



Catherine B. Templeton, Director

Promoting and protecting the health of the public and the environment

June 30, 2014

Mr. A. Stanley Meiburg, Acting Regional Administrator
U.S. EPA, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

RE: Annual Air Network Monitoring Plan for 2015

Dear Mr. Meiburg:

In accordance with the requirements of 40 Code of Federal Regulations Part 58, Subpart B, the South Carolina Department of Health and Environmental Control (Department) respectfully submits the Annual Air Network Monitoring Plan for calendar year 2015. The Department is required by 40 CFR 58.10 to adopt and submit to the Regional Administrator an Annual Monitoring Network Plan which provides for the establishment and maintenance of an air quality surveillance system. This system is a network of State and Local Air Monitoring Stations (SLAMS) including Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors that are part of SLAMS, National Core Monitoring Network (NCore) stations, Speciation Trends Network (STN) stations, and Special Purpose Monitor (SPM) monitoring stations. This plan is required to include a statement of purpose for each monitor and evidence that siting and operation of each monitor meets the requirements of 40 CFR 58, Appendices A, C, D and E.

The Department received six comments during the public comment period, which was held from May 14, 2014 through June 12, 2014. A complete package, including the Department's response to comments received is being sent to Gregg Worley of your office. Should you have any questions or need additional information regarding this matter, please contact Robert Brown of my staff at (803) 898-4105.

Sincerely,

Myra Reece, Chief
Bureau of Air Quality

cc: Gregg Worley, US EPA Region 4 (w/attachments)
ec: David McNeal, US EPA Region 4 (w/attachments)
Carol Kemker, US EPA Region 4 (w/o attachments)
Robert Brown, BAQ (w/o attachments)
Scott Reynolds, BES (w/o attachments)

State of South Carolina Network Description and Ambient Air Network Monitoring Plan

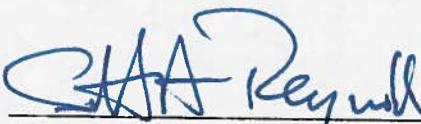
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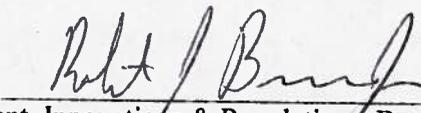
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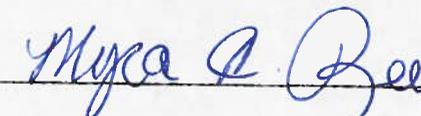
Certification

This document contains the planned changes and final description of the sites and monitors of the South Carolina Ambient Air Monitoring Network (Monitoring Network) for criteria pollutants and related parameters for calendar year 2015. The South Carolina Department of Health and Environmental Control (DHEC) certifies that the network described herein meets or exceeds the minimum requirements needed to support the State Implementation Plan, national air quality assessments and policy decisions as required in 40 Code of Federal Regulations (CFR) Part 58, Ambient Air Quality Surveillance, at the time of submittal to the United States Environmental Protection Agency (EPA), Region 4. Due to circumstances that may arise during the implementation of the plan in 2014 and during the 2015 monitoring year, some elements of the network may require modification. A notification of modifications will be posted on the DHEC website and provided to the EPA Region 4 office. Where necessary, a request for approval of deviations from this plan and supporting documentation will be submitted to the EPA Region 4 office.

Scott Reynolds Signature:  Date: 6/30/14
Director, Division of Air Quality Analysis, Bureau of Environmental Services
South Carolina Department of Health and Environmental Control

Renee G. Shealy Signature:  Date: 6/30/14
Chief, Bureau of Environmental Services
South Carolina Department of Health and Environmental Control

Robert Brown Signature:  Date: 6/30/14
Director, Division of Air Assessment, Innovations & Regulations, Bureau of Air Quality
South Carolina Department of Health and Environmental Control

Myra C. Reece Signature:  Date: 6/30/14
Chief, Bureau of Air Quality
South Carolina Department of Health and Environmental Control

