality standard was not violated, 2012-2014. If the projected emissions remain at or below the baseline emissions, continued maintenance is demonstrated and the ambient air quality standard should not be violated in the future. In addition to comparing the final year of the plan, all of the interim years are compared to the 2014 baseline to demonstrate that these years are also expected to show continued maintenance of the 2008 8-hour ozone NAAQS.

The emissions inventories are comprised of four major types of sources: point, area, on-road mobile, and non-road mobile. The projected emissions inventories have been estimated using projected rates of growth in population, traffic, economic activity, and other parameters. Naturally occurring, or biogenic, emissions are not included in the emissions inventory comparison, as these emissions are outside the State's span of control.

The North Carolina Division of Air Quality (NCDAQ) has developed a maintenance plan for the North Carolina portion of the Charlotte nonattainment area. For emissions summaries for the North Carolina portion of the Charlotte nonattainment area, refer to the Redesignation Demonstration and Maintenance Plan submitted by NCDAQ.

1. Emission Inventories

There are four different man-made emission inventory source classifications: (1) point, (2) area, (3) on-road mobile, and (4) nonroad mobile sources. In addition, wildfires and prescribed fires ("events") have been summarized separately in Table III-5 and Appendix E.

Point sources are those larger industrial or commercial stationary facilities that must have Title V permits issued by the SCDHEC Bureau of Air Quality (BAQ). These sources have the potential to emit more than 100 tons of NO_x or VOC. The source emissions are tabulated from data collected by direct on-site measurements of emissions or mass balance calculations utilizing approved emission factors. There are usually several emission sources for each facility. Emission data is collected for each point source at a facility and the data is entered into an in-house database system. For the projected year's inventory, point sources are adjusted by growth factors based on NAICS codes. Growth rates for the industrial point sources were obtained, via the North Carolina Department of Natural Resources (NCDENR), from the *2018 AEO2014 South Atlantic Division Economic Forecast, Census Division: South Atlantic*. The AEO gives growth rates by REVIND number. NCDENR created a crosswalk from REVIND number to NAICS. The base source of airport/ helipad point source emissions data was the 2011 NEI. A complete description of how these inventories were developed is discussed in detail in Appendix A.

Area sources are those stationary sources whose emissions are relatively small but due to the large number of these sources, the collective emissions could be significant (i.e., smaller industrial facilities, dry cleaners, service stations, etc.) For area sources, emissions are estimated by multiplying an emission factor by some known indicator of collective activity such as production, number of employees, or population. The emission factors used were obtained from the EIIP Tech Reports, the Procedures document or the USEPA's AP 42 Compilation of Air Pollutant Emission Factors, Fifth Edition, referred to as AP 42, and the ERTAC collaboration. These types of emissions are estimated on the county level. Various sources of data, such as population growth, energy consumption by sector, and county business

patterns from the Census, were used to determine the growth projections. A complete description of how these inventories were developed is discussed in detail in Appendix B.

For on-road mobile sources, the EPA mobile model MOVES2014 is used to generate emissions. MOVES can be used to estimate exhaust and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles. The estimation of emissions involves multiplying an activity level by an emission factor, and is all done within the model. The activity level used by MOVES2014 is vehicle miles traveled (VMT). For the future years' inventories, the MOVES 2014 mobile model takes into consideration expected federal tailpipe standards, fleet turnover, and new fuels. A complete description of how these inventories were developed is discussed in detail in Appendix C.

Nonroad mobile sources are equipment that can move but do not use the roadways, i.e., lawn mowers, construction equipment, agricultural equipment, etc. The emissions from this category are calculated using the nonroad part of EPA's MOVES2014 mobile model. Railroad locomotive emissions are not calculated included in the nonroad portion of the MOVES2014 model, so the emissions need to be calculated differently. A complete description of how these inventories were developed is given in detail in Appendix D. The MOVES2014 model expresses VOC emissions as Total Gaseous Hydrocarbons (TGH).

2. Summary of Emissions

The tables below contain the estimated emissions from all of the emission source sectors, i.e., point, area, on-road mobile, nonroad mobile and events for the York County portion of the Charlotte nonattainment area. Additionally, the sum total of these man-made emissions for the York County portion of the Charlotte nonattainment area is tabulated in Table III-6. For emissions summaries for the North Carolina portion of the Charlotte nonattainment area, refer to the Redesignation Demonstration and Maintenance Plan submitted by NCDENR.

Table III- 1: Point Source Emissions

County	2014	2018	2022	2026
VOC Emissions (tons/ozone season day)				
York*	3.80	3.83	3.84	3.86
NO _x Emissions (tons/ozone season day)				
York*	4.54	4.57	4.59	4.62

* Portion of York County within the Charlotte nonattainment area

Table III- 2: Area Source Emissions

County	2014	2018	2022	2026
VOC Emissions (tons/ozone season day)				
York*	6.89	7.30	7.54	7.80
NO _x Emissions (tons/ozone season day)				
York*	0.91	0.92	0.92	0.92

* Portion of York County within the Charlotte nonattainment area

Table III- 3: On-Road Mobile Source Emissions

County	2014	2018	2022	2026
VOC Emissions (tons/ozone season day)				
York*	3.93	2.79	2.15	1.74
NO _x Emissions (tons/ozone season day)				
York*	10.04	6.65	4.61	3.39

* Portion of York County within the Charlotte nonattainment area

Table III- 4: Nonroad Mobile Source Emissions

County	2014	2018	2022	2026
VOC Emissions (tons/ozone season day) as TGH				
York*	1.70	1.46	1.39	1.40
NO _x Emissions (tons/ozone season day)				
York*	2.50	1.91	1.58	1.43

* Portion of York County within the Charlotte nonattainment area

Table III- 5: Event Source Emissions – Wildfires and Prescribed Fires

County	2014	2018	2022	2026
VOC Emissions (tons/ozone season day)				
York*	0.42	0.42	0.42	0.42
NO _x Emissions (tons/ozone season day)				
York*	0.04	0.04	0.04	0.04

* Portion of York County within the Charlotte nonattainment area

Table III- 6: Total Man-Made Emissions

County	2014	2018	2022	2026
VOC Emissions (tons/ozone season day)				
York*	16.74	15.80	15.34	15.22
NO _x Emissions (tons/ozone season day)				
York*	18.03	14.09	11.74	10.40

* Portion of York County within the Charlotte nonattainment area

3. Maintenance Demonstration

As discussed above, maintenance is demonstrated when the future years total man-made emissions are less than the 2014 baseline emissions. The following table summarizes the VOC and NO_x emissions for the York County portion of the Charlotte nonattainment area. The difference between the base year (2014) and the final year (2026) illustrates that the continued maintenance of the 2008 8-hour ozone NAAQS is expected.

Table III- 7: Maintenance Demonstration (ton/ozone season day)

Year	VOC	NO_x
2014	16.74	18.03
2018	15.80	14.09
2022	15.34	11.74
2026	15.22	10.40
Difference from 2014 to 2026	-1.52	-7.63

The difference between the attainment level of emissions (2014) from all man-made sources and the projected level of emissions from all man-made sources in the York County portion of the Charlotte nonattainment area is considered the “safety margin.” The safety margin for each projected year is listed below in Table III-8.

Table III- 8: Safety Margin (ton/ozone season day)

Year	VOC	NO_x
2014	N/A	N/A
2018	-0.94	-3.94
2022	-1.40	-6.29
2026	-1.52	-7.63

D. Contingency Plan

1. Overview

The two main elements of the South Carolina contingency plan are tracking and triggering mechanisms to determine when contingency measures are needed and a process of developing and adopting appropriate control measures.

2. Contingency Plan Trigger

The primary trigger for evaluation of the contingency plan will be a quality assured/quality controlled (QA/QC) design value that exceeds the 2008 8-hour ozone NAAQS at any monitor within the Charlotte nonattainment area. If the quality assured/quality controlled (QA/QC) data indicates a violating design value for the 2008 8-hour ozone NAAQS, then the triggering event will be the date of the design value violation, and not the final QA/QC date. However, if initial monitoring data indicates a possible design value violation but later QA/QC indicates that a NAAQS violation did not occur, then a triggering event will not have occurred, and contingency measures will not need to be implemented. In addition, SCDHEC will monitor periodic emissions inventory updates and compare to projected emissions. If actual emissions exceed by greater than 10 percent the projected emissions in this maintenance plan, SCDHEC will investigate the differences and develop an appropriate strategy for addressing these differences. SCDHEC has been and will continue proactive efforts including reviewing monitoring data and evaluating trends in an effort to identify possible violations as early as possible.

3. Contingency Measures

The measures that will be considered for adoption upon a trigger of the contingency plan include:

- RACT for NO_x on existing stationary sources not subject to existing requirements;
- Implementation of diesel retrofit programs, including incentives for performing retrofits for fleet vehicle operations;
- Alternative fuel programs for fleet vehicle operations;
- Gas can and lawnmower replacement programs;
- Voluntary engine idling reduction programs;
- SCDHEC's *Take a Break from the Exhaust* program; and
- Other measures deemed appropriate at the time as a result of advances in control technologies.

Programs such as diesel retrofitting may be dependent on the availability of federal funding.

4. Action Resulting from Trigger Activation

In the event that the trigger is activated, the SCDHEC will begin analyses to include emissions inventory assessment to determine those emission control measures that will be necessary for attaining or maintaining the 2008 8-hour ozone NAAQS. SCDHEC is obligated to, at a minimum, consult with the NCDAQ to determine which state, South Carolina and/or North Carolina, will implement a contingency measure(s) within a timeframe, specified in the respective maintenance plan, to bring the area back into attainment.

The following schedule for adoption, implementation, and compliance applies to the contingency measures concerning the option of implementing regulatory requirements in South Carolina:

- Verification through quality assurance and certification of the monitored ozone data, via the ambient air quality monitor(s) in the Charlotte nonattainment area;
- Analysis of available data regarding the air quality, meteorology, transport, and related activities in the area to determine the possible cause of the violation;
- If deemed necessary, selection of a measure within three months after verification of an exceedance of the 2008 8-hour ozone NAAQS at any monitor within the Charlotte nonattainment area;
- As per the requirements established in the South Carolina Administrative Procedures Act, selection of a measure and development and implementation of necessary regulations would be expected to be completed within 24 months of activating the primary trigger. If it is determined that a longer schedule is required to implement specific contingency measures, then, upon selection of the appropriate measures, SCDHEC will notify EPA Region 4 of the proposed schedule and provide sufficient information to demonstrate that the proposed measures are a prompt correction of the triggering event.

5. Tracking for Ongoing Maintenance

As part of a statewide monitoring network, there is one monitoring site (York CMS - AQS ID 45-091-0006) which is located in south-central York County. This site was established as an upwind background monitor in 1993. This site is important for forecasting ozone concentrations in the Charlotte nonattainment area. In addition to measuring ozone, this site also measures wind speed and wind direction. South Carolina will continue operation of an appropriate air quality monitoring network in accordance with 40 CFR Part 58, Ambient Air Quality Surveillance and associated appendices.

South Carolina will continue to update its emissions inventory, including York County, at least once every three years. In addition to the emissions inventory for 2014, the emissions inventory base year, and the last year of the maintenance plan, 2026, interim years of 2018 and 2022 were selected to show a trend analysis for maintenance of the 2008 8-hour ozone NAAQS. Tracking the progress of the maintenance plan also includes performing reviews of the updated emissions inventories for the area using the latest emissions factors, models, and methodologies. For these periodic inventories, SCDHEC will review the assumptions made for the purpose of the maintenance demonstration concerning projected growth of activity levels.

In addition, SCDHEC will continue our commitment to work with local stakeholders to maintain the NAAQS as required. These stakeholders continue to pursue actions that improve air quality in general, focusing on multi-pollutant efforts that reduce emissions contributing to ozone and particulate matter, and

that also reduce air toxics and greenhouse gas emissions. Local stakeholders continue to be more engaged than ever in air quality issues and understanding how the decisions made locally impact air quality. As proven in South Carolina, by taking early action, states may be able to prevent any actual violations of the NAAQS and, therefore, eliminate the need on the part of the EPA to redesignate an area to nonattainment. South Carolina is one of only two states with a statewide Ozone Advance program, excepting the York County part of the Charlotte nonattainment area.

SECTION IV. MOTOR VEHICLE EMISSIONS BUDGET

A. Transportation Conformity

The purpose of transportation conformity is to ensure that federal transportation actions occurring in nonattainment and maintenance areas do not hinder the area from attaining and maintaining the 8-hour ozone NAAQS. The level of emissions estimated by RFATS for the Transportation Implementation Plan (TIP) and Long Range Transportation Plan (LRTP) must not exceed the motor vehicle emission budget (MVEB) as defined in this redesignation demonstration and maintenance plan.

B. Safety Margin

The difference between the attainment level of emissions (2014) from all man-made sources and the projected level of emissions from all man-made sources in the York County portion of the Charlotte nonattainment area is considered the “safety margin.” The safety margin for each projected year is listed below in Table IV-1.

Table IV- 1: Safety Margin in Tons and Kilograms Per Ozone Season Day

Year	VOC tons	VOC kg	NO _x tons	NO _x kg
2014	n/a	n/a	n/a	n/a
2018	0.94	853	3.94	3,574
2022	1.40	1,270	6.29	5,706
2026	1.52	1,379	7.63	6,922

C. Motor Vehicle Emission Budgets

According to Section 93.118 of the aforementioned Transportation Conformity Rule Amendments, a maintenance plan must establish MVEBs for the last year of the maintenance plan, in this case, 2026.

The MVEBs will be set in terms of kilograms (kg) per day. During the preparation of the York nonattainment area attainment demonstration in 2007 it was determined through interagency consultation that kg per day would be the most appropriate unit to use for MVEBs and transportation conformity.

In South Carolina refueling emissions are included in the area source inventory and as such are not included in the MVEBs. Refueling emissions calculated with the EPA’s on-road mobile source emissions model are shown in Appendix C for informational purposes.

Table IV-2 shows the York County portion of the Charlotte nonattainment area on-road mobile NO_x and VOC emissions expressed in tons per day and the corresponding kilograms per day values for base year 2014 and the last year of the maintenance plan, 2026.

Table IV- 2: On-road Mobile Source VOC and NO_x Emissions, York County portion of the Charlotte Nonattainment Area				
Units per ozone season day				
	2014		2026	
Pollutant	Tons	Kg	Tons	Kg
VOC	3.93	3,566	1.74	1,576
NO _x	10.04	9,112	3.39	3,076

SCDHEC has decided to allocate the safety margin to the MVEBs to allow for unanticipated growth in VMT, changes to vehicle mix assumptions, etc., that will influence the emission estimates. Upon the EPA's affirmative adequacy finding for the partial county MVEBs, as shown in Table IV-3, they will become the applicable MVEBs for the York County portion of the Charlotte nonattainment area.

Table IV- 3: VOC and NO_x MVEBs for 2014 and 2026 York County portion of Charlotte Nonattainment Area		
	2014	2026
<i>VOC Emissions (kg/ozone season day)</i>		
Base Emissions	3,566	1,576
Safety Margin Allocated to MVEB	n/a	1,379
VOC Conformity MVEB	3,566	2,955
<i>NO_x Emissions (kg/ozone season day)</i>		
Base Emissions	9,112	3,076
Safety Margin Allocated to MVEB	n/a	6,922
NO_x Conformity MVEB	9,112	9,998

SECTION V. STATE IMPLEMENTATION PLAN APPROVAL

A. INTRODUCTION

For an area to be redesignated and have an approved maintenance plan, the SIP must include evidence of compliance with the rules relied on to show maintenance of the standard. This section provides the evidence of compliance with such rules for the York County portion of the Charlotte nonattainment area.

B. EVIDENCE OF COMPLIANCE

The following rules regulating the emissions of VOCs and NO_x have been approved, or have been submitted for approval, by the EPA into the state SIP:

- R. 61-62.1 – Definitions and General Requirements
- R. 62.2 – Prohibition of Open Burning
- R. 62.3 – Air Pollution Episodes
- R. 62.4 – Hazardous Air Pollution Conditions
- R. 62.5 – Air Pollution Standards
 - Standard 1 – Emissions from Fuel Burning Operations
 - Standard 2 – Ambient Air Quality Standards
 - Standard 4 – Emissions from Process Industries
 - Standard 5 – Volatile Organic Compounds
 - Standard 5.2 – Control of Oxides of Nitrogen
 - Standard 6 – Alternative Emission Limitation Options
 - Standard 7 – Prevention of Significant Deterioration
 - Standard 7.1 – Nonattainment New Source Review
- R. 62.6 – Control of Fugitive Particulate Matter
- R. 62.7 – Good Engineering Practice Stack Height
- R. 62.96 – Nitrogen Oxides Budget Trading Program
- R. 62.99 – NO_x Budget Program Requirements for Stationary Sources Not in the Trading Program

Regulation 61-62.5 Standard No. 2, *Ambient Air Quality Standards* serves to establish emission limits for ozone, while Regulation 61-62.1 *Definitions and General Requirements* addresses some required control measures, means and techniques for a source to certify compliance. Regulations 61-62.5 Standards 1; 4; 5; 5.2; and, 62.96, and 62.99 all provide for direct or indirect control of VOCs and NO_x emissions for particular source categories and processes.

Regulations 61-62.1, *Regulations and General Requirements*; 62.5, Standard No. 7, *Prevention of Significant Deterioration*; and 62.5, Standard No. 7.1, *Nonattainment New Source Review* provide for the enforcement of all SIP measures and the regulation of construction of new or modified stationary sources, and apply to the construction of any new major and some minor stationary sources or any project at existing major or some minor stationary sources in areas designated as attainment, unclassifiable, or nonattainment. These regulations meet federal prevention of significant deterioration (PSD) and nonattainment new source review (NSR) requirements.

Regulations 61-62.3, *Air Pollution Episodes* and 62.4, *Hazardous Air Pollution Conditions* include provisions for the curtailment of processes which contribute to air pollution levels which are a substantial and imminent threat to public health. Regulation 61-62.2, *Prohibition of Open Burning*, prohibits open

burning in certain instances which may be detrimental to air quality and includes a ban of certain open burning during the ozone season for additional control of NO_x emissions.

40 CFR Section 52.2133 General Conformity, was adopted into the South Carolina State Implementation Plan on June 16, 1997 (62 FR 32537), and incorporates by reference 40 CFR Part 51, subpart W, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, which will continue to apply to the portion of York County within the Charlotte nonattainment area. On July, 28, 2009 (74 FR 37168), the EPA approved the South Carolina Transportation Conformity SIP submittal which consists of transportation conformity criteria and procedures related to interagency consultation and enforceability of certain transportation-related control measures and mitigation measures. This updated the transportation conformity criteria and procedures in the South Carolina SIP.

Standards incorporated in Regulations 61-62.60, *SC Designated Facility Plan and New Source Performance Standards*; 62.61, *National Emission Standards for Hazardous Air Pollutants (NESHAP)*; and 62.63, *NESHAPs for Source Categories* also control the emissions of VOCs and NO_x, but have not been submitted to the EPA for SIP approval. The state does, however, have authority to enforce these standards either automatically once promulgated by the federal government (NESHAP regulations) or once incorporated into state regulations (NSPS regulations).

Also, Section 48-1-50(23) of the 1976 South Carolina Code of Laws, as amended, provides the Department with the statutory authority to “*Adopt emission and effluent control regulations, standards and limitations that are applicable to the entire State, that are applicable only within specified areas or zones of the State, or that are applicable only when a specified class of pollutant is present.*”

SECTION VI. STATE COMPLIANCE WITH CLEAN AIR ACT REQUIREMENTS

Section 107(d)(3)(E)(v) of the CAA requires that the provisions of Section 110 and Part D of the Act be met within the area to be redesignated. This means that South Carolina must meet all requirements, if any, that had come due as of the date of the redesignation request.

The EPA in its latest guidance on meeting redesignation requirements as contained in a memorandum from John Calcagni, Director, Air Quality Management Division, Office of Air Quality Planning and Standards to the EPA Regional Offices dated September 4, 1992, states that “For the purposes of redesignation, a state must meet all requirements of Section 110 and Part D that were applicable prior to submittal of the complete redesignation request. When evaluating a redesignation request, Regions should not consider whether the state has met requirements that come due under the Act after submittal of a complete redesignation request.”