Acronyms

AQI – Air Quality Index	NO _y – Nitrogen Oxides
AQS – Air Quality System	NPAP – National Performance Audit Program
BAQ – Bureau of Air Quality	PEP – Performance Evaluation Program
BC – Black Carbon	PM _{2.5} – Particulate Matter ≤ 2.5 microns
CBSA – Core-Based Statistical Area	PM ₁₀ – Particulate Matter ≤ 10 microns
CFR – Code of Federal Regulation	PPB – Parts Per Billion
CO – Carbon Monoxide	PPM – Parts Per Million
CSA – Combined Statistical Area	PSD – Prevention of Significant Deterioration
CSN – Chemical Speciation Network	PTFE – Polytetrafluoroethylene
CMS – Continuous Monitoring Site	PUF – Polyurethane Foam
DAQA – Division of Air Quality Analysis	QA – Quality Assurance
DHEC – South Carolina Department of Health and Environmental Control	QAPP – Quality Assurance Project Plan
DNPH – Analysis method using 2,4-dinitrophenylhydrazine	QC – Quality Control
EPA – Environmental Protection Agency	SLAMS – State and Local Air Monitoring Station
FEM – Federal Equivalent Method	SO ₂ – Sulfur Dioxide
FRM – Federal Reference Method	SPM – Special Purpose Monitor
GC/MS – Gas Chromatography / Mass Spectroscopy	SVOC – Semi-volatile Organic Compound
GFAA – Graphite Furnace Atomic Absorption Spectrometry	TEOM – Tapered Element Oscillating Microbalance
HPLC – High Performance Liquid Chromatography	TPY – Tons Per Year
IC – Ion Chromatography	TSP – Total Suspended Particulate
IMPROVE – Interagency Monitoring of Protected Visual Environments	UV – Ultraviolet
ICP/MS – Inductively Coupled Plasma Mass Spectroscopy	VOC – Volatile Organic Compound
MET – Meteorology	WGS84 – World Geodetic System of 1984 revised in 2004
MOA – Memorandum of Agreement	
MSA – Metropolitan Statistical Area	
mSA – Micropolitan Statistical Area	
µg/m ³ – Micrograms per cubic meter	
NAAQS – National Ambient Air Quality Standards	
NATTS – National Air Toxics Trends Site	
NADP-MDN – National Atmospheric Deposition Program Mercury Deposition Network	
NCore – National Core Monitoring Network	
NO – Nitric oxide	
NO ₂ – Nitrogen Dioxide	

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Introduction

The DHEC or its predecessors have operated an air quality monitoring network in South Carolina since 1959. During that time, the network has continually evolved to meet the requirements and needs of the DHEC's Air Program and to comply with federal requirements. In 2015 the network will be comprised of 104 monitors and samplers at 34 sites.

In October, 2006, the EPA published revisions to the ambient monitoring regulations (71 FR 61236, October 17, 2006) requiring quality assurance (QA), monitor designations, minimum requirements for both number and distribution of monitors among metropolitan statistical areas (MSAs), and probe siting changes. The regulation also included the requirement for an annual monitoring network plan and periodic network assessments.

Monitor designations include the State and Local Air Monitoring Station (SLAMS), special purpose monitoring (SPM), and the National Core Monitoring Network (NCore). The SLAMS air monitoring network is specific for the criteria pollutants, those pollutants for which National Ambient Air Quality Standards (NAAQS) have been established. In addition to a SLAMS network, the air monitoring network includes SPM for air toxics, particulate, mercury, criteria pollutants, precipitation, and meteorology. NCore is a national multi-pollutant network that utilizes advanced measurement systems for particles, pollutant gases, and meteorology. It provides data to long-term trends of criteria and non-criteria pollutants and to support air quality model evaluation, scientific studies, and ecosystem assessments.

This plan covers the eighteen month period from July 1, 2014 through December 31, 2015. This period includes a 6 month implementation period during which sites indicated as 'New' will be identified, secured, and prepared for the installation of monitoring equipment. It is expected that any monitoring indicated as 'New' or 'To be established' will be installed, calibrated, and operating in 2015 with the exception of some ozone monitors which may begin operation at the start of the South Carolina Ozone Monitoring Season (April-October). The annual Network Description and Ambient Air Monitoring Plan, as required and described in 40 CFR Part 58.10, and Periodic Network Assessment, must contain the following information for each monitoring station in the network:

- The Air Quality System (AQS) site identification number (ID) for existing stations
- The location, including street address and geographical coordinates, for each monitoring station
- The sampling and analysis method used for each measured parameter
- The operating schedule for each monitor
- Any proposal to remove or relocate a monitoring station within a period of eighteen months following the plan submittal
- The monitoring objective and spatial scale of representativeness for each monitor
- The identification of any sites that are suitable for comparison against the Particulate Matter ≤ 2.5 microns (PM_{2.5}) NAAQS
- The MSA, Core-Based Statistical Area (CBSA), Combined Statistical Area (CSA) or other area represented by the monitor

This document constitutes the 2015 South Carolina Air Monitoring Network Plan (2015 Monitoring Plan) and is organized into two main parts:

- Network Summaries: A table which presents the total number of sites and monitors for the State, including a list of all proposed changes to the current network and

- Air Monitoring Station Description: An outline of the designations, parameters, monitoring methods, and the purpose for each monitor at the site

The South Carolina Ambient Air Monitoring Network (Monitoring Network) is reviewed annually. Planned changes are described in this 2015 Monitoring Plan and provided for public review and comment prior to submission to the EPA Region 4 Administrator.

Public Participation Opportunities

In response to public interest and the potential impact of the monitoring regulation changes, DHEC's Air Program solicits involvement from both internal (to DHEC) and external workgroups.

Individuals that had expressed interest in the development of the ambient air monitoring network were notified of the availability of the 2015 Monitoring Plan and were invited to provide comments. This group consists of representatives from the business, environmental, and health communities, and concerned citizens.