Monitoring is one of the requirements of Section 110. The SCDHEC will continue operation of the York CMS ozone monitor in compliance with 40 CFR Part 58, Ambient Air Quality Surveillance, providing sufficient funding is available for continued operation. No plans are currently underway to discontinue operation or otherwise affect the integrity of the ambient monitoring network in place. Changes will only be made if they are consistent with 40 CFR Part 58 and associated appendices and included in the SCDHEC Annual Network Description and Ambient Air Network Monitoring Plan.

SECTION VII. CONCLUSION

The most recent three years of ozone monitoring data for the Charlotte nonattainment area demonstrate compliance with the 2008 8-hour ozone NAAQS. Since the 1990's, there have been many major programs enacted in South Carolina that have led to significant actual, enforceable emissions reductions, which have led to improvements in the air quality in the Charlotte nonattainment area. Additionally, the maintenance plan demonstrates that the projected total emissions for 2026, the final year of the maintenance plan, as well as the interim years, are all less than the base year (2014) total emissions. This SIP revision, which constitutes a redesignation demonstration and maintenance plan as required by the CAA, demonstrates that maintenance of the 2008 8-hour ozone NAAQS has been achieved for the Charlotte nonattainment area.

Appendix A
Point Source Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

The point source inventory consists of emissions from larger industrial facilities and airports/ helipads. Primarily, the larger industrial facilities are those that must have Title V permits issued by the South Carolina Department of Health and Environmental Control ("the Department") Bureau of Air Quality (BAQ), and send in regularly scheduled air emission inventories to the Department.

Although the Department's emission inventories include all the criteria pollutants and a large number of toxic pollutants, only the nitrogen oxides (NO_x) and volatile organic compounds (VOC) are reported here since they are important for ozone formation. The emissions in this report represent 2014 (the base year) and are projected to the future years 2018, 2022, and 2026.

The point source inventories detailed in this section have been developed for York County as well as the Rock Hill Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization portion of York County (also referred to as the York nonattainment area, NAA), South Carolina, within the Charlotte-Gastonia-Rock Hill, NC-SC nonattainment area for the 2008 8-hour ozone NAAQS Redesignation Demonstration and Maintenance Plan. All emissions are calculated on a ton per summer day basis.

2.0 OVERALL METHODOLOGY

All large permitted sources defined as Inventory Type A sources under the United States Environmental Protection Agency (EPA) Air Emissions Reporting Rule are required to report emissions annually and other Title V sources are required to report every three years to BAQ. Additionally, the EPA requires BAQ to submit this data to the EPA Emissions Inventory System (EIS) on the same schedule. The latest year available for the Inventory Type A point source inventory submitted to the EPA is 2013. For the smaller sources that report emissions every three years, the most recent emissions inventory available were 2011 emissions. These data were projected to a base year of 2014, and to future years 2018, 2022, 2026.

2.1 SOURCE IDENTIFICATION

All York County industrial sources whose coordinates fell within the boundaries for the non-attainment area were included in this document. Only two industrial sources fell within this area:

Resolute FP US INC

Cytec Carbon Fibers Rock Hill

In addition to the industrial sources, the airport/ helipads were mapped and sources within the non-attainment area were identified.

No railyards were identified to be in the York NAA.

2.2 INDUSTRIAL SOURCE EMISSION ESTIMATION APPROACH

This section details the development of the 2014 base year inventory for industrial point sources. The development of the point source inventory by the Department began with the collection of the most current actual emission estimates from the stationary sources, in the NAA of York County, that are subject to Title V permitting program. Sources required to send in inventory data are determined in accordance with the Air Emissions Reporting Rule. Every inventory received was reviewed by the Department's staff to ensure that the correct procedures were followed in developing the inventory and to ensure that appropriate emission factors were used. The Department's staff rely on EPA-approved methodology and use preferred methods over less preferred methods where available when performing or accepting calculations. For example, Department approved stack testing emission factors are preferred over AP-42 emission factors; when available, continuous emission monitor data are used preferentially over stack test data. The order of preferred methods from best to least desirable are 1) mass balance calculations, 2) continuous emissions monitor data, 3) Bureau approved and reviewed stack test emission factors, 4) AP-42 or FIRE Emission factors, 5) in-house stack test, and 6) other. Emission sources are assigned a source classification code (SCC), which identifies the type of source it is, and emissions are linked to the SCC.

Resolute FP US INC had a 2013 annual inventory as a basis, while Cytec Carbon Fibers had a 2011 annual inventory.

To estimate the average summer day emissions for industrial point sources, the Department used monthly throughput percentages provided by the facilities. If no monthly throughput percentages were provided by the facility, the Department assumed an equal percentage for all twelve months. The throughput percentage for months May, June, July, August, and September were added together to get the percentage of the throughput assumed to have been used during the ozone season. This ozone season percentage was then multiplied by the annual emissions to get an ozone season emission estimate. The ozone season emission estimate was then divided by the number of days in the 2011 ozone season, 153 days, to get an estimate of the average summer day emissions. The resulting tons/ avg ozone season day values were then grown to develop our 2014, 2018, 2022, and 2026 emissions.

Growth rates for the industrial point sources were obtained, via the North Carolina Department of Natural Resources (NCDENR), from the 2018 AEO2014 South Atlantic Division Economic Forecast, Census Division: South Atlantic. The AEO gives growth rates by REVIND number. NCDENR created a crosswalk from REVIND number to NAICS. The growth rates were assigned to York County NAA industrial sources by their

NAICS code. Industrial source base data were grown to 2014, 2018, 2022, and 2026 using these growth rates:

Table 2- 1: NAICS Codes and Growth Factors for York NAA Point Sources

Code	Description	2014/ 2013	2018/ 2013	2022/ 2013	2026/ 2013
322110	Pulp Mills	1	1	1	1
		2014/ 2011	2018/ 2011	2022/ 2011	2026/ 2011
335991	Carbon and Graphite Product Manufacturing	1.0719	1.3052	1.4563	1.6371

2.3 2011 AIRPORT POINT SOURCE INVENTORY DEVELOPMENT

The aircraft sector includes all aircraft types used for public, private, and military purposes. This includes four types of aircraft: (1) Commercial, (2) Air Taxis (AT), (3) General Aviation (GA), and (4) Military. A critical detail is whether each aircraft is turbine- or piston-driven, which allows the emissions estimation model to assign the fuel used, jet fuel or aviation gas, respectively. The fraction of turbine- and piston-driven aircraft is either collected or assumed for all aircraft types. Commercial aircraft include those used for transporting passengers, freight, or both. Commercial aircraft tend to be larger aircraft powered with jet engines. Air Taxis carry passengers, freight, or both, but usually are smaller aircraft and operate on a more limited basis than the commercial aircraft. General Aviation includes most other aircraft used for recreational flying and personal transportation. Finally, military aircraft are associated with military purposes, and they sometimes have activity at non-military airports.

The national AT and GA fleet includes both jet- and piston-powered aircraft. Most of the Air Taxi and General Aviation fleet are made up of larger piston-powered aircraft, though smaller business jets can also be found in these categories. Military aircraft cover a wide range of aircraft types such as training aircraft, fighter jets, helicopters, and jet-powered and piston-powered planes of varying sizes.

The inventories also includes emission estimates for aircraft auxiliary power units (APUs) and aircraft ground support equipment (GSE) typically found at airports, such as aircraft refueling vehicles, baggage handling vehicles, and equipment, aircraft towing vehicles, and passenger buses.

The base source of airport/ helipad point source emissions data was the 2011 NEI. EPA developed emissions estimates associated with aircrafts' landing and takeoff (LTO) cycle. The cycle begins when the aircraft approaches the airport on its descent from cruising altitude, lands, taxis to the gate, and idles during passenger deplaning. It

continues as the aircraft idles during passenger boarding, taxis back out onto the runway for subsequent takeoff, and ascent (climb out) to cruising altitude. Thus, the five specific operating modes in an LTO are (1) Approach, (2) Taxi/idle-in, (3) Taxi/idle-out, (4) Takeoff, and (5) Climbout. The LTO cycle provides a basis for calculating aircraft emissions. During each mode of operation, an aircraft engine operates at a fairly standard power setting for a given aircraft category. Emissions for one complete cycle are calculated using emission factors for each operating mode for each specific aircraft engine combined with the typical period of time the aircraft is in the operating mode.

Refer to *Development of 2011 Aircraft Component for National Emissions Inventory, June 17, 2013* for more detail on preparing the LTO data and running the Emissions and Dispersion Modeling System (EDMS).

Emissions for GSE and APUs associated with aircraft-specific activity were also estimated by EDMS, using the assumptions and defaults incorporated in the model. EPA's NONROAD model also estimates GSE emissions, but that method is deemed less accurate than EDMS's LTO-based estimates and an EIS critical error check prohibits GSE SCCs from being submitted to the non-road equipment data category which would duplicate emissions.

The Department reviewed the EPA inputs into EDMS and the emissions for York Co, SC but no changes were made to the EPA data for 2011 NEI v1. Only airports found within the NAA of York County were included in this submittal.

To estimate the average summer day emission for the airport related point emissions, the Department started with the EPA generated 2011 annual emissions. The Department had no actual activity data from these sources, so the exact amount of activity that occurred during the ozone season months could not be ascertained. Therefore, it was assumed that these sources operated at a constant rate throughout all months of the year (8.333% activity for each month). If each month of the year contributed 8.333% of the activity, the percent of activity for the 5 ozone season months would be 41.66%. Since there are 153 days in the 2011 ozone season, the 41.66% can be divided by 153 to get an estimate of activity for an average ozone season day. This gives a result of 0.272% activity for each ozone season day. The estimated ratio of 0.00272 was multiplied by the annual emissions to estimate the 2011 average ozone season day emissions.

Now that the airport/helipad 2011 average ozone season daily emissions for the NAA of York County are determined, the values then needed to be grown to years 2014, 2018, 2022, and 2026. The Department used York County population growth as an indicator of expected growth for the railroads. Current 2011 census data was obtained, as well as projected population values provided by the Charlotte Department of Transportation. The following growth rates were calculated:

Table 2- 2: Airport/Helipad Point Source Growth Rates

	2011-2014	2011-2018	2011-2022	2011-2026
Growth Rate	1.0502	1.1554	1.2453	1.3488

The 2011 average ozone season daily emissions for the NAA of York County were multiplied by the calculated growth rates to generate projected average ozone season daily emissions for the NAA of York County for years 2014, 2018, 2022, and 2026.

3.0 QUALITY ASSURANCE

The emission inventory has undergone a number of quality assurance checks so that it meets the standards for submitting the annual inventory to the EPA. The state emissions inventory database program helps insure that important data elements are present. Where the program performs calculations, it helps avoid math errors. In addition, the State works closely with all Title V sources to ensure that all tons-per-year emissions reported are accurate.

4.0 TOTAL POINT SOURCES EMISSIONS

In the following sections the total point emissions for the York NAA are totaled. The emissions by SCC and facility have also been provided for years 2014, 2018, 2022, and 2026.

4.1 YORK NONATTAINMENT AREA SUMMARY

Table 4- 1: Total NO_x Emissions in Tons per Day

	2014	2018	2022	2026
York NAA	4.54	4.57	4.59	4.62

Table 4- 2: Total VOC Emissions in Tons per Day

	2014	2018	2022	2026
York NAA	3.80	3.83	3.84	3.86

4.2 SUMMARY OF NO₂ EMISSIONS BY FACILITY AND SCC

Table 4- 3: Summary of NO₂ Emissions by Facility and SCC

Name	Naics1	Scs	Pollutant	2014 ton/day	2018 ton/day	2022 ton/day	2026 ton/day
CYTEC CARBON FIBERS ROCK HILL	335991	10500106	NO2	0.00	0.00	0.00	0.00
				0.01	0.01	0.02	0.02
		30102499	NO2	0.04	0.05	0.05	0.06
				0.00	0.00	0.00	0.00
		39000699	NO2	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.01	0.01
PIEDMONT MEDICAL CENTER	Airport/ Helipad	2275050011	NO2	0.00	0.00	0.00	0.00
		2275050012	NO2	0.00	0.00	0.00	0.00
RESOLUTE FP US INC	322110	10200401	NO2	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
		10200402	NO2	0.01	0.01	0.01	0.01
				0.02	0.02	0.02	0.02
		10200405	NO2	0.04	0.04	0.04	0.04
		10200601	NO2	0.02	0.02	0.02	0.02
				0.05	0.05	0.05	0.05
				0.10	0.10	0.10	0.10
		10200603	NO2	0.00	0.00	0.00	0.00
				0.06	0.06	0.06	0.06
		10200604	NO2	0.04	0.04	0.04	0.04
		10200901	NO2	0.67	0.67	0.67	0.67
				0.84	0.84	0.84	0.84
		10201002	NO2	0.00	0.00	0.00	0.00
		10201301	NO2	0.00	0.00	0.00	0.00
		30700105	NO2	0.01	0.01	0.01	0.01
				0.01	0.01	0.01	0.01
		30700106	NO2	0.31	0.31	0.31	0.31
30700110	NO2	0.63	0.63	0.63	0.63		
		1.07	1.07	1.07	1.07		
30700117	NO2	0.47	0.47	0.47	0.47		
30700199	NO2	0.00	0.00	0.00	0.00		
50300107	NO2	0.00	0.00	0.00	0.00		

Rock Hill/York Co/Bryan	Airport/Helipad	2275001000	NO2	0.00	0.00	0.00	0.00
		2275050011	NO2	0.00	0.00	0.00	0.00
		2275050012	NO2	0.00	0.00	0.00	0.00
		2275060011	NO2	0.00	0.00	0.00	0.00
		2275060012	NO2	0.00	0.00	0.00	0.00
YORK	Airport/Helipad	2275050011	NO2	0.00	0.00	0.00	0.00
		2275050012	NO2	0.00	0.00	0.00	0.00

Table 4- 4: Summary of VOC Emissions by Facility and SCC

Name	Naics1	Sec	Pollutant	2014 Tons/day	2018 Tons/day	2022 Tons/day	2026 Tons/day
CYTEC CARBON FIBERS ROCK HILL	335991	10500106	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
		30102432	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.12	0.13	0.14	0.16
		39000699	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
PIEDMONT MEDICAL CENTER	Airport/Helipad	2275050011	VOC	0.00	0.00	0.00	0.00
		2275050012	VOC	0.00	0.00	0.00	0.00
RESOLUTE FP US INC	322110	10200401	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
		10200402	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
		10200405	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
		10200601	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
10200603	VOC	0.00	0.00	0.00	0.00		
		0.00	0.00	0.00	0.00		
10200604	VOC	0.00	0.00	0.00	0.00		
10200901	VOC	0.05	0.05	0.05	0.05		

				0.06	0.06	0.06	0.06
		10201002	VOC	0.00	0.00	0.00	0.00
		10201301	VOC	0.00	0.00	0.00	0.00
		30700101	VOC	0.03	0.03	0.03	0.03
		30700103	VOC	0.01	0.01	0.01	0.01
		30700105	VOC	0.01	0.01	0.01	0.01
				0.02	0.02	0.02	0.02
		30700106	VOC	0.01	0.01	0.01	0.01
		30700107	VOC	0.00	0.00	0.00	0.00
		30700110	VOC	0.06	0.06	0.06	0.06
				0.10	0.10	0.10	0.10
		30700114	VOC	0.15	0.15	0.15	0.15
		30700115	VOC	0.00	0.00	0.00	0.00
		30700117	VOC	0.20	0.20	0.20	0.20
		30700121	VOC	1.03	1.03	1.03	1.03
		30700122	VOC	0.05	0.05	0.05	0.05
		30700199	VOC	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.01	0.01	0.01	0.01
				0.01	0.01	0.01	0.01
				0.01	0.01	0.01	0.01
				0.12	0.12	0.12	0.12
		30700234	VOC	0.00	0.00	0.00	0.00
		30701220	VOC	0.42	0.42	0.42	0.42
		30701399	VOC	0.00	0.00	0.00	0.00
				0.09	0.09	0.09	0.09
				0.14	0.14	0.14	0.14
		39999996	VOC	0.01	0.01	0.01	0.01
				0.03	0.03	0.03	0.03
				0.04	0.04	0.04	0.04
				0.14	0.14	0.14	0.14
				0.36	0.36	0.36	0.36
				0.49	0.49	0.49	0.49
		40688801	VOC	0.00	0.00	0.00	0.00
		50300107	VOC	0.00	0.00	0.00	0.00
Rock Hill/York Co/Bryan	Airport/Helipad	2275001000	VOC	0.00	0.00	0.00	0.00
		2275050011	VOC	0.00	0.00	0.00	0.00
		2275050012	VOC	0.01	0.01	0.01	0.01
		2275060011	VOC	0.00	0.00	0.00	0.00
		2275060012	VOC	0.00	0.00	0.00	0.00
YORK	Airport/Helipad	2275050011	VOC	0.00	0.00	0.00	0.00
		2275050012	VOC	0.00	0.00	0.00	0.00

Appendix B
Area Source Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

Area sources represent a collection of many small, unidentified points of air pollution emissions within a specified geographical area, emitting less than the minimum level prescribed for point sources. Because these sources are too small and/or too numerous to be surveyed and characterized individually, all area source activities are collectively estimated. The county is usually the geographic area for which emissions from area sources are compiled, primarily because counties are the smallest areas for which data used for estimating emissions is readily available.

The area source inventories detailed in this document have been developed for York County as well as the Rock Hill Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization (MPO) portion of York County (also referred to as the York nonattainment area, or NAA), South Carolina within the Charlotte-Gastonia-Rock Hill, NC-SC nonattainment area for the 2008 8-hour ozone NAAQS Redesignation Demonstration and Maintenance Plan. All emissions are calculated on a ton per day basis.

2.0 OVERALL METHODOLOGY

2.1 BASELINE EMISSIONS INVENTORY

The beginning emission inventory for this document is the York County, SC inventory taken from the 2011 National Emissions Inventory. The 2011 NEI was developed by the US EPA, with input from the Department, and was developed per the AERR reporting requirements. The EPA developed emission estimates for many nonpoint sectors in collaboration with a consortium of state and regional planning organizations called the Eastern Regional Technical Advisory Committee (ERTAC, <http://www.ertac.us/>). This task is referred to by ERTAC as the “Area Source Comparability” project on the ERTAC website, and a subgroup was developed to work on this project. The purpose of the subgroup and project was to agree on methodologies, emission factors, and SCCs for a number of important nonpoint sectors, allowing EPA to prepare the emissions estimates for all states using the group’s final approaches.

2.2 EMISSION ESTIMATION APPROACH

Nonpoint source emissions are typically estimated by multiplying an emission factor by some known indicator of collective activity for each source category within the inventory area. An indicator is any parameter associated with the activity level of a source that can be correlated with the air pollutant emissions from that source, such as production, number of employees, or population.

In general, one of the following emissions estimation approaches is used to calculate the area source emissions: per capita emission factors, employment-related emission factors, commodity consumption-related emission factors, and level of activity based emission factors. The emission factors used were obtained from the EIIP Tech Reports, the Procedures document or the USEPA's AP 42 Compilation of Air Pollutant Emission Factors, Fifth Edition, referred to as AP 42, and the ERTAC collaboration.

There are several methods for estimating the activity level for a specific area source category. These are: treating area sources as point sources, surveying local activity levels, apportioning national or statewide activity totals to local inventory areas, using population or employment data.

For certain categories, there can be overlap between the point source emissions and the area source emissions calculated with emission factors. The 2011 point source emissions in these categories were identified so that they could be subtracted where appropriate.