Other opportunities for public involvement include:

- A webpage maintained for publication and access to current and draft monitoring plan reference documents and announcements¹.
- Availability of the proposed 2015 Monitoring Plan **for public review and comment ran from May 14, 2014 to June 12, 2014**. All recorded participants who registered in the outreach and discussion activities were notified when the 2015 Monitoring Plan became available for review. During this time, DHEC received six public comments, which are addressed in Appendix A.

DHEC is committed to continuing the opportunities for input and participation in the development of the annual revisions of the Network Description and Ambient Air Network Monitoring Plan and the periodic assessments of the air quality surveillance system.

Network Operation

The primary responsibility for the operation of the Monitoring Network is assigned to the Division of Air Quality Analysis (DAQA) in the Bureau of Environmental Health Services (Division). The Division establishes, maintains, and operates the sites and instruments that make up the network and performs the analysis of samples collected as part of routine monitoring or special projects. Data generated by the network for comparison to the NAAQS is verified to be accurate, reported by the Division for storage and public access in the national AQS database.

Criteria pollutant monitoring for the purpose of comparison to the NAAQS is performed using the EPA designated Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM) to ensure the precision and accuracy of the measurements across the air quality surveillance system.

Regular calibration and audits of the measurement systems are performed to verify that the instruments are operating correctly and data being collected is accurate. The QA activities supporting the Monitoring Network meet or exceed the QA requirements defined in 40 CFR Part 58 Appendix A (Quality Assurance Requirements for SLAMS, SPMs, and Prevention of Significant Deterioration (PSD) Air Monitoring).

Raw data is collected hourly from sites across the state and provided to internal data users (forecasters and data analysts) and to the AIRNow database for presentation to the public. Before the data is submitted to AQS, it is verified to be accurate through review of the instrument Quality Control (QC) and QA performance documentation.

¹<http://www.scdhec.gov/environment/baq/AmbientAirMonitoring/>

Instrument QA/QC alone is not sufficient to assure monitoring data quality. In addition to periodic site assessments, DHEC conducts additional visits of monitoring sites to document comparison with applicable siting criteria.

It is DHEC's intent that all criteria pollutant monitors and samplers be sited and operated in accordance with the requirements of 40 CFR Part 58 and Appendices A (Quality Assurance), C (Methods), D (Network Design), and E (Probe Siting Criteria) and the data collected by these samplers and monitors is suitable for comparison to the NAAQS. DHEC further intends to assure that the samplers and monitors comply with as many of the recommendations contained within the regulations and applicable guidance documents as is possible.

An element of the Quality System² employed by the Division is periodic assessments of systems and monitor performance. As the primary QA organization for ambient air monitoring activities, the Division operates under the approved Environmental Quality Control Quality Assurance Management Plan, the Ambient Air Quality Monitoring Quality Assurance Project Plan, and approved plans for specific projects. The EPA Region 4 office provides periodic Technical Systems Audits of sampling and analytical methods, network operation, data collection, and reporting and QA activities at their discretion or at the request of DHEC's Air Program. The EPA Region 4 office may conduct audits of any component of the operation of the network or quality management system. The Division also participates in the National Performance Audit Program (NPAP) and the Performance Evaluation Program (PEP) administered by the EPA to provide independent audits.

Station Description Content

Specific siting information for each site and monitor is stored in the EPA's AQS, the national ambient air database. The AQS Site Description includes the exact location of the site, local, and regional population and description of the site location, monitor types, and monitoring objectives. This site and monitor information is routinely updated whenever there is a change in site characteristics or pollutants monitored.

The AQS is used as the primary repository for all South Carolina ambient air monitoring information, including site descriptions. All ambient air monitoring data is stored in AQS, including non-NAAQS parameters, ambient air toxics, total suspended particulate (TSP), and supporting QA data.

Station Description

Each network station description contained in this document includes a Site Description and Monitor Details. These sections may include the following information:

Site Description

The header for each site includes:

- **Site Name**
- **CBSA** in which site is located as defined by the United States Census. (February, 2013).³
- **AQS Site ID:** The unique site ID used in AQS in the form of 45-cc-ssss where:
 - **45** is the federal identification code for South Carolina,
 - **ccc** is the county identification code; and
 - **ssss** is the site identification code within the county.
- **Location:** Typically the street address of the site where available.

² The Quality System is the means by which DHEC implements the quality management process through the Quality Assurance Management Plan for SC DHEC, March, 2014.

³ The US Census Bureau periodically adjusts CBSA names and boundaries. This plan uses the latest available revision.

- **County:** County in which the site is located.
- **Coordinates:** Latitude (N), then Longitude (W) listed in decimal degrees using WGS84 projection.
- **Date Established:** The date when each existing monitoring station was established is shown in the description. For new stations proposed in this Monitoring Plan, a date is provided when it is expected for the station to be in operation. Individual monitors at a site may have differing start and stop dates.
- **Site Evaluation (most recent date visited):** Each monitoring station in the network is periodically visited to determine whether all required probe exposure criteria for monitors are met. If necessary, corrective action is scheduled to address deficiencies. If a monitoring site has not yet been evaluated, it will be denoted with the word “PENDING”. Auditors may visit sites to provide an additional, independent QA check on the site evaluations. When an additional independent check has been conducted, the date of the visit will be noted next to the date of the latest site evaluation and contained within parentheses.

Monitor Details

The parameters monitored at that site are listed in a table associated with each site, along with descriptive information associated with that parameter.

- **Parameter**

Criteria (compounds for which a NAAQS has been established), non criteria, and/or supporting parameters (primarily meteorological measurements) measured at the site are listed.

- **Scale**

Each monitor or sampler in the monitoring network is described in terms of the approximate physical dimensions of the air parcel nearest the monitoring station throughout which pollutant concentrations are expected to be reasonably similar. This is most often referred to as the *Scale* of the monitor. Different pollutants monitored at the same location may represent different scales depending on the characteristics of the pollutant. Area dimensions or scales of representativeness used in the network description are:

(a) Microscale

Air volumes associated with area dimensions ranging from several meters up to about 100 meters

(b) Middle scale

Areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers

(c) Neighborhood scale

Extended areas of a city that have relatively uniform land use with dimensions ranging from 0.5 to 4.0 kilometers

(d) Urban scale

Citywide or equivalent rural areas with dimensions ranging from 4 to 50 kilometers

(e) Regional scale

Areas ranging from 50 to hundreds of kilometers in diameter

The true representative area may best be described by an irregular shape of the approximate dimensions indicated above to account for local sources, topography and differing land use.

The representative scale of a monitor is closely associated with the monitoring objective.

- **Objective**

The ambient air monitoring network is designed to meet three primary objectives:

1) Provide air pollution data to the public in a timely manner. Near real-time data is made available on the internet through AIRNow and Air Quality Index (AQI) reporting and forecasting in the major metropolitan areas.

2) Support compliance with ambient air quality standards and emissions strategy development. Monitors are operated to measure concentrations for comparison to NAAQS and to provide information to aid in the development of strategies to improve air quality.

3) Support air pollution research studies. Data from the monitoring network support greater understanding of the impacts and effects of ambient air pollution.

Individual monitors within a monitoring network that support these basic objectives generally serve one or more of the following purposes:

- Determine highest concentrations of pollutants
- Determine representative concentrations in areas of high population density
- Determine impact on air quality of significant sources or source categories
- Determine general background concentrations
- Determine extent of regional pollutant transport
- Determine welfare-related impacts in more rural and remote areas (ex. visibility impairment and impacts to vegetation)

The design intent in siting stations is to correctly match the area represented by the sample of monitored air with the scale most appropriate to meet the monitoring objective of the monitor. The relationship of appropriate scale to the six basic purposes are:

Monitoring Purpose	Siting Scale
Highest concentration	Micro, Middle, Neighborhood
Population	Neighborhood, Urban
Source impact	Micro, Middle, Neighborhood
General/background	Neighborhood, Urban, Regional
Regional transport	Urban, Regional
Welfare-related impacts	Urban, Regional

Monitor and sampler data is regularly reviewed to assure the assigned scale is correct and appropriate for the intended objective.

- **Designation**

SLAMS: The required and long term criteria pollutant monitors described in the air quality monitoring network are designated SLAMS. The EPA requirements for air quality surveillance systems provide for the establishment of a network of monitoring stations designated SLAMS that measure ambient concentrations of those pollutants for which standards have been established. These stations must meet requirements that relate to four major areas: QA, monitoring methodology, sampling interval, and siting of instruments and instrument probes.

SPM: Monitors in the air quality surveillance network not designated SLAMS are SPM. The SPM support investigations addressing complaints, areas and pollutants of concern, network refinement, modeling verification, and compliance. These monitors are committed to investigation and projects as described in the associated Quality Assurance Project Plan (QAPP). They may be located as separate monitoring stations or be included at existing monitoring locations. Monitoring data will be reported to AQS where possible. Siting and probe exposure will conform to all requirements for SLAMS monitors whenever possible.

Both SLAMS and SPM data may be used in the reporting of an area's AQI.

AQI: The AQI is a method of reporting that converts concentration levels of pollution to a simple number scale of 0-500. Index reporting is required for all urban areas with a population exceeding 350,000. Intervals on the AQI scale are related to potential health effects of the daily measured concentration of the measured pollutants. All stations in a metropolitan area provide data for daily index reporting. Data collected from continuous monitors for Ozone and PM_{2.5} monitors is collected hourly and reported as AQI maps on the EPA's AIRNow website. A daily AQI is provided for the areas in and around Aiken, Charleston, Columbia, Florence/Darlington, Greenville-Spartanburg, and York/Chester/Lancaster.