- **Table 2- 1: EPA-estimated emissions sources in York County, SC expected to be exclusively nonpoint**

EPA-estimated emissions source description	Carried Forward	EIS Sector Name	Name of supporting data file or other reference
Residential Heating; bituminous and anthracite coal		Fuel Comb – Residential – Other	residential_consumption_coal.zip
Residential Heating; distillate oil		Fuel Comb – Residential – Oil	residential_consumption_oil_revised_06272012.zip
Residential Heating; Kerosene		Fuel Comb – Residential – Oil	residential_consumption_kerosene.zip
Residential Heating; natural gas		Fuel Comb – Residential – Natural Gas	residential_consumption_ng_revised_06222012.zip
Residential Heating; liquefied petroleum gas		Fuel Comb – Residential – Other	residential_consumption_lpg.zip
Residential Heating; Fireplaces, woodstoves, fireplace inserts, pellet stoves, indoor furnaces, outdoor hydronic heaters, and firelogs.		Fuel Comb – Residential – Wood	rwc_estimation_tool_2011v1_120612.zip
Commercial Cooking		Commercial Cooking	commercial_cooking_2302002nnn_2011.zip
Architectural Coatings		Solvent – Non-Industrial Surface Coating	surface_coatings_arch_coatings_whaps_2011.zip
Traffic Markings		Solvent – Industrial Surface Coating & Solvent Use	traffic_markings_whaps_2011.zip
Consumer & Commercial – All personal care products		Solvent – Consumer & Commercial Solvent Use	cons_comm_personal_care_products_whaps_2011.zip
Consumer & Commercial – All household products		Solvent – Consumer & Commercial Solvent Use	cons_comm_misc_products_whaps_2011.zip cons_comm_cleaning_products_whaps_2011.zip

EPA-estimated emissions source description	Carried Forward	EIS Sector Name	Name of supporting data file or other reference
			cons_comm_auto_aftermarket_whaps_2011.zip
Consumer & Commercial – All coatings and related products		Solvent – Consumer & Commercial Solvent Use	cons_comm_coatings_and_related_products_whaps_2011.zip
Consumer & Commercial – All adhesives and sealants		Solvent – Consumer & Commercial Solvent Use	cons_comm_adhesives_sealants_whaps_2011.zip
Consumer & Commercial – All FIFRA related products		Solvent – Consumer & Commercial Solvent Use	cons_comm_fifra_whaps_2011.zip
Consumer Pesticide Application		Solvent – Consumer & Commercial Solvent Use	cons_comm_fifra_whaps_2011.zip
Commercial Pesticide Application	x	Solvent – Consumer & Commercial Solvent Use	agricultural_pesticides_2011_eis_format.zip
Residential Portable Gas Cans		Miscellaneous Non-Industrial NEC	portable_fuel_containers_2011.zip
Commercial Portable Gas Cans		Miscellaneous Non-Industrial NEC	portable_fuel_containers_2011.zip
Open Burning – Leaves		Waste Disposal	open_burning_yard_waste_2011.zip
Open Burning – Brush		Waste Disposal	open_burning_yard_waste_2011.zip
Open Burning – Residential Household Waste		Waste Disposal	open_burning_msw_2011.zip
Open Burning – Land Clearing Debris		Waste Disposal	open_burning_land_clearing_debris_2011.zip
Publicly Owned Treatment Works		Waste Disposal	potw_2011_rev.zip
“Carried Forward” indicates whether EPA data were carried forward from the 2008 or other previous year inventory.			

• **Table 2- 2: Emissions sources in York County, SC with potential nonpoint and point contribution**

EPA-estimated emissions source description	Carried Forward ?	EIS Sector Name	Link to supporting data file
Industrial, Commercial/Institutional Fuel Combustion		Fuel Comb – Industrial Boilers, ICEs – All Fuels Fuel Comb – Comm/Institutional – All Fuels	ici_fuel_combustion_by_state/
Industrial Surface Coating – Auto Refinishing		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_automobile_refinishing_2011whaps.zip
Industrial Surface Coating – Factory Finished Wood		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_factory_finished_wood_2011whaps.zip
Industrial Surface Coating – Wood Furniture		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_wood_furniture_2011whaps_rev_4.zip
Industrial Surface Coating – Metal Furniture		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_metal_furn_2011whaps.zip
Industrial Surface Coating – Metal Can Coating		Solvent – Industrial Surface Coating & Solvent Use	surface_coatings_metal_can_whaps_2011.zip
Industrial Surface Coating – Machinery and Equipment		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_machinery_and equip_whaps2011.zip
Industrial Surface Coating – Large Appliances		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_appliances_2011whaps.zip
Industrial Surface Coating – Motor Vehicles		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_motor%20vehicles_whaps_2011.zip
Other Special Purpose Coatings		Solvent – Industrial Surface Coating & Solvent Use	surface_coating_other_special_purpose_whaps_2011.zip
Degreasing		Solvent – Degreasing	degreasing_whaps_2011_eisformat.zip
Graphic Arts		Solvent – Graphic Arts	graphic_arts_w_haps_2011.zip
Dry Cleaning		Solvent – Dry Cleaning	dry_cleaning_emissions_2011_rev.zip
Gasoline Distribution – Stage	x	Bulk Gasoline	gasoline_distribution_stage_1_bu

EPA-estimated emissions source description	Carried Forward ?	EIS Sector Name	Link to supporting data file
1 Bulk Plants		Terminals	lk_plants_2011.zip
Gasoline Distribution – Stage 1 Bulk Terminals	x	Bulk Gasoline Terminals	gasoline_distribution_stage%201%20bulk_terminals_2011.zip
Gasoline Distribution – Stage 1 Service Station Unloading		Gas Stations	gas_distribution_service_station_unloading_eis_format.zip
Gasoline Distribution – Stage 1 Underground Storage Tanks		Gas Stations	gasoline_distribution_stage1_ust_2011.zip
“Carried Forward” indicates whether EPA data were carried forward from previous year inventory.			

2.3 NON-POINT AVERAGE SUMMER DAY EMISSIONS ESTIMATE

The Department does not have ozone season emissions data for the NAA of York, County, SC, so the whole York County, SC annual emissions from the EPA’s 2011 NEI v1 was used as the starting point. The next step was to allocate the annual emissions down to an average ozone season day. No known allocation factors were available to do this so the annual emissions were allocated down to an average daily value by dividing by 365 (the number of days in the year 2011). The resulting average daily value was assumed to be an average ozone season daily value.

2.4 EMISSIONS PROJECTIONS

The county-level emissions inventory was projected to future years first, and then the emissions were allocated down to the York NAA using the percentages in Table 2-4. Various sources of data, such as population growth, energy consumption by sector, and county business patterns from the Census, were used to determine the growth projections. Table 2-3 contains the source and growth factors for each of the source categories.

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• **Table 2- 3: Growth Factors for each Area Source Category**

Area Source Category	Source of Growth Factors	Comments	Growth Factors			
			2014	2018	2022	2026
Architectural Coating	Population	RFATS MPO and Census	1.0518	1.1122	1.1718	1.2308
Autobody Refinishing	Employment-NAICS 811121	Census-County Business Patterns	1.0224	1.0789	1.1355	1.192
Degreasing	No Growth		1	1	1	1
Dry Cleaning	Employment-NAICS 812310 and 812320 (assume same growth rates for 2018, 2022, 2026 so there is no neg growth)	Census-County Business Patterns	0.5033	0.2005	0.2005	0.2005
Graphic Arts	No Growth		1	1	1	1
Open Burning	No Growth		1	1	1	1
Surface Coatings-Automobiles	Employment-NAICS 336\	Census-County Business Patterns	1.0662	1.0428	1.0195	0.9961
Surface Coatings-Electronics	No Growth		1	1	1	1
Surface Coatings-Machinery and Equipment	No Growth		1	1	1	1
Surface Coatings-Metal Furniture	No Growth		1	1	1	1
Surface Coatings-Misc Manuf	Employment-NAICS 339\	Census-County Business Patterns	0.9472	0.8639	0.7805	0.6971
Surface Coatings-Paper, Film and Foil	No Growth		1	1	1	1
Surface Coatings-Wood Furniture	No Growth		1	1	1	1
Surface Coatings-Industrial Maintenance	Population	RFATS MPO and US Census	1.0518	1.1122	1.1718	1.2308
Surface Coatings-Other Special Purpose	Population	RFATS MPO and US Census	1.0518	1.1122	1.1718	1.2308
Commercial Cooking	Employment-NAICS 722	Census-County Business Patterns	1.0932	1.1172	1.2852	1.3811
Consumer and Commercial Solvents	Population	RFATS MPO and US Census	1.0518	1.1122	1.1718	1.2308
Gasoline Distribution-UST Breathing and Emptying	2014 Energy Outlook-Transportation Motor Gasoline	Energy Consumption-South Atlantic Region	0.9852	0.9666	0.9234	0.8698
Gasoline Distribution-Truck Transit	2014 Energy Outlook-Transportation Motor Gasoline	Energy Consumption-South Atlantic Region	0.9852	0.9666	0.9234	0.8698
Gasoline Distribution-Gasoline Service Station Unloading	No growth, all years calculated because the emissions are based on RVP					
Traffic Markings	Statewide Paved Roads	NC Department of Transportation	1.0065	1.0151	1.0237	1.0323
Industrial Combustion	No Growth		1	1	1	1
Commercial Combustion	No Growth		1	1	1	1

Area Source Category	Source of Growth Factors	Comments	Growth Factors			
			2014	2018	2022	2026
Residential Combustion , Coal	No Growth		1	1	1	1
Residential Combustion , Distillate Oil	2014 Energy Outlook-Residential Distillate Oil	Energy Consumption-South Atlantic Region	1.0287	0.9345	0.8624	0.7992
Residential Combustion, NG	2014 Energy Outlook-Residential NG	Energy Consumption-South Atlantic Region	1.0461	1.0157	1.0157	1.014
Residential Combustion , LPG	2014 Energy Outlook-Residential LPG	Energy Consumption-South Atlantic Region	0.9759	0.9085	0.8660	0.8316
Residential Combustion, Kerosene	2014 Energy Outlook-Residential Kerosene	Energy Consumption-South Atlantic Region	0.2819	0.2175	0.1959	0.177
Fireplace: general	EPA GFs-2018 Emissions Modeling Platform		1.072	1.072	1.072	1.072
Woodstove: fireplace inserts; non-EPA certified	EPA GFs-2018 Emissions Modeling Platform		0.897	0.897	0.897	0.897
Woodstove: fireplace inserts; EPA certified; non-catalytic	EPA GFs-2018 Emissions Modeling Platform		1.181	1.181	1.181	1.181
Woodstove: fireplace inserts; EPA certified; catalytic	EPA GFs-2018 Emissions Modeling Platform		1.181	1.181	1.181	1.181
Woodstove: freestanding, non-EPA certified	EPA GFs-2018 Emissions Modeling Platform		0.980	0.980	0.980	0.980
Woodstove: freestanding, EPA certified, non-catalytic	EPA GFs-2018 Emissions Modeling Platform		1.181	1.181	1.181	1.181
Woodstove: freestanding, EPA certified, catalytic	EPA GFs-2018 Emissions Modeling Platform		1.181	1.181	1.181	1.181
Woodstove: pellet-fired, general (freestanding or FP insert)	EPA GFs-2018 Emissions Modeling Platform		1.645	1.645	1.645	1.645
Hydronic heater: outdoor	EPA GFs-2018 Emissions Modeling Platform		1.237	1.237	1.237	1.237
Outdoor wood burning device, NEC (fire-pits, chimeas, etc)	EPA GFs-2018 Emissions Modeling Platform		1.072	1.072	1.072	1.072
Firelog Total: All Combustor Types	EPA GFs-2018 Emissions Modeling Platform		1.072	1.072	1.072	1.072

2.5 ALLOCATION OF EMISSIONS TO YORK NONATTAINMENT AREA

The NEI area source inventory contains emissions at the county-level. The ratio of the York NAA population to the county population was used to estimate emissions for the York NAA. Table 2-4 contains the 2011 population for York County, taken from the US Census, and population projections as determined by the RFATS MPO. The population of the York NAA is also provided, as well as the percentage of the NAA to the entire county. This percentage was used to allocate the county-level emissions to the York NAA.

• **Table 2- 4: Population data**

	2011	2014	2018	2022	2026
York NA Area	---	185,086	206,444	223,407	242,750
York County	230,528	242,106	266,363	287,072	310,932
% Population in NA Area	---	76.4	77.5	77.8	78.1

3.0 AREA SOURCE EMISSIONS

The area source categories are presented in the following sections and like source classification codes (SCCs) are grouped together. The sections include methodologies, as appropriate, 2011 annual emissions in tons for York County and future year projected emissions in tons per day for the York NAA area.

The tons per day emissions were calculated, as follows, and an example NO_x calculation for SCC 2102002000 Industrial Bituminous / Subbituminous Coal Combustion is included with each step.

Step 1 Full County Ozone Day Emissions:

The York County NO_x emissions are ratioed to the ozone season day (1/ 365) emissions.

2011 York County emissions * 0.002739 = 20.36 tons * 0.002739 = 0.0558 tons per ozone day

Step 2 Ozone Day Emissions are grown to Future Year:

The York County emissions for NO_x were multiplied by the yearly Growth Factor to estimate projected year emissions.

2011 tons per ozone day * 2011-2014 growth factor = 2014 York County NO_x tons per ozone day
 0.0558 * 1 = 0.0558 2014 tons per ozone day (see Table 2-2)

Step 3: Allocate Emissions to York NAA

The projections were then allocated to the York NAA, using the percentages provided in the population Table 2-4.

0.0558 tons per ozone day * 76.4% = 0.0426 tons per ozone day of NO_x for the 2014 York NAA

3.1 INDUSTRIAL COMBUSTION – VARIOUS FUELS

This category contains industrial boiler emissions from bituminous/subbituminous coal, distillate oil, residual oil, natural gas, wood, and kerosene. Liquid Petroleum Gas emissions are all assumed to be accounted for in the point source inventory. This category includes boilers, ICE, including reciprocating and turbines, industrial space heaters and orchard heaters (nonpoint) firing any type of fuel. The Department did identify Point source fuel consumptions for this category and subtracted it from the total county level fuel consumption. The county level fuel consumption, minus point source contribution, was used to estimate the emissions for this category.

The EPA approach used in calculating emissions for industrial fuel combustion is to first develop state-level fuel consumption estimates, then to allocate these to the county-level, and then to multiply the resulting county-level consumption estimates by appropriate emission factors.

Total state-level industrial sector energy consumption data are available from the EIA's State Energy Data System (SEDS), and were used for most source categories. In calculating the emission activity for industrial fuel combustion, EPA excluded all SEDS fuel types for which EIA assumes 100 percent of consumption is non-fuel use. For fuel types for which non-fuel use occurs, but is less than 100 percent, EPA reviewed two information sources to identify the non-fuel use percentage to apply in the NEI: EIA's 2002 *Manufacturing Energy Consumption Survey* (MECS) and EIA's GHG emissions inventory for 2005. Further adjustments were made to the SEDS data for the coal and LPG sectors, and a separate EIA data source, Fuel Oil and Kerosene Sales, was used for distillate oil. These adjustments were necessary in order to avoid double counting between the point, nonroad, and nonpoint inventories. For example, coal consumed by coke plants is accounted for in the point source inventory, so when estimating nonpoint emissions, this consumption should be removed. Similarly, for distillate oil and LPG, the SEDS data includes consumption estimates for equipment that EPA includes in the nonroad sector inventory. Therefore, the SEDS data should be adjusted so that these emissions are not double counted. More details on these adjustments can be found in the documentation given in <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>. Year 2009 SEDS data were used to estimate 2011 emissions because these were the most recent consumption data available at the time this work was performed in 2012. County-level activity estimates were developed by allocating the state-level adjusted EIA data. To do this, the EPA compiled 2009 estimates of manufacturing sector employment from the Bureau of Census' *County Business Patterns 2009* for use in this procedure. We allocated state-level industrial fuel combustion by fuel type to each county using the ratio of the number of manufacturing sector (NAICS codes 31-33) employees in each county to the total number of manufacturing sector employees in the state. A separate document describes how withheld *County Business Patterns* employment data were estimated.

- **Table 3- 1: NO_x Emissions (ton per year) for York County – Industrial Combustion**

SCC	SCC Description	York Co. (whole) annual NO_x
2102001000	Stationary Source Fuel Combustion_Anthracite Coal_Industrial_Total	0.00
2102002000	Stationary Source Fuel Combustion_Bituminous/Subbituminous Coal_Industrial_Total	20.36
2102004001	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All Boiler Types	0.00
2102004002	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All IC Engine Types	45.96
2102005000	Stationary Source Fuel Combustion_Residual Oil_Industrial_Total: All Boiler Types	5.87
2102006000	Stationary Fuel Combustion_Natural Gas_Industrial_Total: Boilers and IC Engines	14.70
2102007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Industrial_Total: All Boiler Types	0.00
2102008000	Stationary Source Fuel Combustion_Wood_Industrial_Total: All Boiler Types	119.51
2102011000	Stationary Source Fuel Combustion_Kerosene_Industrial_Total: All Boiler Types	0.03

- **Table 3- 2: VOC Emissions (ton per year) for York County – Industrial Combustion**

SCC	SCC Description	York Co. (whole) annual VOC
2102001000	Stationary Source Fuel Combustion_Anthracite Coal_Industrial_Total	0.00
2102002000	Stationary Source Fuel Combustion_Bituminous/Subbituminous Coal_Industrial_Total	0.09
2102004001	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All Boiler Types	0.00
2102004002	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All IC Engine Types	3.72
2102005000	Stationary Source Fuel Combustion_Residual Oil_Industrial_Total: All Boiler Types	0.02

SCC	SCC Description	York Co. (whole) annual VOC
2102006000	Stationary Fuel Combustion_Natural Gas_Industrial_Total: Boilers and IC Engines	0.80
2102007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Industrial_Total: All Boiler Types	0.00
2102008000	Stationary Source Fuel Combustion_Wood_Industrial_Total: All Boiler Types	9.23
2102011000	Stationary Source Fuel Combustion_Kerosene_Industrial_Total: All Boiler Types	0.00

- Table 3- 3: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area – Industrial Combustion**

SCC	SCC Description	2014 NO_x	2018 NO_x	2022 NO_x	2026 NO_x
2102001000	Stationary Source Fuel Combustion_Anthracite Coal_Industrial_Total	0.0000	0.0000	0.0000	0.0000
2102002000	Stationary Source Fuel Combustion_Bituminous/Subbituminous Coal_Industrial_Total	0.0426	0.0432	0.0434	0.0436
2102004001	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All Boiler Types	0.0000	0.0000	0.0000	0.0000
2102004002	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All IC Engine Types	0.0962	0.0976	0.0979	0.0983
2102005000	Stationary Source Fuel Combustion_Residual Oil_Industrial_Total: All Boiler Types	0.0123	0.0125	0.0125	0.0126
2102006000	Stationary Fuel Combustion_Natural Gas_Industrial_Total: Boilers and IC Engines	0.0308	0.0312	0.0313	0.0314
2102007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Industrial_Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2102008000	Stationary Source Fuel Combustion_Wood_Industrial_Total: All Boiler Types	0.2501	0.2537	0.2547	0.2557
2102011000	Stationary Source Fuel Combustion_Kerosene_Industrial_Total: All Boiler Types	0.0001	0.0001	0.0001	0.0001

- Table 3- 4: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Industrial Combustion**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2102001000	Stationary Source Fuel Combustion_Anthracite Coal_Industrial_Total	0.0000	0.0000	0.0000	0.0000
2102002000	Stationary Source Fuel Combustion_Bituminous/Subbituminous Coal_Industrial_Total	0.0002	0.0002	0.0002	0.0002
2102004001	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All Boiler Types	0.0000	0.0000	0.0000	0.0000
2102004002	Stationary Source Fuel Combustion_Distillate Oil_Industrial_All IC Engine Types	0.0078	0.0079	0.0079	0.0080
2102005000	Stationary Source Fuel Combustion_Residual Oil_Industrial_Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000
2102006000	Stationary Fuel Combustion_Natural Gas_Industrial_Total: Boilers and IC Engines	0.0017	0.0017	0.0017	0.0017
2102007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Industrial_Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000
2102008000	Stationary Source Fuel Combustion_Wood_Industrial_Total: All Boiler Types	0.0193	0.0196	0.0197	0.0197
2102011000	Stationary Source Fuel Combustion_Kerosene_Industrial_Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000

3.2 COMMERCIAL INSTITUTIONAL COMBUSTION – VARIOUS FUELS

This section includes the description of five EIS sectors:

Fuel Comb – Commercial/Institutional Boilers, ICEs - Coal

Fuel Comb - Commercial/Institutional Boilers, ICEs – Oil

Fuel Comb - Commercial/Institutional Boilers, ICEs - Natural Gas

Fuel Comb - Commercial/Institutional Boilers, ICEs – Biomass

Fuel Comb - Commercial/Institutional Boilers, ICEs – Other

They are treated here in a single section because the methods used are the same across all sectors.

These five sectors are defined by the point source SCCs beginning with 103, 105 and 2030 and the nonpoint SCCs starting with 2103. These SCCs include boilers, ICE, including reciprocating and turbines, and space heaters. The primary fuels used by the boilers are coal, oil, and natural gas. Other fuels used by commercial/institutional boilers include biomass, waste products, and process gases. The primary fuels used by the ICE are natural gas and oil, but there are some which use various available process gases and LPG. The SCC-based EIS sector definitions will cause a different universe of units to be included in these sectors than would other definitions of boilers, turbines, or reciprocating internal combustion engines. For example, the industrial/Commercial/Institutional Boilers and Process Heaters MACT include 25 MW and smaller boilers used to generate electricity; these boilers are not included in the sectors described here because they may have SCCs beginning with 101.

The approach in calculating nonpoint emissions for commercial/institutional fuel combustion is to first develop state-level fuel consumption estimates, then to allocate these to the county-level, and then to multiply the resulting county-level consumption estimates by appropriate emission factors. Total state-level commercial sector energy consumption data are available from the EIA's SEDS, and were used for most source categories. Several adjustments were made to the SEDS data. These adjustments were necessary in order to avoid double counting between the nonroad and nonpoint inventories. Furthermore, for the coal sector, SEDS data do not provide coal consumption estimates by type of coal (i.e., anthracite versus bituminous/subbituminous), and this level of data is needed because of differing emission factors for these coal types. For LPG and distillate oil, the SEDS data includes consumption estimates for equipment that EPA includes in the nonroad sector inventory. Therefore, the SEDS data should be adjusted so that these emissions are not double counted.

To estimate the volume of commercial/institutional sector LPG consumption that should not be included in the nonpoint source inventory, EPA subtracted 18 percent from each state's commercial sector LPG consumption estimate reported in SEDS. EPA ran the NMIM, which uses the NONROAD2008a model, for 2006 and calculated the national volume of nonroad LPG consumption from commercial sector source categories. This estimate was then divided into the SEDS total commercial sector LPG consumption estimate to yield the proportion of total commercial/institutional sector LPG consumption attributable to the nonroad sector in that year (approximately 18 percent). To avoid double-counting of distillate oil consumption between the nonpoint and nonroad sector emission inventories, EPA relied on a source other than SEDS to estimate consumption. The approach uses more detailed distillate oil consumption estimates

reported in EIA's *Fuel Oil and Kerosene Sales*, and assumptions from the regulatory impact analysis (RIA) for EPA's nonroad diesel emissions rulemaking. Table 4 displays the assumptions that were applied to the state-level distillate oil consumption estimates reported in *Fuel Oil and Kerosene Sales* to estimate total stationary source commercial/institutional sector consumption. The percentages shown in Table 4 come from page 7-8 of EPA's RIA for the nonroad diesel emissions rulemaking. More details on these adjustments can be found in the documentation given in <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>. Year 2009 SEDS data were used to estimate 2011 emissions because these were the latest year consumption data available at the time this work was performed in 2012.

- Table 3- 5: Assumptions Used to Estimate Commercial/Institutional Sector Stationary Source Distillate Fuel Consumption**

Sector	Distillate Fuel Type	Percent (%) of Total Consumption from Stationary Sources
Commercial	No. 1 Distillate Fuel Oil	80
	No. 2 Distillate Fuel Oil	100
	No. 2 Distillate/Ultra-Low, Low, and High Sulfur Diesel	0 ^a
	No. 4 Distillate Fuel Oil	100

a. A very small portion of total commercial/institutional diesel is consumed by point sources (SCC 203001xx).

Year 2009 county-level activity estimates were developed by allocating the state-level activity resulting from the adjustments to the SEDS data described above. The EPA compiled 2006 estimates of commercial sector (NAICS codes 42 through 81) employment from the Bureau of Census' *County Business Patterns 2009* for use in this procedure. A separate document describes how withheld *County Business Patterns* employment data were estimated. The EPA also developed 2006 county-level estimates of institutional sector (NAICS code 92) employment from 2007 local government employment data in the *2007 Census of Governments* and adjustments reflecting each state's 2006/2007 local government employment ratio. State-level commercial/institutional fuel combustion by fuel type was allocated to each county using the ratio of the number of commercial/institutional sector employees in each county to the total number of commercial/institutional sector employees in the state.

- Table 3- 6: NO_x Emissions (ton per year) for York County– Commercial Institutional Combustion**

SCC	SCC Description	NO _x
2103001000	Stationary Source Fuel Combustion Anthracite Coal Commercial/Institutional Total: All Boiler Types	0.00
2103002000	Stationary Source Fuel Combustion Bituminous/Subbituminous Coal Commercial/Institutional Total: All Boiler Types	0.44
2103004001	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional Boilers	0.07

SCC	SCC Description	NO _x
2103004002	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional IC Engines	2.92
2103005000	Stationary Source Fuel Combustion Residual Oil Commercial/Institutional Total: All Boiler Types	0.00
2103006000	Stationary Source Fuel Combustion Natural Gas Commercial/Institutional Total: Boilers and IC Engines	41.48
2103007000	Stationary Source Fuel Combustion Liquified Petroleum Gas (LPG) Commercial/Institutional Total: All Combustor Types	0.05
2103008000	Stationary Source Fuel Combustion Wood Commercial/Institutional Total: All Boiler Types	2.95
2103011000	Stationary Source Fuel Combustion Kerosene Commercial/Institutional Total: All Combustor Types	0.31

- Table 3- 7: VOC Emissions (ton per year) for York– Commercial Institutional Combustion**

SCC	SCC Description	VOC
2103001000	Stationary Source Fuel Combustion Anthracite Coal Commercial/Institutional Total: All Boiler Types	0.00
2103002000	Stationary Source Fuel Combustion Bituminous/Subbituminous Coal Commercial/Institutional Total: All Boiler Types	0.00
2103004001	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional Boilers	0.00
2103004002	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional IC Engines	0.00
2103005000	Stationary Source Fuel Combustion Residual Oil Commercial/Institutional Total: All Boiler Types	0.00
2103006000	Stationary Source Fuel Combustion Natural Gas Commercial/Institutional Total: Boilers and IC Engines	2.28
2103007000	Stationary Source Fuel Combustion Liquified Petroleum Gas (LPG) Commercial/Institutional Total: All Combustor Types	0.00
2103008000	Stationary Source Fuel Combustion Wood Commercial/Institutional Total: All Boiler Types	0.22
2103011000	Stationary Source Fuel Combustion Kerosene Commercial/Institutional Total: All Combustor Types	0.01

• **Table 3- 8: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area – Commercial Institutional Combustion**

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2103001000	Stationary Source Fuel Combustion Anthracite Coal Commercial/Institutional Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000
2103002000	Stationary Source Fuel Combustion Bituminous/Subbituminous Coal Commercial/Institutional Total: All Boiler Types	0.0009	0.0009	0.0009	0.0009
2103004001	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional Boilers	0.0001	0.0001	0.0001	0.0001
2103004002	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional IC Engines	0.0061	0.0062	0.0062	0.0062
2103005000	Stationary Source Fuel Combustion Residual Oil Commercial/Institutional Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000
2103006000	Stationary Source Fuel Combustion Natural Gas Commercial/Institutional Total: Boilers and IC Engines	0.0868	0.0881	0.0884	0.0887
2103007000	Stationary Source Fuel Combustion Liquified Petroleum Gas (LPG) Commercial/Institutional Total: All Combustor Types	0.0001	0.0001	0.0001	0.0001
2103008000	Stationary Source Fuel Combustion Wood Commercial/Institutional Total: All Boiler Types	0.0062	0.0063	0.0063	0.0063
2103011000	Stationary Source Fuel Combustion Kerosene Commercial/Institutional Total: All Combustor Types	0.0006	0.0007	0.0007	0.0007

• **Table 3- 9: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Commercial Institutional Combustion**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2103001000	Stationary Source Fuel Combustion Anthracite Coal Commercial/Institutional Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2103002000	Stationary Source Fuel Combustion Bituminous/Subbituminous Coal Commercial/Institutional Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000
2103004001	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional Boilers	0.0000	0.0000	0.0000	0.0000
2103004002	Stationary Source Fuel Combustion Distillate Oil Commercial/Institutional IC Engines	0.0000	0.0000	0.0000	0.0000
2103005000	Stationary Source Fuel Combustion Residual Oil Commercial/Institutional Total: All Boiler Types	0.0000	0.0000	0.0000	0.0000
2103006000	Stationary Source Fuel Combustion Natural Gas Commercial/Institutional Total: Boilers and IC Engines	0.0048	0.0048	0.0049	0.0049
2103007000	Stationary Source Fuel Combustion Liquefied Petroleum Gas (LPG) Commercial/Institutional Total: All Combustor Types	0.0000	0.0000	0.0000	0.0000
2103008000	Stationary Source Fuel Combustion Wood Commercial/Institutional Total: All Boiler Types	0.0005	0.0005	0.0005	0.0005
2103011000	Stationary Source Fuel Combustion Kerosene Commercial/Institutional Total: All Combustor Types	0.0000	0.0000	0.0000	0.0000

3.3 RESIDENTIAL COMBUSTION – VARIOUS FUELS

Residential NG and LPG usage is influenced strongly by seasonal temperatures. During the summer months usage will generally be for cooking and operating appliances, such as water heaters and clothes dryers. It was assumed that during the summer months no residential oil, coal, or wood were used since these are normally used only for residential heating. Emissions for these activities (oil, coal, and wood) have been marked as “NA” (not applicable) in the daily tables.

The approach in calculating nonpoint emissions for residential fuel combustion is to first develop state-level fuel consumption estimates, then to allocate these to the county-level, and then to multiply the resulting county-level consumption estimates by appropriate emission factors.

Total state-level residential sector energy consumption data are available from the EIA’s SEDS, and were used for most source categories. Several adjustments were made to the SEDS data. These adjustments were necessary in order to avoid double counting between the nonroad and nonpoint inventories.

The source category for residential wood burning includes devices such as fireplaces, fireplaces with inserts (inserts), free standing woodstoves, pellet stoves, outdoor hydronic heaters (also know as outdoor wood boilers), indoor furnaces, and outdoor burning in firepits and chimeneas. We further differentiate free standing woodstoves and inserts into three categories: conventional (not EPA certified); EPA certified, catalytic; and EPA certified, noncatalytic. Generally speaking, the conventional units were constructed prior to 1988. Units constructed after 1988 had to meet EPA emission standards and they are either catalytic or non-catalytic. EPA estimates emission for all SCCs other than SCC=2104008300, which is a general woodstove SCC that provides no details on the category.

Emission estimates were developed using a tool in Microsoft® Access®, developed by EPA. This tool computes county- and SCC-level emissions of criteria and HAPs for the entire country. EPA updated the inputs to the tool for the 2011 NEI in partnership with ERTAC. For the 2011 inventory, the appliance profiles were updated using the newest American Housing Survey results.

The emissions from RWC are calculated using the equation below

$$E_y = u \times EF_y \times CF_y \quad \text{where:}$$

E_y = annual emissions (tons/yr) for a specific appliance (SCC)

u = annual activity (tons of fuel burned/yr)

EF_y = emission factor (tons of pollutant emitted/ mass of fuel used)

CF_y = control factor

y is a specific pollutant

• **Table 3- 10: NO_x Emissions (ton per year) for York County– Residential Combustion**

SCC	SCC Description	NO _x
2104001000	Stationary Source Fuel Combustion_Anthracite Coal_Residential_Total: All Combustor Types	0.00
2104002000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	0.04
2104004000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	3.12
2104006000	Stationary Source Fuel Combustion_Natural Gas_Residential_Total: All Combustor Types	79.86
2104007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Residential_Total: All Combustor Types	10.50
2104008100	Stationary Source Fuel Combustion_Wood_Residential_Fireplace: general	1.44
2104008210	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; non-EPA certified	3.03

SCC	SCC Description	NO _x
2104008220	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; EPA certified; non-catalytic	0.79
2104008230	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; EPA certified; catalytic	0.23
2104008310	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, non-EPA certified	1.27
2104008320	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, EPA certified, non-catalytic	0.33
2104008330	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, EPA certified, catalytic	0.09
2104008400	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: pellet-fired, general (freestanding or FP insert)	0.19
2104008610	Stationary Source Fuel Combustion_Wood_Residential_Hydronic heater: outdoor	0.00
2104008700	Stationary Source Fuel Combustion_Wood_Residential_Outdoor wood burning device, NEC (fire-pits, chimineas, etc)	0.05
2104009000	Stationary Source Fuel Combustion_Firelog_Residential_Total: All Combustor Types	0.61
2104011000	Stationary Source Fuel Combustion_Kerosene_Residential_Total: All Heater Types	1.48

- Table 3- 11: VOC Emissions (ton per year) for York County – Residential Combustion**

SCC	SCC Description	VOC
2104001000	Stationary Source Fuel Combustion_Anthracite Coal_Residential_Total: All Combustor Types	0.00
2104002000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	0.04
2104004000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	0.12
2104006000	Stationary Source Fuel Combustion_Natural Gas_Residential_Total: All Combustor Types	4.67
2104007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Residential_Total: All Combustor Types	0.38
2104008100	Stationary Source Fuel Combustion_Wood_Residential_Fireplace: general	10.48
2104008210	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; non-EPA certified	57.41
2104008220	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; EPA certified; non-catalytic	4.16
2104008230	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; EPA certified; catalytic	1.73

SCC	SCC Description	VOC
2104008310	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, non-EPA certified	24.05
2104008320	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, EPA certified, non-catalytic	1.74
2104008330	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, EPA certified, catalytic	0.72
2104008400	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: pellet-fired, general (freestanding or FP insert)	0.00
2104008610	Stationary Source Fuel Combustion_Wood_Residential_Hydronic heater: outdoor	0.00
2104008700	Stationary Source Fuel Combustion_Wood_Residential_Outdoor wood burning device, NEC (fire-pits, chimineas, etc)	0.40
2104009000	Stationary Source Fuel Combustion_Firelog_Residential_Total: All Combustor Types	3.17
2104011000	Stationary Source Fuel Combustion_Kerosene_Residential_Total: All Heater Types	0.05

• **Table 3- 12: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area – Residential Combustion**

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2104001000	Stationary Source Fuel Combustion_Anthracite Coal_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104002000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104004000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104006000	Stationary Source Fuel Combustion_Natural Gas_Residential_Total: All Combustor Types	0.1748	0.1722	0.1728	0.1732
2104007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Residential_Total: All Combustor Types	0.0214	0.0202	0.0194	0.0187
2104008100	Stationary Source Fuel Combustion_Wood_Residential_Fireplace: general	NA	NA	NA	NA

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2104008210	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : fireplace inserts; non-EPA certified	NA	NA	NA	NA
2104008220	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : fireplace inserts; EPA certified; non- catalytic	NA	NA	NA	NA
2104008230	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : fireplace inserts; EPA certified; catalytic	NA	NA	NA	NA
2104008310	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : freestanding, non-EPA certified	NA	NA	NA	NA
2104008320	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : freestanding, EPA certified, non-catalytic	NA	NA	NA	NA
2104008330	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : freestanding, EPA certified, catalytic	NA	NA	NA	NA
2104008400	Stationary Source Fuel Combustion_Wood_Residential_Woodstove : pellet-fired, general (freestanding or FP insert)	NA	NA	NA	NA
2104008610	Stationary Source Fuel Combustion_Wood_Residential_Hydronic heater: outdoor	NA	NA	NA	NA
2104008700	Stationary Source Fuel Combustion_Wood_Residential_Outdoor wood burning device, NEC (fire-pits, chimineas, etc)	NA	NA	NA	NA
2104009000	Stationary Source Fuel Combustion_Firelog_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104011000	Stationary Source Fuel Combustion_Kerosene_Residential_Total: All Heater Types	NA	NA	NA	NA

• **Table 3- 13: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Residential Combustion**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2104001000	Stationary Source Fuel Combustion_Anthracite Coal_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104002000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104004000	Stationary Source Fuel Combustion_Distillate Oil_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104006000	Stationary Source Fuel Combustion_Natural Gas_Residential_Total: All Combustor Types	0.0102	0.0101	0.0101	0.0101
2104007000	Stationary Source Fuel Combustion_Liquified Petroleum Gas (LPG)_Residential_Total: All Combustor Types	0.0008	0.0007	0.0007	0.0007
2104008100	Stationary Source Fuel Combustion_Wood_Residential_Fireplace: general	NA	NA	NA	NA
2104008210	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; non-EPA certified	NA	NA	NA	NA
2104008220	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; EPA certified; non-catalytic	NA	NA	NA	NA
2104008230	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: fireplace inserts; EPA certified; catalytic	NA	NA	NA	NA
2104008310	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, non-EPA certified	NA	NA	NA	NA
2104008320	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, EPA certified, non-catalytic	NA	NA	NA	NA
2104008330	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: freestanding, EPA certified, catalytic	NA	NA	NA	NA

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2104008400	Stationary Source Fuel Combustion_Wood_Residential_Woodstove: pellet-fired, general (freestanding or FP insert)	NA	NA	NA	NA
2104008610	Stationary Source Fuel Combustion_Wood_Residential_Hydraulic heater: outdoor	NA	NA	NA	NA
2104008700	Stationary Source Fuel Combustion_Wood_Residential_Outdoor wood burning device, NEC (fire-pits, chimineas, etc)	NA	NA	NA	NA
2104009000	Stationary Source Fuel Combustion_Firelog_Residential_Total: All Combustor Types	NA	NA	NA	NA
2104011000	Stationary Source Fuel Combustion_Kerosene_Residential_Total: All Heater Types	NA	NA	NA	NA

3.4 COMMERCIAL COOKING – CHARBROILING

Commercial cooking refers to the cooking of meat, including steak, hamburger, poultry, pork, and seafood, and French fries on five different cooking devices: chain-driven (conveyorized) charbroilers, underfired charbroilers, deep-fat fryers, flat griddles, and clamshell griddles. The York County, SC inventory includes VOC emissions from the categories in Table 3-14.

• **Table 3- 14: Source Classification Codes used in the Commercial Cooking sector**

2302002100	Commercial Cooking	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Charbroiling	Conveyorized Charbroiling
2302002200	Commercial Cooking	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Charbroiling	Under-fired Charbroiling
2302003100	Commercial Cooking	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Frying	Flat Griddle Frying
2302003000	Commercial Cooking	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Frying	Deep Fat Frying
2302003200	Commercial Cooking	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Frying	Clamshell Griddle Frying

The approach to estimating emissions from commercial cooking in 2011 consists of three general steps, as follows:

- Determine county-level activity, i.e., the number of restaurants in each county in 2011;
- Determine the fraction of restaurants with commercial cooking equipment, the average number of units of each type of equipment per restaurant, and the average amount of food cooked on each type of equipment; and
- Apply emission factors to each type of food for each type of commercial cooking equipment.

Data on the number of restaurants in each county are available from the U.S. Census Bureau County Business Patterns database, which reports the number of full-service restaurants (NAICS 722110) and limited-service restaurants (722211) in each county. The 2002 NEI, which is the most recent inventory in which the emissions from commercial cooking were estimated using restaurant-level data, rather than population data, used the Dun and Bradstreet industry database, which contains more specific information on the type of restaurant in each county. The documentation from the 2002 NEI identifies five specific categories of restaurants that are likely to have the equipment that matches the source categories for commercial cooking emissions, including: Ethnic food restaurants, Fast food restaurants, Family restaurants, Seafood restaurants, and Steak & Barbecue restaurants. Because Dun and Bradstreet data for 2011 were not readily available, the number of restaurants had to be estimated using the 2002 data. Using the estimated number of restaurants in 2002, the number of restaurants in 2011 was determined by employing a growth factor based on the change in the number of restaurants between 2002 and 2011 as determined by the U.S. Census Bureau County Business Statistics Database.

Emission factors for each pollutant for each type of commercial cooking equipment came from the 2002 NEI documentation. This information remains the most complete catalog of emission factors for commercial cooking. The fraction of restaurants with commercial cooking equipment and the average units of equipment per restaurant were obtained.