- **Probe Height**

The monitor or sampler probe is the point where ambient air enters the analytical or sample collection system. Ideally, air would be sampled approximately at nose height, but due to operational, exposure and security considerations, air may be sampled further from ground level. Proper probe height is specified in the monitoring regulations (typically between 2 and 15 meters) and is checked as part of the periodic site evaluations.

- **Analysis Methods**

All sampling and analytical procedures used for comparison of ambient concentrations of criteria pollutants to the NAAQS will use designated FRM or FEM. Where appropriate for specific monitoring objectives, well characterized non-equivalent methods may be used.

- **Criteria Pollutants**

- **Particulate Matter \leq 10 microns (PM₁₀)**

PM₁₀ samplers operated by DHEC are designated as either FRM or FEM samplers and are operated according to the requirements set forth in 40 CFR Part 50 and 40 CFR Part 58. Intermittent samplers collect a 24-hour sample no less than every sixth day on a quartz filter. The filter is conditioned and weighed before and after the sample run. The gain in weight in relation to the volume of air sampled is calculated in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The quartz filters are equilibrated before each weighing for a minimum of 24 hours at a 20-23°C mean temperature and a 30-40 percent mean relative humidity.

Continuous PM₁₀ samplers provide 24-hour concentration measurements every day. During sampling, ambient air passes through an inlet designed to pass only particles smaller than 10 microns in diameter.

After exiting the inlet, the sample stream is sent through a mass transducer to determine instantaneous and total flow. Particulate in the sample stream passes through a Teflon-coated glass fiber filter. This filter is weighed every two seconds. The difference between the current filter weight and the previous weight gives the total mass of the collected particulate for that period. The mass concentration is computed by dividing the total mass gained by the flow rate. Data is stored locally on redundant data acquisition systems and recovered hourly by an automated central data acquisition system.

- **Particulate Matter \leq 2.5 microns (PM_{2.5})**

All PM_{2.5} samplers operated by DHEC are designated FRM samplers. Manual samplers are operated per the requirements set forth in 40 CFR Part 50, Appendix L. Samples are collected on 46.2 millimeter Polytetrafluoroethylene (PTFE) filters over a 24-hour sampling period. Air flow through the filter is maintained at 16.7 liters per minute. The flow rate must not vary more than +/-5 percent for five minutes over a 24-hour sample period at actual ambient temperature and pressure. Samples are retrieved within 96 hours of the end of the sample run and are kept cool (4°C or cooler) during transit to meet the thirty-day limit for final weighing.

The PTFE filters are equilibrated and weighed before and after the sample run for a minimum of 24 hours at a controlled atmosphere of 20-23°C mean temperature and 30-40 percent mean relative humidity. Filters are used within thirty days of initial weighing. Samples are typically weighed within two weeks of sampling. Samples must be re-weighed within thirty days of the end of the sample run if kept at 4°C or cooler. The gain in weight in relation to the volume of air sampled is calculated in $\mu\text{g}/\text{m}^3$.

Unless designated FEM, continuous PM_{2.5} monitors provide hourly measurements for AQI reporting and do not provide concentration data currently suitable for comparison to the NAAQS. During monitoring, ambient air passes through an inlet system designed to pass only particles smaller than 2.5 microns in diameter. After exiting the inlet, the sample stream is sent through a mass transducer to determine instantaneous and total flow. Particulate in the sample stream is captured by a Teflon-coated glass fiber filter. This filter is weighed every two seconds. The difference between the current filter weight and the previous weight gives the total mass of the collected particulate for that period. The mass concentration is computed by dividing the total mass gained by the total flow rate during the period. Data is stored locally on redundant data acquisition systems and recovered hourly by an automated central data acquisition system.

PM_{2.5} Speciation sampling and analysis

In addition to operating PM_{2.5} samplers that allow measurement of only PM_{2.5} mass concentration, DHEC also operates PM_{2.5} speciation samplers that collect samples that are analyzed to determine the chemical makeup of PM_{2.5}. Samples are collected on a set of two cartridges on the Met-One SASS sampler for nitrates and sulfates and a single cartridge on the URG 3000N sampler for carbon. The samples are collected over a 24-hour sampling period. The individual cartridges contain denuders and filters designed to efficiently capture the major components of PM_{2.5}.

After collection, the samples are shipped cold to the EPA contract laboratory for analysis. At the laboratory, the samples are analyzed using thermal optical analysis (for carbon), ion chromatography (IC) (for nitrates and sulfates) and x-ray fluorescence (for metals) to determine the presence and concentration of specific compounds. This is referred to as the Chemical Speciation Network (CSN) protocol. Sample results are stored and available from AQS.

- **Sulfur Dioxide (SO₂)**

Instruments used to continuously monitor SO₂ concentrations in the atmosphere employ Ultraviolet (UV) fluorescence Federal Reference Method. The continuous data output from the instrument is stored locally on redundant data acquisition systems and recovered hourly by an automated central data acquisition system.