• **Table 3- 15: NO_x Emissions (ton per year) for York County– Commercial Cooking**

SCC	SCC Description	NO _x
2302002100	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Conveyorized Charbroiling	NA
2302002200	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Under-fired Charbroiling	NA
2302003000	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Deep Fat Frying	NA
2302003100	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Flat Griddle Frying	NA
2302003200	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Clamshell Griddle Frying	NA

- **Table 3- 16: VOC Emissions (ton per year) for York County– Commercial Cooking**

SCC	SCC Description	VOC
2302002100	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Conveyorized Charbroiling	1.56
2302002200	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Under-fired Charbroiling	4.87
2302003000	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Deep Fat Frying	0.83
2302003100	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Flat Griddle Frying	0.61
2302003200	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Clamshell Griddle Frying	0.02

- **Table 3- 17: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area – Commercial Cooking**

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2302002100	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Conveyorized Charbroiling	0.0000	0.0000	0.0000	0.0000
2302002200	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Under-fired Charbroiling	0.0000	0.0000	0.0000	0.0000
2302003000	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Deep Fat Frying	0.0000	0.0000	0.0000	0.0000
2302003100	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Flat Griddle Frying	0.0000	0.0000	0.0000	0.0000
2302003200	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Clamshell Griddle Frying	0.0000	0.0000	0.0000	0.0000

- **Table 3- 18: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Commercial Cooking**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2302002100	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Conveyorized Charbroiling	0.0036	0.0037	0.0043	0.0046
2302002200	Industrial Processes_Commercial Cooking - Charbroiling_Food and Kindred Products: SIC 20_Under-fired Charbroiling	0.0111	0.0115	0.0133	0.0144
2302003000	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Deep Fat Frying	0.0019	0.0020	0.0023	0.0025
2302003100	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Flat Griddle Frying	0.0014	0.0014	0.0017	0.0018
2302003200	Industrial Processes_Commercial Cooking - Frying_Food and Kindred Products: SIC 20_Clamshell Griddle Frying	0.0000	0.0000	0.0001	0.0001

3.5 WASTE DISPOSAL, TREATMENT, AND RECOVERY: OPEN BURNING

Open burning includes the outdoor combustion of yard waste, household waste, and land clearing debris. These fires result in the emission of NO_x and VOC. The emission estimates generated by EPA in the 2011 NEIv1 were accepted for York County, SC. More detailed description of how these emissions were calculated should be available in the final draft of the 2011 NEI Technical Support Document.

- **Table 3- 19: NO_x Emissions (ton per year) for York County – Open Burning**

SCC	SCC Description	NO _x
2610000100	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Leaf Species Unspecified	0.73
2610000400	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Brush Species Unspecified	0.58
2610000500	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	55.74
2610030000	Waste Disposal, Treatment, and Recovery_Residential_Open Burning_Household Waste (use 26-10-000-xxx for Yard Wastes)	15.46

- **Table 3- 20: VOC Emissions (ton per year) for York County – Open Burning**

SCC	SCC Description	VOC
2610000100	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Leaf Species Unspecified	3.30
2610000400	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Brush Species Unspecified	2.23
2610000500	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	129.32
2610030000	Waste Disposal, Treatment, and Recovery_Residential_Open Burning_Household Waste (use 26-10-000-xxx for Yard Wastes)	22.05

- **Table 3- 21: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area – Open Burning**

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2610000100	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Leaf Species Unspecified	0.0015	0.0015	0.0016	0.0016
2610000400	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Brush Species Unspecified	0.0012	0.0012	0.0012	0.0012
2610000500	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	0.1166	0.1183	0.1188	0.1192
2610030000	Waste Disposal, Treatment, and Recovery_Residential_Open Burning_Household Waste (use 26-10-000-xxx for Yard Wastes)	0.0324	0.0328	0.0329	0.0331

• **Table 3- 22: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Open Burning**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2610000100	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Leaf Species Unspecified	0.0069	0.0070	0.0070	0.0071
2610000400	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Yard Waste - Brush Species Unspecified	0.0047	0.0047	0.0048	0.0048
2610000500	Waste Disposal, Treatment, and Recovery_All Categories_Open Burning_Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	0.2706	0.2745	0.2756	0.2766
2610030000	Waste Disposal, Treatment, and Recovery_Residential_Open Burning_Household Waste (use 26-10-000-xxx for Yard Wastes)	0.0461	0.0468	0.0470	0.0472

3.6 SOLVENT UTILIZATION: SURFACE COATING – VARIOUS PROCESSES

These categories include a list of similar operations that involve applying a coating to a surface, which may emit VOC. The following is a list of surface coating operations that were calculated for York County, SC in the 2011 NEIv1:

- Architectural Coatings
- Auto Refinishing: SIC 7532
- Traffic Markings
- Factory Finished Wood: SIC 2426
- Wood Furniture: SIC25
- Metal Furniture: SIC 25
- Machinery and Equipment: SIC 35
- Large Appliances: SIC 363
- Motor Vehicles: SIC 371
- Industrial Maintenance Coatings
- Other Special Purpose Coatings

An employee based emission factor was used for these categories. The emission estimates generated by the joint collaboration of ERTAC and EPA, were used in the 2011 NEIv1 and were also accepted for York County, SC. It is possible to have some overlap with point sources with these three categories, but that was not the case for York Co, SC and no point source subtractions were made.

No NO_x emissions were associated with these SCCs in the inventory.

• **Table 3- 23: VOC Emissions (ton per year) for York County - Surface Coating**

SCC	SCC Description	VOC
2401001000	Solvent Utilization_Surface Coating_Architectural Coatings_Total: All Solvent Types	264.50
2401005000	Solvent Utilization_Surface Coating_Auto Refinishing: SIC 7532_Total: All Solvent Types	48.14
2401008000	Solvent Utilization_Surface Coating_Traffic Markings_Total: All Solvent Types	0.26
2401015000	Solvent Utilization_Surface Coating_Factory Finished Wood: SIC 2426 thru 242_Total: All Solvent Types	1.20
2401020000	Solvent Utilization_Surface Coating_Wood Furniture: SIC 25_Total: All Solvent Types	2.70
2401025000	Solvent Utilization_Surface Coating_Metal Furniture: SIC 25_Total: All Solvent Types	1.86
2401030000	Solvent Utilization_Surface Coating_Paper: SIC 26_Total: All Solvent Types	0.00
2401055000	Solvent Utilization_Surface Coating_Machinery and Equipment: SIC 35_Total: All Solvent Types	15.31
2401060000	Solvent Utilization_Surface Coating_Large Appliances: SIC 363_Total: All Solvent Types	1.76
2401065000	Solvent Utilization_Surface Coating_Electronic and Other Electrical: SIC 36 - 363_Total: All Solvent Types	0.13
2401070000	Solvent Utilization_Surface Coating_Motor Vehicles: SIC 371_Total: All Solvent Types	130.78
2401090000	Solvent Utilization_Surface Coating_Miscellaneous Manufacturing_Total: All Solvent Types	0.00
2401100000	Solvent Utilization_Surface Coating_Industrial Maintenance Coatings_Total: All Solvent Types	68.17
2401200000	Solvent Utilization_Surface Coating_Other Special Purpose Coatings_Total: All Solvent Types	7.23

• **Table 3- 24: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Surface Coating**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2401001000	Solvent Utilization_Surface Coating_Architectural Coatings_Total: All Solvent Types	0.5813	0.6487	0.7019	0.7632
2401005000	Solvent Utilization_Surface Coating_Auto Refinishing: SIC 7532_Total: All Solvent Types	0.1030	0.1103	0.1165	0.1228
2401008000	Solvent Utilization_Surface Coating_Traffic Markings_Total: All Solvent Types	0.0005	0.0006	0.0006	0.0006
2401015000	Solvent Utilization_Surface Coating_Factory Finished Wood: SIC 2426 thru 242_Total: All Solvent Types	0.0026	0.0029	0.0032	0.0035
2401020000	Solvent Utilization_Surface Coating_Wood Furniture: SIC 25_Total: All Solvent Types	0.0057	0.0057	0.0058	0.0058
2401025000	Solvent Utilization_Surface Coating_Metal Furniture: SIC 25_Total: All Solvent Types	0.0039	0.0039	0.0040	0.0040
2401030000	Solvent Utilization_Surface Coating_Paper: SIC 26_Total: All Solvent Types	0.0000	0.0000	0.0000	0.0000
2401055000	Solvent Utilization_Surface Coating_Machinery and Equipment: SIC 35_Total: All Solvent Types	0.0320	0.0325	0.0326	0.0328
2401060000	Solvent Utilization_Surface Coating_Large Appliances: SIC 363_Total: All Solvent Types	0.0039	0.0043	0.0047	0.0051
2401065000	Solvent Utilization_Surface Coating_Electronic and Other Electrical: SIC 36 - 363_Total: All Solvent Types	0.0003	0.0003	0.0003	0.0003
2401070000	Solvent Utilization_Surface Coating_Motor Vehicles: SIC 371_Total: All Solvent Types	0.2918	0.2895	0.2841	0.2787
2401090000	Solvent Utilization_Surface Coating_Miscellaneous Manufacturing_Total: All Solvent Types	0.0000	0.0000	0.0000	0.0000

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2401100000	Solvent Utilization_Surface Coating_Industrial Maintenance Coatings_Total: All Solvent Types	0.1498	0.1672	0.1809	0.1967
2401200000	Solvent Utilization_Surface Coating_Other Special Purpose Coatings_Total: All Solvent Types	0.0159	0.0177	0.0192	0.0209

3.7 DEGREASING

Degreasing operations occur a lot in small shops, such as auto repair, painting operations, etc. Solvents, which can emit VOC, are often used to remove grease from a surface.

An employee based emission factor was used for this category. The emission estimates generated by the joint effort of ERTAC and EPA, were used in the 2011 NEIv1 and were also accepted for York County, SC. It is possible to have some overlap with point sources, but that was not the case for York Co, SC and no point source subtractions were made.

No NOx emissions were associated with this SCC in the 2011 EPA inventory.

- **Table 3- 25: VOC Emissions (ton per year) for York County - Degreasing**

SCC	SCC Description	VOC
2415000000	Solvent Utilization_All Processes/All Industries_Degreasing_Total: All Solvent Types	133.95

- **Table 3- 26: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area - Degreasing**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2415000000	Solvent Utilization_All Processes/All Industries_Degreasing_Total: All Solvent Types	0.2803	0.2843	0.2854	0.2865

3.8 DRY CLEANING

Dry cleaners are sources that launder clothing using solvents, some emitting VOC as a result. The VOC emissions from dry cleaning vary with the type of process and the solvent used. For the most part, dry cleaners (coin-op and conventional) are small business entities. As a result of their size, dry cleaning emissions are not captured as point sources.

An employee based emission factor was used for this category. The emission estimates generated by the joint effort of ERTAC and EPA, were used in the 2011 NEIv1 and were also accepted for York County, SC. It is possible to have some overlap with point sources, but that was not the case for York Co, SC and no point source subtractions were made.

No NO_x emissions were associated with these SCCs in the EPA inventory.

- **Table 3- 27: VOC Emissions (ton per year) for York County – Dry Cleaning**

SCC	SCC Description	VOC
2420000000	Solvent Utilization_All Processes_Dry Cleaning_Total: All Solvent Types	6.32

- **Table 3- 28: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Dry Cleaning**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2420000000	Solvent Utilization_All Processes_Dry Cleaning_Total: All Solvent Types	0.0067	0.0027	0.0027	0.0027

3.9 GRAPHIC ARTS

Graphic arts include operations that are involved in printing of newspapers, magazines, books, and other printed materials, which can be divided into several subsets based upon printing technology. Over the last decade ink-jet and offset lithography have emerged as the dominant technologies. The use of oils as ink solvents and the reduction of alcohols in the fountain solution and in the cleanup solutions have resulted in notable reductions in emissions for offset lithography. Ink-jet printing results in essentially no VOC emissions.

An employee based emission factor was used for this category. The emission estimates generated by the joint effort of ERTAC and EPA, were used in the 2011 NEIv1 and were also accepted for York County, SC. It is possible to have some overlap with point sources, but that was not the case for York Co, SC and no point source subtractions were made.

No NO_x emissions were associated with this SCC in the EPA inventory.

- **Table 3- 29: VOC Emissions (ton per year) for York County – Graphic Arts**

SCC	SCC Description	VOC
2425000000	Solvent Utilization_All Processes_Graphic Arts_Total: All Solvent Types	27.16

- **Table 3- 30: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Graphic Arts**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2425000000	Solvent Utilization_All Processes_Graphic Arts_Total: All Solvent Types	0.0568	0.0577	0.0579	0.0581

3.10 COMMERCIAL AND/ OR CONSUMER SOLVENT UTILIZATIONS (NON-INDUSTRIAL)

This category includes only non-industrial solvents that are used in commercial or consumer applications. The solvent containing products consist of a diverse grouping, e.g. personal care products, household products, automotive aftermarket products, adhesives and sealants, pesticides, some coatings, and other commercial and consumer products that may emit VOCs. VOC emissions for this category is estimated by using an agreed upon emission factor during the ERTAC collaboration with EPA. York County, SC 2011 emission estimates came from the EPA 2011 NEIv1, with no changes by the Department.

No NO_x emissions were associated with these SCCs in the EPA inventory.

- **Table 3- 31: VOC Emissions (ton per year) for York County - Commercial And/ Or Consumer Solvent Utilizations**

SCC	SCC Description	VOC
2460100000	Solvent Utilization_All Personal Care Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	214.76
2460200000	Solvent Utilization_All Household Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	203.46
2460400000	Solvent Utilization_All Automotive Aftermarket Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	153.72
2460500000	Solvent Utilization_All Coatings and Related Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	107.38
2460600000	Solvent Utilization_All Adhesives and Sealants_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	64.43

SCC	SCC Description	VOC
2460800000	Solvent Utilization_All FIFRA Related Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	201.20
2460900000	Solvent Utilization_Miscellaneous Products (Not Otherwise Covered)_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	7.91
2461850000	Solvent Utilization_Pesticide Application: Agricultural_Miscellaneous Non-industrial: Commercial_All Processes	30.21

• **Table 3- 32: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area - Commercial And/ Or Consumer Solvent Utilizations**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2460100000	Solvent Utilization_All Personal Care Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.4720	0.5267	0.5699	0.6196
2460200000	Solvent Utilization_All Household Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.4471	0.4990	0.5399	0.5870
2460400000	Solvent Utilization_All Automotive Aftermarket Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.3378	0.3770	0.4079	0.4435
2460500000	Solvent Utilization_All Coatings and Related Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.2360	0.2634	0.2850	0.3098
2460600000	Solvent Utilization_All Adhesives and Sealants_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.1416	0.1580	0.1710	0.1859
2460800000	Solvent Utilization_All FIFRA Related Products_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.4422	0.4935	0.5339	0.5805
2460900000	Solvent Utilization_Miscellaneous Products (Not Otherwise Covered)_Miscellaneous Non-industrial: Consumer and Commercial_Total: All Solvent Types	0.0174	0.0194	0.0210	0.0228

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2461850000	Solvent Utilization_Pesticide Application: Agricultural_Miscellaneous Non-industrial: Commercial_All Processes	0.0664	0.0741	0.0802	0.0872

3.11 RESIDENTIAL AND COMMERCIAL GAS CANS

Portable Fuel Containers, or PFCs, cover emissions from residential and commercial sector portable gasoline containers. Permeation, diurnal, transport, spillage, and vapor displacement emissions are typically accounted for in this category.

The emission estimates generated by the joint effort of ERTAC and EPA, were used in the 2011 NEIv1 and were also accepted for York County, SC. More detailed description of how these emissions were calculated should be available in the final draft of the 2011 NEI Technical Support Document.

No NO_x emissions were associated with these SCCs in the EPA inventory.

- **Table 3- 33: VOC Emissions (ton per year) for York County– Portable Gas Cans**

SCC	SCC Description	VOC
2501011011	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Permeation	55.68
2501011012	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Evaporation (includes Diurnal losses)	108.72
2501011013	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Spillage During Transport	8.49
2501011014	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Vapor Displacement	3.63
2501011015	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Spillage	0.24
2501012011	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Permeation	1.77
2501012012	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Evaporation (includes Diurnal losses)	3.47

SCC	SCC Description	VOC
2501012013	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Spillage During Transport	11.58
2501012014	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Vapor Displacement	7.00
2501012015	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Spillage	0.46

• **Table 3- 34: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Portable Gas Cans**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2501011011	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Permeation	0.1224	0.1366	0.1478	0.1607
2501011012	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Evaporation (includes Diurnal losses)	0.2389	0.2666	0.2885	0.3137
2501011013	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Spillage During Transport	0.0187	0.0208	0.0225	0.0245
2501011014	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Vapor Displacement	0.0080	0.0089	0.0096	0.0105
2501011015	Storage and Transport_Residential Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Spillage	0.0005	0.0006	0.0006	0.0007
2501012011	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Permeation	0.0039	0.0043	0.0047	0.0051
2501012012	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Evaporation (includes Diurnal losses)	0.0076	0.0085	0.0092	0.0100
2501012013	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Spillage During Transport	0.0254	0.0284	0.0307	0.0334

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2501012014	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Vapor Displacement	0.0154	0.0172	0.0186	0.0202
2501012015	Storage and Transport_Commercial Portable Gas Cans_Petroleum and Petroleum Product Storage_Refilling at the Pump - Spillage	0.0010	0.0011	0.0012	0.0013

3.12 PETROLEUM STORAGE AND PRODUCTS: BULK TERMINALS AND PLANTS

Due to resource constraints at EPA, 2011 emissions are assumed to be the same as 2008 emissions. This category includes VOC emissions from bulk plants and bulk terminals. The Department did identify point source emissions for this category and subtracted the point emissions from the Nonpoint emissions. This ensured that the nonpoint emissions were not double counted. Detailed documentation for EPA's 2008 NEI can be found at <http://www.epa.gov/ttn/chief/net/2008inventory.html>

No NO_x emissions were associated with these SCCs.

- **Table 3- 35: VOC Emissions (ton per year) for York County – Bulk Petroleum Terminals and Plants**

SCC	SCC Description	VOC
2501050120	Storage and Transport_Bulk Terminals: All Evaporative Losses_Petroleum and Petroleum Product Storage_Gasoline	14.11
2501055120	Storage and Transport_Bulk Plants: All Evaporative Losses_Petroleum and Petroleum Product Storage_Gasoline	5.71

- **Table 3- 36: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Bulk Petroleum Terminals and Plants**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2501050120	Storage and Transport_Bulk Terminals: All Evaporative Losses_Petroleum and Petroleum Product Storage_Gasoline	0.0291	0.0290	0.0278	0.0263
2501055120	Storage and Transport_Bulk Plants: All Evaporative Losses_Petroleum and Petroleum Product Storage_Gasoline	0.0118	0.0117	0.0112	0.0106

3.13 SERVICE STATIONS: GASOLINE AND DIESEL

Stage 1 (gasoline service station unloading and underground storage tanks) activities are not calculated by the mobile model MOVES and are, therefore, included as part of the area source inventory. While Stage 2 (gasoline refueling at the pump) activities can be calculated using MOVES, they were included in the area source inventory for consistency. Stage 2 was excluded from the MOVES runs for York County to avoid double-counting. Emission factors and equations used to calculate these emissions came from the EPA’s AP-42. The York County, SC 2011 estimates were calculated by EPA. There are no gas stations that are point sources, so no point source subtraction was required.

No NO_x emissions were associated with these SCCs.

- Table 3- 37: VOC Emissions (ton per year) for York County– Gasoline Service Stations**

SCC	SCC Description	VOC
2501060051	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 1: Submerged Filling	0.00
2501060052	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 1: Splash Filling	781.76
2501060053	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 1: Balanced Submerged Filling	0.00
2501060100	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 2: Total	148.57
2501060201	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Underground Tank: Breathing and Emptying	50.03
2501070100	Storage and Transport_Diesel Service Stations_Petroleum and Petroleum Product Storage_Stage 2: Total	11.00

- **Table 3- 38: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Gasoline Service Stations**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2501060051	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 1: Submerged Filling	0.0000	0.0000	0.0000	0.0000
2501060052	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 1: Splash Filling	1.6117	1.6040	1.5383	1.4546
2501060053	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 1: Balanced Submerged Filling	0.0000	0.0000	0.0000	0.0000
2501060100	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Stage 2: Total	0.3063	0.3048	0.2923	0.2764
2501060201	Storage and Transport_Gasoline Service Stations_Petroleum and Petroleum Product Storage_Underground Tank: Breathing and Emptying	0.1031	0.1027	0.0984	0.0931
2501070100	Storage and Transport_Diesel Service Stations_Petroleum and Petroleum Product Storage_Stage 2: Total	0.0242	0.0270	0.0292	0.0317

3.14 AIRPORTS: GASOLINE

No NO_x emissions were associated with these SCCs.

- **Table 3- 39: VOC Emissions (ton per year) for York County – Airports: Gasoline**

SCC	SCC Description	VOC
2501080050	Storage and Transport_Airports : Aviation Gasoline_Petroleum and Petroleum Product Storage_Stage 1: Total	7.15
2501080100	Storage and Transport_Airports : Aviation Gasoline_Petroleum and Petroleum Product Storage_Stage 2: Total	0.37

- **Table 3- 40: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Airports: Gasoline**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2501080050	Storage and Transport_Airports : Aviation Gasoline_Petroleum and Petroleum Product Storage_Stage 1: Total	0.0148	0.0153	0.0157	0.0162
2501080100	Storage and Transport_Airports : Aviation Gasoline_Petroleum and Petroleum Product Storage_Stage 2: Total	0.0008	0.0008	0.0008	0.0008

3.15 PETROLEUM: TRUCK – GASOLINE

No NO_x emissions were associated with these SCCs.