Calibration of these instruments and audits of their performance are done using the EPA protocol gas mixtures containing a known concentration of SO₂ in nitrogen. This gas is diluted to provide known concentrations of SO₂. These known concentrations are supplied to the instrument, which is adjusted so that the instrument output corresponds with the specific concentrations. Calibration curves are prepared for each instrument and each measurement is automatically compared to this curve before entry into the data acquisition system.

- **Carbon Monoxide (CO)**

Continuous monitoring for CO is performed by use of the FRM non-dispersive infrared correlation method. Data is stored locally on redundant data acquisition systems and recovered hourly by the Division's automated central data acquisition system.

Calibration of the instrument and audits of its performance are done using EPA Protocol gas mixtures containing a known concentration of CO in air. The gas is diluted to provide known concentrations of CO. These known concentrations are supplied to the instrument, which is adjusted so that the instrument output corresponds with the specific concentrations. Calibration curves are prepared for each instrument and each measurement is automatically compared to this curve before entry into the data acquisition system.

- **Ozone**

Ozone is monitored using the FEM UV photometry method. The continuous data output from the instrument is stored locally on redundant data acquisition systems and recovered hourly by the automated central data acquisition system.

Monitors are routinely calibrated and performance audited using portable ozone transfer standards. Calibration curves are prepared for each instrument and each measurement is automatically compared to this curve before entry into the data acquisition system.

- **Nitrogen Dioxide (NO₂)**

The FRM UV chemiluminescence method is used in the Network for measurement of NO₂ concentration in the ambient air. The continuous data output from the instrument is stored locally on redundant data acquisition systems and recovered hourly by an automated central data acquisition system.

Calibration of the instrument and audits of their performance is done using EPA protocol gas mixtures containing a known concentration of nitric oxide (NO) and Nitrogen Oxides (NO_x) in nitrogen. The gas is diluted to present several known concentrations of the oxides. A converter is used to convert NO_x to NO for reaction with internally generated ozone and measurement of the light produced by the reaction. Known concentrations are supplied to the instrument, which is adjusted so that the instrument output corresponds with the supplied concentrations. Calibration curves are prepared for each instrument and the response and calibration are used to report measured concentrations.

- **Lead**

Lead concentrations are determined by the analysis of TSP collected using high volume particulate samplers as described in 40 CFR Part 50 Appendix G. Particulate samples are acid extracted from a portion of the filter to dissolve metals from the collected materials. The lead content is determined using Flameless (Graphite Furnace) Atomic Absorption spectrometry.

- **Non criteria pollutants**

Non criteria pollutants such as air toxics, black carbon (BC), sulfate, and meteorology elements may also be measured. The sampling and analytical procedures used for these parameters are as follows:

- **Meteorology**

Wind Direction and Speed

Wind data is collected using systems that are higher precision 'Air Quality' systems. These use separate or combined wind vanes and anemometers mounted 10 meters above ground. The systems provide needed information about the local meteorology, but data quality is not sufficient for reporting to the national database.

Precipitation

Precipitation is measured by tipping bucket gauges that provide a signal indicating the occurrence, rate and amount of precipitation. The gauges are not heated, so do not accurately provide the time of frozen precipitation events. The monitors are checked for operation and accuracy using a known volume of water, then compared with actual volumes of collected precipitation in collocated samplers.

Ambient Temperature and Pressure

Ambient Temperature is available from sensors that are part of the sampling systems for the FRM PM_{2.5} samplers. Ambient temperature measurement is necessary for the systems to maintain the required flow rate to reproducibly separate the desired particulate size fractions as conditions change. Although the primary use of the measurement is for sampler flow control, the data is collected every five minutes.

Temperature and Pressure sensors are compared to reference systems at least once per month.

- **Air Toxics**

Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are collected into passivated or silica lined stainless steel canisters. The canisters are cleaned, tested and evacuated prior to installation at the sampling site, then filled and pressurized with ambient air throughout the sampling period (typically 24 hours). Measured portions of the captured air are concentrated at low temperature and analyzed using Gas Chromatography with a Mass Spectrometer detector (GC/MS) to identify and quantitate the collected compounds. The collection and analysis method is based on EPA Method TO-15.

Semi-volatile Organic Compounds

Semi Volatile Organic Compounds (SVOCs) are collected using polyurethane foam (PUF) and a solid adsorbant to trap the compounds from air pulled through the material by a high volume sampler. The SVOCs are extracted from the collection cartridge using a solvent, and the rinses are concentrated for analysis. Measured portions of the extract are analyzed using GC/MS to identify and quantitate the collected compounds. The collection and analysis method is based on EPA Method TO-13.

Carbonyls

Carbonyls (including aldehydes and ketones) are extracted from ambient air by reaction with a compound that makes them stable enough to capture and hold. The reaction of the compounds with Dinitro phenyl hydrazine (DNPH) removes them from the sampled air and concentrates them in the sample cartridge. Solvent Extraction of the DNPH derivatives from the cartridge is followed by analysis using High Pressure Liquid Chromatograph to identify and quantitate the collected carbonyls. The collection and analysis method is based on EPA Method TO-11.