- **Table 3- 41: VOC Emissions (ton per year) for York County – Gasoline Transport Truck**

SCC	SCC Description	VOC
2505030120	Storage and Transport_Truck_Petroleum and Petroleum Product Transport_Gasoline	3.27

- **Table 3- 42: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Gasoline Transport Truck**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2505030120	Storage and Transport_Truck_Petroleum and Petroleum Product Transport_Gasoline	0.0067	0.0067	0.0064	0.0061

3.16 PIPELINE – GASOLINE

No NO_x emissions were associated with these SCCs in the inventory.

- **Table 3- 43: VOC Emissions (ton per year) for York County– Gasoline Pipeline**

SCC	SCC Description	VOC
2505040120	Storage and Transport_Pipeline_Petroleum and Petroleum Product Transport_Gasoline	14.03

- **Table 3- 44: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Gasoline Pipeline**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2505040120	Storage and Transport_Pipeline_Petroleum and Petroleum Product Transport_Gasoline	0.0308	0.0344	0.0372	0.0405

3.17 PUBLICLY OWNED WASTEWATER TREATMENT

No NO_x emissions were associated with these SCCs.

- **Table 3- 45: VOC Emissions (ton per year) for York County – Publicly Owned Wastewater Treatment**

SCC	SCC Description	VOC
2630020000	Waste Disposal, Treatment, and Recovery_Public Owned_Wastewater Treatment_Total Processed	4.12

- **Table 3- 46: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area – Publicly Owned Wastewater Treatment**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2630020000	Waste Disposal, Treatment, and Recovery_Public Owned_Wastewater Treatment_Total Processed	0.0091	0.0101	0.0109	0.0119

3.18 AGRICULTURE BURNING

Agricultural fires are intentional controlled burns used to burn off vegetative debris from agricultural fields. To estimate annual 2011 emissions for these types of fires, the 2011 annual crops burned information was obtained from the South Carolina Forestry Commission. Emissions were estimated using the SCFC data along with emission factors from EPA 2008 NEI (CARB memo dated Aug. 2000). Annual 2011 emissions were then adjusted to ozone season day, grown to the future years, and then adjusted to the nonattainment only portion of the county, as documented in section 2.3, 2.4, and 2.5.

- **Table 3- 47: NO_x Emissions (ton per year) for York County – Agriculture Burning**

SCC	SCC Description	NO _x
2801500000	Miscellaneous Area Sources_Agricultural Field Burning - whole field set on fire_Agriculture Production - Crops - as nonpoint_Unspecified crop type and Burn Method	1.97

- **Table 3- 48: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area - Agriculture Burning**

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2801500000	Miscellaneous Area Sources_Agricultural Field Burning - whole field set on fire_Agriculture Production - Crops - as nonpoint_Unspecified crop type and Burn Method	0.0043	0.0048	0.0052	0.0057

- **Table 3- 49: VOC Emissions (ton per year) for York County – Agriculture Burning**

SCC	SCC Description	VOC
2801500000	Miscellaneous Area Sources_Agricultural Field Burning - whole field set on fire_Agriculture Production - Crops - as nonpoint_Unspecified crop type and Burn Method	3.95

- **Table 3- 50: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area - Agriculture Burning**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2801500000	Miscellaneous Area Sources_Agricultural Field Burning - whole field set on fire_Agriculture Production - Crops - as nonpoint_Unspecified crop type and Burn Method	0.0087	0.0097	0.0105	0.0114

3.19 HUMAN CREMATION

- **Table 3- 51: NO_x Emissions (ton per year) for York County – Human Cremation**

SCC	SCC Description	NO _x
2810060100	Miscellaneous Area Sources_Cremation_Other Combustion_Humans	0.77

- **Table 3- 52: Projected NO_x Emissions (ton per ozone season day) for the York Nonattainment Area – Human Cremation**

SCC	SCC Description	2014 NO _x	2018 NO _x	2022 NO _x	2026 NO _x
2810060100	Miscellaneous Area Sources_Cremation_Other Combustion_Humans	0.0017	0.0019	0.0020	0.0022

- **Table 3- 53: VOC Emissions (ton per year) for York County – Human Cremation**

SCC	SCC Description	VOC
2810060100	Miscellaneous Area Sources_Cremation_Other Combustion_Humans	0.00

- **Table 3- 54: Projected VOC Emissions (ton per ozone season day) for the York Nonattainment Area - Human Cremation**

SCC	SCC Description	2014 VOC	2018 VOC	2022 VOC	2026 VOC
2810060100	Miscellaneous Area Sources_Cremation_Other Combustion_Humans	0.0000	0.0000	0.0000	0.0000

4.0 SUMMATION OF AREA SOURCE EMISSIONS FOR THE YORK NAA

The emissions of NO_x and VOC in ton per day for the York NAA are presented in Tables 4-1 and 4-2. The emissions in the preceding sections were summed to determine total NO_x emissions and VOC emissions for each projection year through 2026.

- **Table 4- 1: Area Source NO_x (ton per day) for the York NAA**

2014	2018	2022	2026
0.9118	0.9180	0.9206	0.9232

- **Table 4- 2: Area Source VOC (ton per day) for the York NAA**

2014	2018	2022	2026
6.8950	7.2986	7.5358	7.7965

Appendix C
On-road Mobile Source Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

The on-road mobile source inventory detailed in this section has been developed for the Rock Hill-Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization (MPO) portion of York County, South Carolina within the Charlotte-Gastonia-Rock Hill, NC-SC nonattainment area (the York NAA) for the 2008 8-hour ozone NAAQS Redesignation Demonstration and Maintenance Plan. On-road mobile sources were identified from the United States Environmental Protection Agency (EPA) highway mobile model, MOVES2014. On-road mobile sources consist of cars, trucks, and motorcycles that travel on the main roads and interstates.

Although the South Carolina Department of Health and Environmental Control ("the Department") Bureau of Air Quality (BAQ) inventories all the criteria pollutants and a large number of toxic pollutants, only the nitrogen oxides (NO_x) and volatile organic compounds (VOC) are reported here since they are important for ozone formation. The emissions in this report were projected to the years 2014 (the base year), 2018, 2022, and 2026.

2.0 EMISSION ESTIMATION APPROACH

Mobile source emissions are estimated by the methodologies suggested in the EPA document *Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity: Technical Guidance for MOVES 2010, 2010a and 2010b* (EPA-420-B-12-028, April 2012), hereafter referred to as the Technical Guidance document. (The technical guidance document for MOVES2014 had not been released when the analysis for this Redesignation Request and Maintenance Plan effort began.)

The EPA mobile model MOVES2014 is used to generate emissions for on-road mobile sources. MOVES2014, first released in July 2014 and updated in October 2014, replaces the previous emissions model, MOVES2010b, as the emissions model that EPA will maintain and support. MOVES2014 is designed to estimate emission factors and inventories, representing both exhaust and evaporative emissions as well as brake and tire wear, for VOCs, NO_x, CO, PM₁₀, PM_{2.5} and other pollutants and precursors from all types of on-road vehicles, including cars, trucks, buses, and motorcycles.

3.0 QUALITY ASSURANCE MEASURES

The quality analysis (QA) for the on-road mobile source category can be broken into three components: 1) inputs, 2) MOVES2014 run specification (runspec), and 3) MOVES2014 output. Each of these components is detailed in the paragraphs below.

In all cases, input information being used for the MOVES2014 runs was not received in MOVES2014 format. When data had to be manipulated to get it into the proper format, the final data was compared back to the original data to make sure there were no errors made and the values are represented correctly in the input files.

After the speed and vehicle miles traveled (VMT) information was acquired from the Charlotte Department of Transportation (CDOT), the data was checked for reasonableness against previous years' data for the area, where possible. Each year's estimated annual VMT was compared to each other to make sure they were all reasonable and consistent and no errors were made in generating the inputs. The speeds were all reviewed to make sure they were consistent with the road type and time of day.

Once the input files were prepared, a staff member not responsible for generating the inputs spot checked some of the files to make sure they looked reasonable and the values added up properly. This was especially helpful in reviewing the average speed distribution inputs as the development of the files was very tedious and errors could easily occur. If any discrepancies were found, they were noted back to the person who generated the input files for correction.

Since more than one staff member was responsible for doing the MOVES2014 runs, a template was created that outlined all selections and steps that needed to be included in the runspecs. This ensured consistency in the runspecs.

Once MOVES2014 was run, the output results were compared to each other to make sure they looked consistent. A couple of the years were run by more than one person to make sure the same output emissions were received. The 'moveserror' output table was also checked for each MOVES2014 run to ensure there were no errors noted during the run. In all cases, there were no errors noted for any of the runs.

A final QA step is to check the kilograms per ozone season day (kg/day) emissions developed using the input data and compare this to previous years to check for reasonableness.

4.0 DISCUSSION OF MOBILE SOURCE CATEGORIES

On-road mobile sources produce VOCs and NO_x, along with a host of other pollutants. Emissions of NO_x and VOC are estimated in the mobile source inventory required for the maintenance plan. The objective of the following section is to describe the source category and the emissions estimation procedures. This section also includes tables summarizing the estimated emissions for a typical July day for the York NAA.

4.1 Introduction and Scope

On-road mobile sources are considered those vehicles that travel on the roadways. Emissions from motor vehicles occur throughout the day while the vehicle is in motion, at idle, parked, and during refueling. All

of these emissions processes need to be estimated in order to properly reflect the total emissions from this source category. It is important to note that emissions from vehicle refueling (Stage 2 refueling emissions) and spillage loss during refueling emissions are accounted for in the Area source portion of the inventory and are not included in the MOVES2014 runs.

The EPA developed the MOVES2014 model to estimate emissions based on more current information on the way vehicles are driven in a particular area. Key inputs for MOVES2014 include information on the age of vehicles on the roads, the average speed of those vehicles, what types of roads those vehicles are traveling, and any control technologies in place in an area to reduce emissions for motor vehicles (e.g., emissions inspection programs), temperature, and humidity data.

A very important component of the on-road mobile emissions estimation process is interagency consultation. The South Carolina interagency consultation partners involved in the development of the redesignation request and maintenance plan include EPA Region 4, the South Carolina Department of Transportation (SCDOT), the Federal Highway Administration, the Federal Transit Administration, the Department and the RFATS MPO. The interagency consultation partners consult on MOVES2014 modeling inputs as well as issues concerning the motor vehicle emission budgets (MVEBs) through monthly conference calls and via email.

4.2 MOVES2014 Runs

Runspecs and inputs were developed using the EPA's Technical Guidance document as guidance. Due to the size and the complexity of the MOVES2014 input and output files, the files will be provided electronically. A complete listing of the files is referenced in Section 5.0.

4.2.1 Runspec Selections

In order to use MOVES 2014 to develop emissions for SIP purposes, certain criteria had to be met in selections made in the runspec. The following are selections made for each tab of the runspec:

Scale:

Domain/Scale= County

Calculation Type= Inventory

Time Spans:

Time Aggregation Level= Hour

Years= 2014 (Base Year), 2018, 2022 and 2026

Months= July (To represent an average summer month)

Days= Weekdays (Recommended for SIPs in the Technical Guidance document)

Hours= Start Hour= 00:00-00:59 End Hour= 23:00-23:59 (This represents all 24 hrs in a day)

Geographic Bounds:

York County, South Carolina

Domain Input Database appears at the bottom of this tab and provides access to the County Data Manager, where the actual York County specific inputs were imported for each run. These county specific inputs will be discussed in detail later in this document.

Vehicles/Equipment- Onroad Vehicle Equipment:

The Technical Guidance document indicates users must select the appropriate fuel and vehicle type combinations in the On Road Vehicle Equipment panel to reflect the full range of vehicles that will operate in the county. According to the early guidance for MOVES 2014, all gasoline, diesel, compressed natural gas (CNG) and ethanol (E-85) combinations with all source use types were selected (27 total fuel/source use type selections).

Road Type:

All 5 road types were selected.

The Technical Guidance document indicates that all SIP and regional conformity analyses must include the Off-Network road type in order to account for emissions from vehicle starts, extended idle activity, and evaporative emissions (for hydrocarbons).

Pollutants/processes:

All processes for total gaseous hydrocarbons, non-methane hydrocarbons, VOC and NO_x have been selected, except refueling and spillage emissions, since these are already captured in our area source inventory.

Output- General Output:

Units: Mass units= Kilograms

Units: Energy units= Million BTU

Units: Distance units= Miles

Activity: 'Population' and 'Distance Traveled' were selected, as recommended by the Technical Guidance document.

Kilograms have been selected because kg/day has been used since the RFATS Attainment Demonstration for the 1997 8-hour Ozone Standard was originally submitted in 2007.

Output- Output Emission Detail:

Always: 24-Hour Day and County were selected.

For all vehicle equipment categories: No selections were made.

On Road: No selections were made.

Advanced Performance Features:

No selections were made.

4.2.2 Input Assumptions for MOVES2014

Source Type Population

To develop source type population data, the Department obtained an August 1, 2014, snapshot of vehicle population for the whole York County from the South Carolina Department of Motor Vehicles (SCDMV). This population data was not broken out by the MOVES2014 source type categories. Passenger vehicles and motorcycles were the only MOVES2014 source types that could be distinguished from all other vehicles. As the Technical Guidance document indicates, the 2014 default York County source type population data was exported from MOVES2014 and used to help apportion the actual vehicle type population. Using the ratio of MOVES2014 passenger cars and passenger trucks to each other, the actual York County passenger vehicle population was separated into passenger cars and passenger trucks. Vehicles designated as “trailers” were removed. For the remaining non-passenger and non-motorcycle sources, the MOVES2014 ratio of each was calculated against all non-passenger and non-motorcycle population. This ratio was then multiplied by the remaining actual York population (after the passenger cars, passenger trucks, trailers and motorcycle populations had been subtracted). This methodology created MOVES2014-ready source type population values for all of York County, but this effort is only dealing with the York NAA.

The ratio of the York NAA population to the county population was used to estimate emissions for the York NAA. Table 1 contains the 2010 population for York County. The 2010 York NAA (RFATS) population was obtained from RFATS. Using this data, the estimated York NAA population is 173,881, and 76.9 percent of York County’s population is in the York NAA. This percentage was used to allocate the county-level emissions to the York NAA.

Table 1: Population Data

2010 Population of York County	226,073
2010 Population of York NAA	173,881
Percentage of Population in York NAA	76.9

Once the base year source type population was generated, the future year files for 2018, 2022 and 2026 needed to be estimated. The SCDMV has not been able to provide future year vehicle population data, nor have they had any suggestions on expected annual growth in vehicle population values. In order to

get an estimate of average annual vehicle population growth, the Department obtained two years of historical York County vehicle population data from the SCDMV, 2004 and 2014. Using these two years the average annual increase percentage was calculated (Table 2). This data was used to estimate the population for future years through 2026.

Table 2: Vehicle Average Annual Increase Percentage

2004	2014	# vehicles increased over 10 years	% increase from 2004	Avg annual increase over 10 years
147,130	205,183	58,053	39.4	3.94%

The base year 2014 source type population multiplied by .0394 was added to the base year source type to generate a 2015 estimate. This process was repeated until all future years through 2026 were calculated. The years used for the redesignation and maintenance plan are shown in Table 3 below.

Table 3: Source Type Population (Base and Future Years)

Base Year Id	Source Type	2014 Source Type Population	2018 Source Type Population	2022 Source Type Population	2026 Source Type Population
2014	11	5,239	6,117	7,141	8,336
2014	21	67,002	78,220	91,315	106,603
2014	31	49,873	58,223	67,971	79,350
2014	32	24,889	29,056	33,920	39,599
2014	41	140	164	191	223
2014	42	70	81	95	111
2014	43	944	1,102	1,286	1,502
2014	51	63	73	86	100
2014	52	5,312	6,201	7,239	8,451
2014	53	763	891	1,040	1,214
2014	54	1,254	1,465	1,710	1,996
2014	61	986	1,152	1,344	1,570
2014	62	1,277	1,491	1,741	2,032

Vehicle Type VMT

Daily weekday VMT and speed data was obtained from CDOT (see Table 4). The CDOT data was used to compile the average daily VMT by MOVES2014 road type. VMT was distributed to the MOVES2014 source types according to the distribution in SCDOT's 2011-2014 Functional Class Annual Reports. Because SCDOT collects limited functional class data, and the data varies considerably from year to year, data from the three most recent years was averaged to inform the development of VMT fractions to be applied to each MOVES source type. To convert the daily VMT data to an annual value, which is required by MOVES2014, the EPA's [advmt-converter-tool-moves2014.xlsx](#) VMT converter tool was used. This tool used default monthly, daily, and hourly ratios to create an annual VMT profile from an average daily profile. The resulting files (filenames [HPMSVTypeYear-calc](#), [monthVMTFraction-calc](#), [dayVMTFraction-calc](#), and [hourVMTFraction-calc](#)) were exported from the converter tool and used in the MOVES2014 modeling.

Table 4: York County Nonattainment Area VMT and Speed Data Provided by the Charlotte Department of Transportation (Base and Future Years)

2014	AM Peak		Midday		PM Peak		Night		DAILY	
	VMT	Spd	VMT	Spd	VMT	Spd	VMT	Spd	VMTassn	Spd
Rural Interstate	228,932	58	302,449	65	256,117	54	174,120	65	961,618	60
Rural Principal Art.	24,940	36	37,178	44	28,470	32	16,488	57	107,076	40
Rural Minor Art.	62,503	33	89,510	35	70,609	31	50,096	44	272,718	35
Rural Major Collect.	65,726	34	96,889	38	74,619	32	49,186	47	286,420	36
Rural Minor Collect.	8,906	20	13,328	21	9,627	15	6,624	33	38,485	20
Rural Local	103,437	27	161,615	27	117,986	27	72,880	27	455,919	27
Urban Interstate	209,243	58	278,255	63	234,809	58	161,504	63	883,812	61
Urban Frwy/Exprwy	17,998	40	27,724	41	19,834	39	11,172	43	76,729	41
Urban Principal Art.	199,686	30	309,509	32	223,061	28	163,565	40	895,821	32
Urban Minor Art.	171,365	30	270,641	32	193,862	27	139,382	39	775,249	31
Urban Collector	71,995	23	113,061	23	83,293	18	46,729	32	315,078	23
Urban Local	149,972	24	253,890	24	169,012	24	114,695	25	687,569	24
Rural	494,445	39	700,970	41	557,427	37	369,393	46	2,122,236	40
Urban	820,258	32	1,253,081	32	923,871	30	637,046	38	3,634,257	32
County	1,314,703	34	1,954,051	35	1,481,299	32	1,006,440	41	5,756,493	35

	AM Peak		Midday		PM Peak		Night		DAILY	
2018	VMT	Spd	VMT	Spd	VMT	Spd	VMT	Spd	VMTassn	Spd
Rural Interstate	243,739	58	330,918	65	272,279	52	185,284	65	1,032,220	60
Rural Principal Art.	26,964	34	40,256	42	30,017	30	19,896	56	117,132	38
Rural Minor Art.	70,457	32	101,617	34	79,764	30	56,105	43	307,942	34
Rural Major Collect.	73,812	32	107,813	36	83,257	31	54,921	46	319,802	35
Rural Minor Collect.	9,813	17	14,797	20	10,756	14	7,449	30	42,814	18
Rural Local	117,130	26	182,206	27	132,486	27	82,443	27	514,265	27
Urban Interstate	222,137	58	302,421	63	247,165	57	172,902	63	944,624	60
Urban Frwy/Exprwy	19,997	39	32,651	41	22,780	37	12,885	42	88,313	40
Urban Principal Art.	229,883	27	357,406	30	256,437	26	193,125	39	1,036,852	30
Urban Minor Art.	187,557	29	298,694	31	212,819	27	152,315	39	851,384	30
Urban Collector	81,805	23	129,931	24	96,073	20	52,954	33	360,763	23
Urban Local	177,422	24	300,682	24	201,557	24	133,715	25	813,377	24
Rural	541,914	37	777,607	40	608,557	35	406,097	45	2,334,176	39
Urban	918,802	30	1,421,785	32	1,036,829	29	717,895	38	4,095,312	31
County	1,460,716	33	2,199,393	34	1,645,387	31	1,123,993	40	6,429,488	34