Metals

Metals in particulate are collected on filters using the TSP or PM₁₀ High Volume samplers. Metals are extracted from a portion of the filter using sonication in an acid solution. Detection, identification and quantitation of the target metals use Inductively Coupled Plasma with a Mass Spectrometer (ICP/MS). The collection and analysis method is based on EPA Method IO-3.

- **Precipitation Chemistry**

A portion of the precipitation sample collected each week is analyzed for pH and conductivity. To determine concentrations of dissolved material that contributes to acid rain, the collected material is tested for cations and anions using Ion Chromatography.

- **Sulfate**

Sulfate in particulate can be measured in both samples and monitored continuously. The continuous method thermally reduces sulfate in ambient particulate to SO₂ for detection in a dedicated SO₂ monitor. Particulate samples collected on the species specific denuders used in the Speciation Trends and Chemical Speciation Networks (STN/CSN) are analyzed for anions (SO₄⁻ and NO₃⁻) using Ion Chromatography for separation and quantification of the species.

- **Light Absorbing Carbon (Black Carbon)**

Light Absorbing Carbon is measured continuously by the use of an Aethalometer. The transmittance of infrared light through a filter is measured as particulate is captured to determine the amount of black carbon collected.

- **Mercury**

Mercury is analyzed in ambient air and in weekly precipitation samples. Ambient concentrations are monitored using the collection of the mercury vapor on an adsorbent followed by thermal desorption and analysis using Cold Vapor Atomic Fluorescence Spectroscopy.

Mercury in precipitation is sampled and analyzed as part of the National Atmospheric Deposition Program, Mercury Deposition Network (NADP/MDN). Details of the sampling and analysis are available on the NADP website. <http://nadp.sws.uiuc.edu/NADP/>

- **Sampling Frequency**

Measurements of the parameters related to air quality are performed using sampling and continuous monitoring. Sampling frequency is the indicator of how often a measurement is made and reported.

Sampling typically involves collection of a sample over a period (typically 24 hours, midnight to midnight) and delivery of the sample to the laboratory for preparation and analysis. Samples are collected every day (1:1), every third day (1:3), every sixth day (1:6), every twelfth day (1:12) or weekly, depending on the data quality objectives of the project. Results of the analysis are reported as averages for the sample period. The EPA publishes 1:3 and 1:6 day sampling schedules used nationwide and by the Monitoring Network.⁴

Monitoring typically uses on-site analyzers that continuously sample the air and measure the pollutant of interest. Results of the analysis are reported as hourly averages. Five minute averages are reported for SO₂ concentrations. One minute averages are collected from many of the continuously monitored parameters for use in verification and validation of the reported monitoring data.

Changes for 2015

⁴ <http://www.epa.gov/ttn/amtic/calendar.html>

Any planned changes in parameters monitored, the configuration, or operations at the site planned for 2015 are described herein and summarized in the Summary of 2015 Network Changes. Unless otherwise indicated, changes at a site including the beginning of new monitoring activity will be effective January 1, 2015. Ozone monitoring for 2015 at new or special project sites may start at the beginning of the ozone monitoring season (April-October).

Network Summary

Network Summary: Calendar Year 2015 Air Monitoring Stations																			
Region	Sites	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	TSP/Lead	Ozone	SO ₂	NO ₂ /NO/NO _y	CO	Sulfate	BC	Carbonyls	SVOC	VOC	Mercury	Precip Chem.	Precip.	*MET
Augusta-Richmond County, GA-SC MSA	2	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Charleston-N. Charleston MSA	5	3	2	0	1	0	2	2	2	0	1	1	0	0	0	0	0	0	1
Charlotte-Concord-Gastonia, NC-SC MSA	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Columbia MSA	7	4	2	1	3	1	3	3	3	1	0	1	2	3	0	2	2	2	2
Florence MSA	5	1	1	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	6	3	1	1	1	0	5	1	1	0	0	1	0	0	0	0	0	0	1
Spartanburg MSA	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Rest of State	6	1	3	1	3	0	5	1	0	0	0	1	1	1	1	0	2	1	1
TOTALS	34	14	11	3	8	5	20	8	6	1	1	4	3	4	1	2	4	3	6

This summary table presents the elements of the 2015 Monitoring Plan after implementation of changes described in this plan.

*MET data includes wind speed and wind direction.

Draft 2013 Criteria Pollutant Design Values

This section presents the preliminary 2013 design values for the South Carolina criteria pollutant monitoring network.