	AM Peak		Midday		PM Peak		Night		DAILY	
2022	VMT	Spd	VMT	Spd	VMT	Spd	VMT	Spd	VMTassn	Spd
Rural Interstate	254,956	55	352,750	65	284,390	48	196,328	65	1,088,424	57
Rural Principal Art.	28,138	30	41,676	38	31,087	28	21,693	53	122,594	35
Rural Minor Art.	72,036	31	104,864	32	81,112	29	57,278	41	315,289	32
Rural Major Collect.	78,927	31	115,387	34	88,479	30	58,182	46	340,975	34
Rural Minor Collect.	10,379	16	15,656	18	11,106	13	7,769	32	44,910	17
Rural Local	126,000	26	196,756	27	142,811	26	88,868	27	554,434	27
Urban Interstate	231,661	56	320,377	63	255,479	55	182,429	63	989,945	59
Urban Frwy/Exprwy	20,666	38	34,053	40	23,839	36	13,622	42	92,181	39
Urban Principal Art.	238,945	26	373,962	29	267,031	25	202,342	39	1,082,280	28
Urban Minor Art.	200,415	28	318,199	30	226,343	26	159,960	39	904,917	30
Urban Collector	86,620	22	137,958	23	101,778	19	56,101	32	382,457	23
Urban Local	188,713	24	321,400	24	215,400	23	142,896	25	868,410	24
Rural	570,435	36	827,089	39	638,985	34	430,117	45	2,466,626	37
Urban	967,020	30	1,505,949	31	1,089,870	28	757,351	38	4,320,190	31
County	1,537,455	32	2,333,039	33	1,728,855	30	1,187,467	40	6,786,816	33

2026	AM Peak		Midday		PM Peak		Night		DAILY	
	VMT	Spd	VMT	Spd	VMT	Spd	VMT	Spd	VMTassn	Spd
Rural Interstate	253,865	59	349,954	65	282,332	53	200,189	65	1,086,339	60
Rural Principal Art.	25,976	33	39,656	40	30,145	29	18,121	54	113,898	36
Rural Minor Art.	74,127	30	108,099	30	83,002	27	59,390	40	324,618	31
Rural Major Collect.	79,727	30	118,128	32	89,755	28	62,172	43	349,782	32
Rural Minor Collect.	11,301	19	16,744	21	11,793	16	8,224	33	48,061	20
Rural Local	132,015	26	209,299	26	149,166	26	94,402	27	584,882	26
Urban Interstate	238,797	54	332,390	63	264,254	55	189,052	63	1,024,493	59
Urban Frwy/Exprwy	21,484	38	35,132	40	24,194	36	14,041	42	94,852	39
Urban Principal Art.	245,244	26	385,094	29	274,435	24	208,074	38	1,112,847	28
Urban Minor Art.	218,305	29	347,483	31	248,012	27	175,773	39	989,573	30
Urban Collector	88,131	23	139,563	24	102,493	20	55,018	32	385,205	23
Urban Local	203,109	24	346,091	24	231,566	23	152,980	25	933,746	24
Rural	577,010	36	841,879	38	646,192	34	442,498	44	2,507,579	37
Urban	1,015,071	30	1,585,754	31	1,144,953	28	794,937	38	4,540,715	31
County	1,592,081	32	2,427,633	33	1,791,145	30	1,237,435	40	7,048,295	33

Fuel Formulation and Supply

The Technical Guidance document states that changes should be made only where local volumetric fuel property information is available, except in the case of RVP where a user should change the value to reflect the regulatory requirements and differences between ethanol and non-ethanol blended gasolines. South Carolina does not have local fuel parameter data so the MOVES2014 default data was used for the required fuel inputs. Through the fuel wizard, RVP for gasoline vehicles (fuelTypeID 1) were changed to reflect the summer RVP regulatory requirement of 9.0.

Meteorology

For average summer day ozone for SIP or conformity purposes, the Technical Guidance recommends using average daily temperature profiles for July, or for the three month period that best represents the area's ozone season. For this effort, the surface hourly data for the Charlotte International Airport was acquired from the Integrated Surface Hourly (ISH) database maintained by the National Climatic Data Center. Hourly temperature and dew point data for the month of July for the years 2004-2010 was extracted from the database. Average hourly temperatures and relative humidity for each hour of the dataset were calculated.

Road Type Distribution

Data from the SCDOT's Functional Class Annual Reports from the years 2011-2013 was averaged to allocate an appropriate fraction of each source type's VMT to each road type. The same road type distribution file was used for all years.

Age Distribution

In the absence of reliable local age distribution data, MOVES2014 defaults were used. The Technical Guidance document states that "If users are unable to acquire data to develop a local age distribution or have reason to believe that data about locally registered vehicles is not necessarily representative of that entire portion of the fleet then MOVES2014 national default age distributions can be used."

Average Speed Distribution

Speed data for a.m. peak hours (6:00 a.m. to 9:00 a.m.), midday (9:00 a.m. to 3:00 p.m.), p.m. peak hours (3:00 p.m. to 6:00 p.m.) and nighttime hours (6:00 p.m. to 6:00 a.m.) was obtained for all modeled years from the CDOT. Vehicle hours traveled (VHT) was calculated for each urban and rural road type by dividing VMT by speed. VHT for each road type was then assigned to a MOVES2014 speed bin. There are 16 speed bins, whose speed ranges are detailed in the Technical Guidance document. VHT for each of the four MOVES2014 on-road road types was totaled for each time period of the day and a fraction developed for each speed bin. Each road type (4 road types), source type (13 source types), and hour (24 hourdayIDs for weekdays) combination has a fraction totaling 1.0. These fractions were calculated and saved in the proper MOVES2014 format, using the default average speed file as a template, and used in the modeling.

4.2.3 Estimated Emissions from On-Road Mobile Sources

Using the outlined inventory approach, the MOVES2014 model gave a summary of emissions in kg per average ozone season day (kg/day). Table 4.2-5 summarizes the NO_x and VOC emissions.

Table 5: On-road Mobile Source NO_x and VOC Emissions York County Nonattainment Area per ozone season day

	2014		2018		2022		2026	
	kg/day	Tons/day	kg/day	Tons/day	kg/day	Tons/day	kg/day	Tons/day
NO_x	9111.69	10.04	6028.98	6.65	4182.42	4.61	3075.97	3.39
VOC	3565.76	3.93	2530.85	2.79	1947.02	2.15	1575.95	1.74

4.2.4 Motor Vehicle Emissions Budget for Conformity

Transportation Conformity

The purpose of transportation conformity is to ensure that federal transportation actions occurring in a nonattainment area do not hinder the area from maintaining the 8-hour ozone standard. This means that the level of emissions estimated for the MPO's Transportation Implementation Plan (TIP) and Long Range Transportation Plan (LRTP) must not exceed the Motor Vehicle Emissions Budget (MVEB) as defined in this maintenance plan.

4.3 Motor Vehicle Emissions Budgets

According to Section 93.118 of the transportation conformity rule, a maintenance plan must establish MVEBs for the last year of the maintenance plan, in this case, 2026. Through the interagency consultation process, it was decided that interim MVEBs would also be set for the year 2014 in the RFATS area.

The MVEBs will be set in terms of kg/day. During the preparation of the York County nonattainment area attainment demonstration in 2007 it was determined through interagency consultation that kg per day would be the most appropriate unit to use for MVEBs and transportation conformity.

Table 6 shows the York County nonattainment area on-road mobile NO_x and VOC emissions expressed in tons *per ozone season day* (Tons/day) and the corresponding kilograms *per ozone season day* (Kg/day) values for 2014 and 2026.

Table 6: On-road Mobile Source NO_x and VOC Emissions York County Nonattainment Area per ozone season day

Pollutant	2014		2026	
	Kg/day	Tons/day	Kg/day	Tons/day
NO _x	9111.69	10.04	3075.97	3.39
VOC	3565.76	3.93	1575.95	1.74

Upon the EPA’s affirmative adequacy finding for the partial county MVEBs, as shown in Table 7, they will become the applicable MVEBs for the York County nonattainment area. See Table IV-3 in the Narrative document for MVEB calculations.

Table 7: York County Nonattainment Area NO_x and VOC MVEBs for 2014 and 2026 per ozone season day, including Safety Margin

Pollutant	MVEB (Kilograms/day)	
	2014	2026
NO _x	9,112	9,998
VOC	3,566	2,955

The MOVES Technical Guidance document directs that all processes, including refueling emissions, be included in MOVES work for SIPS or regional conformity analysis. In South Carolina, however, these processes are accounted for in the area source inventory (Appendix B) and have not been included in previous budgets or conformity analysis. For this reason, these processes have not been included in the inventories or the MVEB for this redesignation demonstration and maintenance plan. Refueling emissions are included separately in Table 8 for the budget years of 2014 and 2026 for informational purposes only.

Table 8: York County Nonattainment Area NO_x and VOC Refueling Emissions for 2014 and 2026

	Kilograms/ozone season day Refueling Emissions	
	2014	2026
NO _x	0.00	0.00
VOC	299.82	279.50

5.0 DATA FILES PROVIDED ON CD

This section contains a list of all data files which were used in the MOVES2014runs and are saved on the attached CD. All of these files are in EXCEL (.xls) format, except the runspecs which come out of MOVES2014 and are saved as an .mrs file.

2014 DATA:

20141229_91_RMP_2014.mrs (runspec)
20141229_91_RMP_2014_in (input file)
20141229_91_RMP_2014_out (output file)

2018 DATA:

20141230_91_RMP_2018.mrs (runspec)
20141230_91_RMP_2018_in (input file)
20141230_91_RMP_2018_out (output file)

2022 DATA:

20141230_91_RMP_2022.mrs (runspec)
20141230_91_RMP_2022_in (input file)
20141230_91_RMP_2022_out (output file)

2026 DATA:

20141230_91_RMP_2026.mrs (runspec)
20141230_91_RMP_2026_in (input file)
20141230_91_RMP_2026_out (output file)

Appendix D
NONROAD Mobile Source Inventory
Documentation

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1.0 NONROAD Model Mobile Sources

The nonroad mobile source category includes a diverse collection of equipment such as lawnmowers, chain saws, tractors, all terrain vehicles, fork lifts and construction equipment. The nonroad portion of the new MOVES2014 model was used to estimate emissions for York County, as well as the Rock Hill Fort Mill Area Transportation Study (RFATS Metropolitan Planning Organization (MPO) portion of York County (also referred to as the York NA area), South Carolina within the Charlotte-Gastonia-Rock Hill, NC-SC (Charlotte) nonattainment area for the 2008 8-hour ozone NAAQS Redesignation Demonstration and Maintenance Plan.

The options files used to provide necessary inputs to the MOVES2014 model were tailored to reflect York County, South Carolina specific data. The Department used default data built into the MOVES2014 model for nonroad mobile sources since we do not have York County specific nonroad vehicle information. The specific selections made during the running of the nonroad portion of the MOVES2014 model are outlined in section. Please note that MOVES2014 does not have VOC emissions for the nonroad portion and only has Total Gaseous Hydrocarbons (TGH). The Department used the TGH emissions and assumed them to equal VOC.

The model was set up to estimate the nonroad emissions from all types of equipment for York County for a typical July weekday for the years: 2014, 2018, 2022, and 2026. The model results directly provided the daily NO_x and VOC estimates for the whole county for each of the requested years. In order to reduce these whole county emissions to the emissions from within the York nonattainment area (NAA), the model results were multiplied by the fraction of the population residing within the York NAA during each of the years versus the total county population.

The ratio of the York NAA population to the county population was used to estimate emissions for the York NAA. Table 1 contains the 2010 population for York County. The 2010 York NAA (RFATS) population was obtained from RFATS. Using this data, the estimated York NAA population is 173,881, and 76.9 percent of York County's population is in the York NAA. This percentage was used to allocate the county-level emissions to the York NAA.

Table 1- 1: Population Data

2010 Population of York County	226,073
2010 Population of York NAA	173,881
Percentage of Population in York NAA	76.9

For reporting purposes, the York NAA NO_x and TGH emissions are summarized by equipment type in Table 1-2.

Table 1- 2: York Nonattainment Area Nonroad Model TGH and NO_x Emissions by Equipment Type

Classification	2014	2018	2022	2026
<i>TGH Emissions (tons per ozone season day)</i>				
Agricultural Equipment	0.01	0.01	0.01	0.01
Commercial Equipment	0.19	0.17	0.18	0.19
Construction Equipment	0.23	0.20	0.18	0.17
GSE/Underground Mining/Oil Field Equipment	0.00	0.00	0.00	0.00
Industrial Equipment	0.06	0.03	0.03	0.03
Lawn and Garden Equipment	0.72	0.68	0.71	0.75
Logging Equipment	0.02	0.02	0.02	0.02
Railway Maintenance Equipment	0.00	0.00	0.00	0.00
Recreational Marine Equipment	0.26	0.19	0.14	0.11
Recreational Vehicles	0.20	0.16	0.14	0.13
TGH Totals	1.69	1.45	1.38	1.39
<i>NO_x Emissions (tons per ozone season day)</i>				
Agricultural Equipment	0.10	0.08	0.06	0.04
Commercial Equipment	0.15	0.13	0.11	0.11
Construction Equipment	1.57	1.09	0.79	0.65
GSE/Underground Mining/Oil Field Equipment	0.00	0.00	0.00	0.00
Industrial Equipment	0.23	0.16	0.14	0.14
Lawn and Garden Equipment	0.15	0.14	0.13	0.14
Logging Equipment	0.02	0.01	0.00	0.00
Railway Maintenance Equipment	0.00	0.00	0.00	0.00
Recreational Marine Equipment	0.05	0.05	0.04	0.04
Recreational Vehicles	0.01	0.01	0.01	0.01
NO_x Totals	2.26	1.65	1.30	1.13

2.0 Railroad Locomotives

Railroads are categorized by size (Class I, Class 2) and passenger service. Class I railroads are long haul operations, while Class II and Class III railroads are short lines, serving localized markets. There does not appear to be any significant amount of passenger rail activity in York County, and both EPA's 2008 and 2011 NEI show no emissions for passenger rail activity for York County. Therefore, only Class I and Class II/III emissions line haul emissions are present in these emissions calculations. Railroad locomotive emissions are not calculated included in the nonroad portion of the MOVES2014 model, so the emissions need to be calculated differently. The Department does not have ozone season emissions data for the NAA of York County, SC, so the whole York County, SC annual emissions from the EPA's 2011 NEI v1 was used as the starting point. The next step was to allocate the annual emissions down to an average ozone season day. No known allocation factors were available to do this so the annual emissions were allocated down to an average daily value by dividing by 365 (the number of days in the year 2011). The resulting average daily value was assumed to be an average ozone season daily value.

Now that the 2011 average ozone season daily emissions for the whole York County, SC are determined, the emissions were allocated to the NAA only portion of the county. The Department decided that using human population was the best indicator of where these emissions may be occurring in the county. Therefore, the 2010 RFATS population data was used, and a ratio of 0.769 was calculated (76.9% of human population in York County, SC is found in the NAA). The whole county ozone season daily emissions were multiplied by this ratio to estimate the average ozone season daily emissions for the NAA of York County in 2011.

Now that the 2011 average ozone season daily emissions for the NAA of York County are determined, the values then needed to be grown to years 2014, 2018, 2022, and 2026. The Department used York County population growth as an indicator of expected growth for the railroads. Current 2011 census data was obtained, as well as projected population values provided by the Charlotte Department of Transportation. The following growth rates were calculated:

Table 2- 1: Calculated Growth Factors for York NAA

Year Interval	2011-2014	2011-2018	2011-2022	2011-2026
Growth Factor	1.0502	1.1554	1.2453	1.3488

The 2011 average ozone season daily emissions for the NAA of York County were multiplied by the calculated growth rates to generate projected average ozone season daily emissions for the NAA of York County for years 2014, 2018, 2022, and 2026.

Table 2-2 shows the total railroad emissions for the York NAA.

Table 2- 2: York Nonattainment Area Railroad Emissions by Railroad Type

Classification	SCC	2014	2018	2022	2026
<i>Railroad NO_x Emissions (Tons Per Ozone Season Day)</i>					
Railroad_diesel_linehaul locomotives Class I	2285002006	0.23	0.26	0.28	0.30
Railroad_diesel_linehaul locomotives Class II/III	2285002007	0.00	0.00	0.00	0.00
Railroad Total NO _x		0.24	0.26	0.28	0.30
<i>Railroad VOC Emissions (Tons Per Ozone Season Day)</i>					
Railroad_diesel_linehaul locomotives Class I	2285002006	0.01	0.01	0.01	0.02
Railroad_diesel_linehaul locomotives Class II/III	2285002007	0.00	0.00	0.00	0.00
Railroad Total VOC		0.01	0.01	0.01	0.02

3.0 Summation of Nonroad Source Emissions for the York NAA

The emissions of NO_x and VOC (as TGH) in tons/average summer day are presented in Table 3-1. Emissions in the preceding sections were summed to determine total NO_x and VOC emissions for each projected year through 2026.

Table 3- 1: Total Nonroad Mobile Emissions for the York County NAA (tons/ozone season day):

York County NAA	2014	2018	2022	2026
Total NO_x	2.50	1.91	1.58	1.43
Total VOC	1.70	1.46	1.39	1.40

4.0 Data File

York County MOVES 2014 Run Options

The following information outlines the run options selected to generate the whole county NONROAD mobile emissions using MOVES2014:

SCALE

Model= Nonroad Domain/Scale = national Calculation Type = Inventory

TIME SPANS

Time Aggregation Level = Hour

Years = 2014, 2018, 2022, 2026

Month = July (all months were selected in run but only the July results were used)

Days = Weekday

GEOGRAPHIC BOUNDS

Region = County

State = South Carolina

Selections = York County

VEHICLE/ EQUIPMENT

All available fuel/sector combinations were selected

ROAD TYPE

Road Type = Nonroad

POLLUTANTS/ PROCESSES

Total Gaseous Hydrocarbons (all processes) *VOC wasn't an option in the model

NOx (all processes)

STRATEGIES (did not compute Rate-of-Progress)

OUTPUT

General Output:

Mass Units = U.S. Ton

Energy Units = Million BTU

Distance Units = Mile

Output Emissions:

24 Hr Day by County selected

SCC selected

Appendix E
Events Source Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

Events are generally defined as any non-structural fire that occurs in wild lands. Events include wildfires and prescribed fires. These fires used to be included within the nonpoint sector but are now calculated and tracked by individual fire.

2.0 OVERALL METHODOLOGY

The EPA's 2011 NEI was the basis for South Carolina's Event inventory for the York Co. NAA. For the 2011 NEI, EPA continues to use the SMARTFIRE2 (SF2) system to estimate wild land fire emission estimates. The Department did provide EPA with a list of all York County, SC wild land and prescribed fires to improve the quality of the estimates.

2.1 BASELINE EMISSIONS INVENTORY

Events in 2011 include wild land fires, or WLFs. WLFs are generally defined as any non-structural fire that occurs in wild lands. Included in WLFs are the following types of fires:

Prescribed (Rx) fire: Any fire ignited by management actions to meet specific objectives, generally related to the reduction of the biomass potentially available for wildfires.

Wildfire (WF): An unplanned, unwanted WLF including unauthorized human-caused fires, escaped prescribed fire projects, or other inadvertent fire situations where the objective is to put the fire out.

Wild land Fire Use (WFU): The application of appropriate management response to naturally-ignited WLFs to accomplish specific resource management objective in pre-designated areas outlined in fire management plans. In other words, an unplanned fire that is subsequently controlled and used as a Rx fire to meet specific objectives. This category existed in 2008, but no longer is used as a way to classify fires in 2011, and thus will not be discussed further in this section.

For the dataset developed by EPA for the 2011 NEI, we used the following general equation to estimate wildfires and prescribed fires. Accurate estimates of fire emissions rely on accurate estimates of the terms in the equation below.

Emissions = Area burned * Fuel Load Available * Fuel Consumed (Burn Efficiency) * Emission Factors

SF2 estimates the "Area burned" term in the above equation, in conjunction with the Bluesky framework model that estimates the last three terms in the above equation. The "fuel load available" term is estimated using the Fuel Characteristic Classification System (FCCS) maps in the Bluesky model. The "fuel consumed" term is estimated from Bluesky using the CONSUME3

model, which predicts the fraction of fuel that burns based on many parameters including fuel moisture. Finally, the “Emission Factors” term is estimated in Bluesky using the Fire Emissions Prediction Simulator which relies on EFs from the literature apportioned by flaming and smoldering combustion. Since SF2 was recently developed, direct references to its development in conjunction with updated Bluesky methods are not yet available.

York County, SC actual 2011 prescribed fires and wildfires were obtained from the SC Forestry Commission and were provided to EPA for use in the 2011 NEI calculations.

The Department does not have ozone season emissions data for the NAA of York, County, SC, so the whole York County, SC annual emissions from the EPA’s 2011 NEI v1 was used as the starting point. The next step was to allocate the annual emissions down to an average ozone season day. No known allocation factors were available to do this so the annual emissions were allocated down to an average daily value by dividing by 365 (the number of days in the year 2011). The resulting average daily value was assumed to be an average ozone season daily value.

2.2 ALLOCATION OF EMISSIONS TO YORK NONATTAINMENT AREA

Now that the average ozone season daily emissions for the whole York County, SC are determined, the emissions were allocated to the NAA only portion of the county. For event sources, the Department decided that using land area was the best indicator of where these emissions may be occurring in the county. The land area for whole York Co is 680.0 sq miles. The land area for the NAA of York Co is 275 sq miles. The ratio of the NAA land area to the whole county is 0.40 or 40% ($275 / 680.8$).

2.3 EMISSIONS PROJECTIONS

Since 2011 data is being used as the basis for the York NAA inventory estimates, the data then needed to be grown to a 2014 base year and then grown to 2018, 2022, and 2026. The Department decided that there is no current recommended way to appropriately grow or adjust the wildland fire emissions to future years, therefore we maintained the 2011 emissions and used that data for our 2014 base year, as well as all future years. This methodology concurs with the methodology used by the N.C. Department of Natural Resources.

Table 2-1 summarizes the average ozone season day emissions for event sources in the NAA of York County, SC.

- **Table 2- 1: 2011 Actual Event Source Emissions for NAA of York County, SC***

SCC	SCC Description	NAA ton per ozone season day NO _x	NAA ton per ozone season day VOC
2810001000	Wildfires	0.00	0.02
2811015000	Prescribed Fires	0.04	0.40
	GRAND TOTAL	0.04	0.42

*Data Also Represents Emissions for Years 2014, 2018, 2022, and 2026

Appendix F
Legal Authority

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LEGAL AUTHORITY¹

No plan for attaining a goal, the attainment of which is dependent upon regulatory action, can be used with any degree of effectiveness unless the legal framework is strong. Consequently, the Requirements for Preparation, Adoption, and Submittal of Implementation Plans, 40 CFR 51, as amended, define the necessary statutory powers which must be immediately available to states to carry out the responsibility to the Clean Air Act.

40 CFR 51.230 sets forth six specific requirements for State authority. The South Carolina Pollution Control Act, Act 1157 of 1970, as amended, S. C. Code Sections 48-1-10 thru - 350 (1976), provides the State's authority to respond to these requirements. The Attorney General of the State of South Carolina has given an opinion as to the adequacy of South Carolina laws, as follows:

Legal Authority Required 40 CFR 51	Adequacy of S. C. Law	S. C. Statutes Involved
(a) "Adopt emission standards and limitations and any other measures necessary for attainment and maintenance of national standards."	Adequate	S. C. Code Secs. 48-1-20, 48-1-50(23)
(b) "Enforce applicable laws, regulations, & standards, and seek injunctive relief."	Adequate	S. C. Code Sec. 48-1-50(1), (3), (4), (5), (11); Secs. 48-1-120, 48-1-130, 48-1-210, 48-1-320, 48-1-330.
(c) "Abate pollutant emissions on an emergency basis to prevent substantial endangerment to the health of persons, i.e., authority comparable to that available to the Administrator under section 305 of the Act."	Adequate	S. C. Code Sec. 48-1-290.
(d) "Prevent construction, modification, or operation of a facility, building, structure, or installation, or combination thereof, which directly or indirectly results or may result in emissions of any air pollutant at any location which will prevent the attainment or maintenance of a national standard."	Adequate	S. C. Code Sec. 48-1-50(5), (10); Secs. 48-1-100, 48-1-110.
(e) "Obtain Information necessary to determine whether air pollution sources are in compliance with applicable laws, regulations, and standards, Including authority to require recordkeeping and to make inspections and conduct tests of air pollution sources."	Adequate	S. C. Code Sec. 48-1-50(10), (20), (22), (24).
(f) "Require owners or operators of stationary sources to install, maintain, and use emission monitoring devices and to make periodic reports to the State on the nature and amounts of emissions from such stationary sources; also authority for the State to make such data available to the public as reported and as correlated with any applicable emission standards or limitations."	Adequate	S. C. Code Secs. 48-1-50(22), 48-1-270.

¹ Section 2 of the EPA-approved South Carolina Air Quality Implementation Plan (SIP), which defines the State's statutory powers as required in 40 CFR 51.230.

Public Hearings

The South Carolina Pollution Control Act provides for notice and public hearings prior to action by the Board of Health and Environmental Control concerning adoption of regulations and standards, adoption or modification of final compliance dates, and other specified legal actions.

Additionally, Act 176 of 1977 enacted by the South Carolina General Assembly requires, among other things, that at least thirty days public notice be given before adoption, amendment or repeal of any rule. It also requires that the substance of the intended action or a description of the subjects and issues involved be made known. While this act escapes the actual requirement for a public hearing in each case, the two Acts taken together do impose the requirement of a thirty days notice of public hearing, assuring compliance with the requirements of 40 CFR 51.102, as amended.

Appendix G
Public Notice in the *South Carolina State*
***Register*, Feb. 27, 2015**

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Affecting Spartanburg County

Establishment of a new Narcotics Treatment Program in Spartanburg County.
Palmetto Carolina Treatment Center, LLC
 Spartanburg, South Carolina
 Project Cost: \$214,464

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

NOTICE OF GENERAL PUBLIC INTEREST

NOTICE OF INTENT TO REVISE THE SIP

**REDESIGNATION DEMONSTRATION AND MAINTENANCE PLAN FOR THE YORK COUNTY
 PORTION OF THE CHARLOTTE-GASTONIA-ROCK HILL NC-SC NONATTAINMENT AREA**

Statutory Authority: The Clean Air Act, 42 U.S.C. Section 7401 *et seq.*; 42 U.S.C. Sections 7407, 7410, and 7505a; 40 CFR Part 51.102; S.C. Code Ann. Section 48-1-10 *et seq.* (2008 & Supp. 2013)

South Carolina Air Quality Implementation Plan:

NOTICE IS HEREBY GIVEN, the Department of Health and Environmental Control (Department) proposes to submit a redesignation demonstration and maintenance plan for the South Carolina Air Quality Implementation Plan, also known as the State Implementation Plan, or SIP, to the Environmental Protection Agency (EPA).

Opportunity for Public Comment:

Interested persons are invited to present their views in writing to Roger Jerry, Division of Air Assessment, Innovations and Regulation, Bureau of Air Quality, 2600 Bull Street, Columbia, SC 29201. Comments may also be submitted via email to jerryre@dhec.sc.gov. To be considered, comments must be received no later than 5:00 p.m. on March 30, 2015, the close of the drafting comment period. The Department is also providing the public with the opportunity to request a public hearing on the issue. A public hearing has been planned for March 30, 2015, at 1 p.m. in the Wallace Room (3141), 2600 Bull Street, Columbia, South Carolina. The public is invited to attend. However, pursuant to 40 CFR 51.102, if no request for a public hearing is received by the close of the comment period (March 30, 2015), the hearing will be cancelled. If a public hearing has been cancelled, the Department will notify the public at least one week prior to the scheduled hearing via the "Scheduled Public Hearings" link on the webpage at <http://www.scdhec.gov/PublicNotices/sip/>. Interested parties are also encouraged to contact Roger Jerry at (803) 898-1799 or jerryre@dhec.sc.gov for more information or to determine whether a public hearing has been cancelled.

Synopsis:

On March 27, 2008 (73 FR 16436), the EPA promulgated amendments to the National Ambient Air Quality Standards (NAAQS) for ozone. On July 20, 2012 (77 FR 30088), the EPA designated and classified a portion of York County, South Carolina within the Rock Hill Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization (MPO) as a marginal nonattainment area for the 8-hour ozone NAAQS as part of the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area.

Air quality monitoring data from 2012 to 2014 indicate that all monitors within the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area currently meet the 2008 8-hour ozone NAAQS of 0.075 ppm. The proposed SIP revision would request that the EPA redesignate the York County portion of the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area to attainment for the 2008 8-hour ozone NAAQS. The plan would also provide

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 February 27, 2015*

14 NOTICES

a maintenance plan which fulfills the requirements of Section 175A of the Clean Air Act as amended, and ensure the area remains in attainment of the 2008 8-hour ozone NAAQS through 2026. Documents relating to this redesignation request and maintenance plan will be available via the Department's website at: <http://www.scdhec.gov/HomeAndEnvironment/Air/MostCommonPollutants/NonAttainmentAreas/>

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

NOTICE OF GENERAL PUBLIC INTEREST

Section IV of R.61-98, the State Underground Petroleum Environmental Response Bank (SUPERB) Site Rehabilitation and Fund Access Regulation, requires that the Department of Health and Environmental Control evaluate and certify site rehabilitation contractors to perform site rehabilitation of releases from underground storage tanks under the State Underground Petroleum Environmental Response Bank (SUPERB) Act.

Class I Contractors perform work involving the collection and interpretation of investigative data; the evaluation of risk; and/or the design and implementation of corrective action plans. Class I applicants must satisfy registration requirements for a Professional Engineer or Geologist in South Carolina. Class II Contractors perform work involving routine investigative activities (e.g., soil or ground water sampling, well installation, aquifer testing) where said activities do not require interpretation of the data and are performed in accordance with established regulatory or industry standards.

Pursuant to Section IV.B.1., the Department is required to place a list of those contractors requesting certification on public notice and accept comments from the public for a period of thirty (30) days. If you wish to provide comments regarding the companies and/or individuals listed below, please submit your comments in writing, no later than March 30, 2015 to:

Contractor Certification Program
South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management - Underground Storage Tank Program
Attn: Michelle Dennison
2600 Bull Street
Columbia, SC 29201

The following company has applied for certification as Underground Storage Tank Site Rehabilitation Contractor:

Class I

URS Corporation, Inc.
Attn: Ronald P. Paulling
4016 Salt Pointe Pkwy, Ste 200
Charleston, SC 29405

*South Carolina State Register Vol. 39, Issue 2
February 27, 2015*

Appendix H
EPA Comments on the Pre-Hearing draft,
received Mar. 24, 2015

**U.S. Environmental Protection Agency's Comments on South Carolina's Submission for
2008 8-hour Ozone Redesignation Demonstration and Maintenance Plan
Covering the 2012 Nonattainment Area**

I. Key Comment(s):

MOVES2014 Input Assumptions, Appendix C, Section 4.2.2 (Appendix C, page 14):
The EPA suggests that the South Carolina Department of Health and Environmental Control (SC DHEC) provide clarification on the process used to obtain the speed data for the hours from 3:00 PM to 6:00 PM. This information appears to be omitted from the information provided to the EPA for review. If the model runs and resulting emissions estimates do not account for the time period of 3:00 PM to 6:00 PM, more information on why this is appropriate is needed. Additionally, justification will need to be provided for how the motor vehicle emissions budgets could be developed without emissions information for the aforementioned time period included. If the omission of the information is a typographical error, please explain this in your final submission.

DEPARTMENT RESPONSE:

The Department has investigated the matter referred to above, and has determined that the modeling was done correctly, but there were typographical errors in the explanatory text that weren't detected in proofreading. The Department has corrected the text as shown below (corrected time slots are underlined):

Average Speed Distribution

Speed data for a.m. peak hours (6:00 a.m. to 9:00 a.m.), midday (9:00 a.m. to 3:00 p.m.), p.m. peak hours (3:00 p.m. to 6:00 p.m.) and nighttime hours (6:00 p.m. to 6:00 a.m.) was obtained for all modeled years from the CDOT. Vehicle hours traveled (VHT) was calculated for each urban and rural road type by dividing VMT by speed. VHT for each road type was then assigned to a MOVES2014 speed bin. There are 16 speed bins, whose speed ranges are detailed in the Technical Guidance document. VHT for each of the four MOVES2014 on-road road types was totaled for each time period of the day and a fraction developed for each speed bin. Each road type (4 road types), source type (13 source types), and hour (24 hourdayIDs for weekdays) combination has a fraction totaling 1.0. These fractions were calculated and saved in the proper MOVES2014 format, using the default average speed file as a template, and used in the modeling.

This corrected text reflects the actual modeling conditions.

Appendix I
Transcript and Sign-In Sheet,
Public Hearing
March 30, 2015

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Public Hearing
REDESIGNATION DEMONSTRATION AND MAINTENANCE PLAN FOR THE YORK
COUNTY PORTION OF THE CHARLOTTE-GASTONIA-ROCK HILL NC-SC 2008 OZONE
NONATTAINMENT AREA

March 30, 2015, 1:00 pm
Wallace Room; Sims/Aycock Building,
2600 Bull Street; Columbia, SC

Good afternoon, my name is Roger Jerry with the Bureau of Air Quality. I will be the facilitator for this public hearing. Let the record show that this forum was convened at 1:05 p.m. on Monday, March 30, 2015, at the duly announced location. Public notice of this hearing was published in the *State Register* on Friday, February 27, 2015. Unless I hear an objection, a copy of this notice will be entered into public record as though it were read. *Are there any objections?*

Let the record reflect that the public hearing today is being conducted by the South Carolina Department of Health and Environmental Control, which will be referred to as "the Department." The purpose of this hearing is to answer questions, clarify issues, and receive input from interested persons on a proposed redesignation and maintenance plan for the York County portion of the Charlotte-Gastonia-Rock Hill NC-SC 2008 ozone nonattainment area, hereafter referred to as the "redesignation request." Comments received today shall be considered by the Department in preparing a final draft redesignation request.

The Department is recording today's hearing for the record. If you wish to speak, please come forward, and begin by stating your name and affiliation for the record. The Department welcomes your input and assistance in perfecting the proposed redesignation request.

If anyone has written comments, please submit them to me for the record. [No comments were received.]

I will present a brief summary and explanation of the proposed redesignation request. Following the presentation, any member of the audience desiring to make comments will be given an opportunity to do so. Speakers will be recognized in the order in which they are registered.

If there are any questions after the presentation, please direct them to me and I will either answer them or ask that the appropriate person respond. If no one is able to answer the question today, an answer will be provided in writing at a later date.

On March 27, 2008 (73 FR 16436), the EPA promulgated amendments to the National Ambient Air Quality Standards (NAAQS) for ozone. On July 20, 2012 (77 FR 30088), the EPA designated and classified a portion of York County, South Carolina within the Rock Hill Fort Mill Area Transportation Study (RFATS) Metropolitan Planning Organization (MPO) as a moderate nonattainment area for the 8-hour ozone NAAQS as part of the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area.

Section 107(d)(3)(E) of the Clean Air Act, as amended (CAA), states an area can be redesignated to attainment if the following conditions are met:

1. The EPA has determined that the NAAQS have been attained. For ozone, the areas must show that the average of the 4th highest 8-hour ozone values from three complete, consecutive calendar years of quality-assured air quality monitoring data must be equal to or below 0.075 ppm.
2. The applicable implementation plan has been fully approved by the EPA under section 110(k).
3. The EPA has determined that the improvement in air quality is due to permanent and enforceable reductions in emissions.
4. The EPA has fully approved a maintenance plan, including a contingency plan, for the areas under CAA section 175A.
5. The State has met all applicable requirements for the area under section 110 and Part D.

The Department has previously satisfied conditions 2 and 5 through its regulations and SIP amendments. Air quality monitoring data from 2012 to 2014 indicate that all monitors within and near the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area currently meet the 2008 8-hour ozone NAAQS of 0.075 ppm (condition 1 for redesignation.) The proposed SIP revision would request that the EPA redesignate the York County portion of the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area to attainment for the 2008 8-hour ozone NAAQS, as the improvement is due to permanent and enforceable emission reductions (condition 3.) The redesignation request would also provide a maintenance plan which fulfills the requirements of Section 175A of the Clean Air Act as amended, and ensure the area remains in attainment of the 2008 8-hour ozone NAAQS through 2026 (condition 4.)

At this point I will recognize anyone who wishes to comment on the proposed redesignation request.

Is there anyone present who wishes to comment on the proposed redesignation request?
Are there any comments for the record? [No one present offered comments.]

There being no further comments, this forum is adjourned. Thank you for your attendance and participation here today.

(Thereupon, at **1:12** on the same day, the forum was concluded.)

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Public Hearing

**REDESIGNATION DEMONSTRATION AND MAINTENANCE PLAN FOR THE YORK COUNTY PORTION OF THE
CHARLOTTE-GASTONIA-ROCK HILL NC-SC 2008 OZONE NONATTAINMENT AREA**

March 30, 2015, 1:00 pm Wallace Room
Sims/Aycock Building, 2600 Bull Street
Columbia, SC

Synopsis: The Department will make a declaration of its intent to amend the Air Quality SIP and seek redesignation of the above-captioned area to attainment.

Name	Representing/Address	Telephone	E-mail
Cheri Neal		917-583-4022	cneal90@gmail.com
Denola Woods		704-425-7816	denola.woods@gmail.com
Maevie Mason	SCDHEC	803.898.2236	masonm@cdec.sc.gov
Hattie Mosblack		609 722 7394	hmosblack@emissions.edu
Carlan Bell	SCDHEC	803 898 8320	bellc@cdec.sc.gov
Daniel Kilpatrick	SC DHEC	803 545 4464	kilpatd@cdec.sc.gov

Appendix J
Notice of Final Amendment of the South
Carolina Air Quality SIP to be published in
the South Carolina *State Register*,
April 24, 2015

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

PUBLIC NOTICE

**NOTICE OF FINAL AMENDMENT TO AIR QUALITY STATE IMPLEMENTATION
PLAN**

**REDESIGNATION DEMONSTRATION AND MAINTENANCE PLAN FOR THE
YORK COUNTY PORTION OF THE CHARLOTTE-GASTONIA-ROCK HILL NC-SC
NONATTAINMENT AREA**

Statutory Authority: The Clean Air Act, 42 U.S.C. Section 7401 *et seq.*; 42 U.S.C. Sections 7407, 7410, and 7505a; 40 CFR Part 51.102; S.C. Code Ann. Section 48-1-10 *et seq.* (2008 & Supp. 2013)

South Carolina Air Quality Implementation Plan:

NOTICE IS HEREBY GIVEN, the Department of Health and Environmental Control (“Department”) has amended the South Carolina Air Quality Implementation Plan (“SIP”) to include a redesignation demonstration and maintenance plan for the Rock Hill Fort Mill Area Transportation Study (“RFATS”) Metropolitan Planning Organization (“MPO”) 8-hour ozone nonattainment area for the 2008 National Ambient Air Quality Standard (“NAAQS”).

On March 27, 2008 (73 FR 16436), the Environmental Protection Agency (“EPA”) promulgated amendments to the ozone NAAQS. On July 20, 2012 (77 FR 30088), the EPA designated and classified a portion of York County, South Carolina within the RFATS MPO as a marginal nonattainment area for the 8-hour ozone NAAQS as part of the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area. Air quality monitoring data from 2012 to 2014 indicate that all monitors within the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area currently meet the 2008 8-hour ozone NAAQS of 0.075 ppm. The SIP revision requests that the EPA redesignate the York County portion of the Charlotte-Gastonia-Rock Hill NC-SC Nonattainment Area to attainment for the 2008 8-hour ozone NAAQS. The plan also provides a maintenance plan which fulfills the requirements of Section 175A of the Clean Air Act as amended, and ensure the area remains in attainment of the 2008 8-hour ozone NAAQS through 2026.

The Department published a Notice of General Public Interest which included an announcement of a 30-day comment period and opportunity to request a public hearing in the *State Register* on February 27, 2015. A prehearing package was submitted to the EPA on February 27, 2015. The public comment period closed on March 30, 2015, and on this day a public hearing was held. No comments, written or oral, were received from the public. The EPA submitted a comment and the Department addressed this in its final SIP package. Documents relating to this redesignation request and maintenance plan are available via the Department’s website at:

<http://www.scdhec.gov/HomeAndEnvironment/Air/MostCommonPollutants/NonAttainmentAreas/>