Site ID	County	Site Name	Ozone (ppm)	PM _{2.5} Annual (µg/m ³)	PM _{2.5} 24-hour (µg/m ³)	PM ₁₀ (# Expected Exceedances)	SO ₂ 1-hour (ppb)	NO ₂ 1-hour (ppb)	NO ₂ Annual (ppb)	CO 8-hour (ppm)	CO 1-hour (ppm)	Lead (µg/m ³) (NOT 3 yrs DV)
001-0001	Abbeville	Due West	0.060									
003-0003	Aiken	Jackson Middle School	0.062									
007-0005	Anderson	Big Creek	0.068									
015-0002	Berkeley	Bushy Park	0.061									
019-0003	Charleston	Jenkins Avenue				0	16	*36	7			.01
019-0046	Charleston	Cape Romain	0.063				7	*10	1			
019-0048	Charleston	FAA		*8.9	*21							
019-0049	Charleston	Charleston Public Works		8.2	20							
021-0002	Cherokee	Cowpens	0.066									
025-0001	Chesterfield	Chesterfield	0.062	*8.4	*19	0						
029-0002	Colleton	Ashton	0.056									
031-0003	Darlington	Pee Dee	0.066									
037-0001	Edgefield	Trenton	0.058	9.3	20							
041-0003	Florence	Williams		9.6	20							
041-8001	Florence	JCI Railroad										.04
041-8002	Florence	JCI Entrance										.04
041-8003	Florence	JCI River										.04
043-0006	Georgetown	Georgetown CMS										
043-0011	Georgetown	Howard High #3				0						
045-0015	Greenville	Greenville ESC		10.0	22	*0	7	*45	8			
045-0016	Greenville	Hillcrest	0.067	9.5	19							
045-1003	Greenville	Famoda Farms	0.063									
063-0008	Lexington	Irmo		10.3	22		37					

Site ID	County	Site Name	Ozone (ppm)	PM _{2.5} Annual (µg/m ³)	PM _{2.5} 24-hour (µg/m ³)	PM ₁₀ (# Expected Exceedances)	SO ₂ 1-hour (ppb)	NO ₂ 1-hour (ppb)	NO ₂ Annual (ppb)	CO 8-hour (ppm)	CO 1-hour (ppm)	Lead (µg/m ³) (NOT 3 yrs DV)
063-0009	Lexington	Cayce CMS										
063-0010	Lexington	Cayce City Hall				*0						
073-0001	Oconee	Long Creek	*0.059				5					
077-0002	Pickens	Clemson	0.067									
077-0003	Pickens	Wolf Creek	*0.066									
079-0007	Richland	Parklane	0.065	9.4	20		12			1	1	
079-0019	Richland	Bates House		*10.1	*22	0						
079-0021	Richland	Congaree Bluff	0.057				17					
079-1001	Richland	Sandhill	0.069					*37	4			
083-0009	Spartanburg	North Spartanburg	0.072									
083-0011	Spartanburg	T.K. Gregg		9.9	20							
091-0006	York	York CMS	0.063				*3					

* denotes design values that did not meet completeness requirements.

Required Monitoring

The EPA regulations require that each State maintain a minimum number of monitors to properly characterize air quality and to meet any required objectives of the monitoring network⁵. In general, the EPA establishes minimum monitoring requirements based on the population and current ambient air monitoring design values in each CBSA. The term CBSA is a collective term for the defined MSAs and Micropolitan Statistical Areas (mSA). A MSA area contains a core urban area of 50,000 or more population, and a mSA contains an urban core of at least 10,000 (but less than 50,000) population. Each metropolitan or micropolitan area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core⁶.

A MSA or mSA geographic composition, or list of geographic components at a particular point in time, is referred to as its "delineation." The MSA or mSA are delineated by the U.S. Office of Management and Budget (OMB) and are the result of the application of published standards based on Census Bureau data. The standards for delineating the areas are reviewed and revised once every ten years, prior to each decennial census. Generally, the areas are delineated using the most recent set of standards following each decennial census. Between censuses, the delineations are updated annually to reflect the most recent Census Bureau population estimates. Areas based on the 2010 standards and Census Bureau data were delineated in February of 2013.⁷

While DHEC understands the need for establishing minimum monitoring requirements, the EPA appropriately has mechanisms within the monitoring plan approval and network assessment process to allow states the flexibility to implement a monitoring network that meets the three basic monitoring objectives and addresses National and State needs. The recent changes in the MSA definitions are an example of the reason for the incorporation of flexibility in the regulations and illustrates necessity that the EPA use the discretion available in the monitoring regulations to afford states flexibility and regulatory certainty.

Per 40 CFR Part 58 Appendix D paragraph 2 (e), minimum monitoring requirements in multi-state MSAs can be met through a cooperative agreement. In the absence of an agreement between states, the minimum monitoring requirements must be met independently in each portion of the MSA. South Carolina has established a memorandum of agreement (MOA) with the States of Georgia⁸, North Carolina, and Mecklenburg County, North Carolina⁹ which specifies the responsibilities of each party to develop a monitoring network that meets the appropriate monitoring objectives for the MSA.

The map below presents South Carolina's CBSAs based on the definitions published in February 2013.

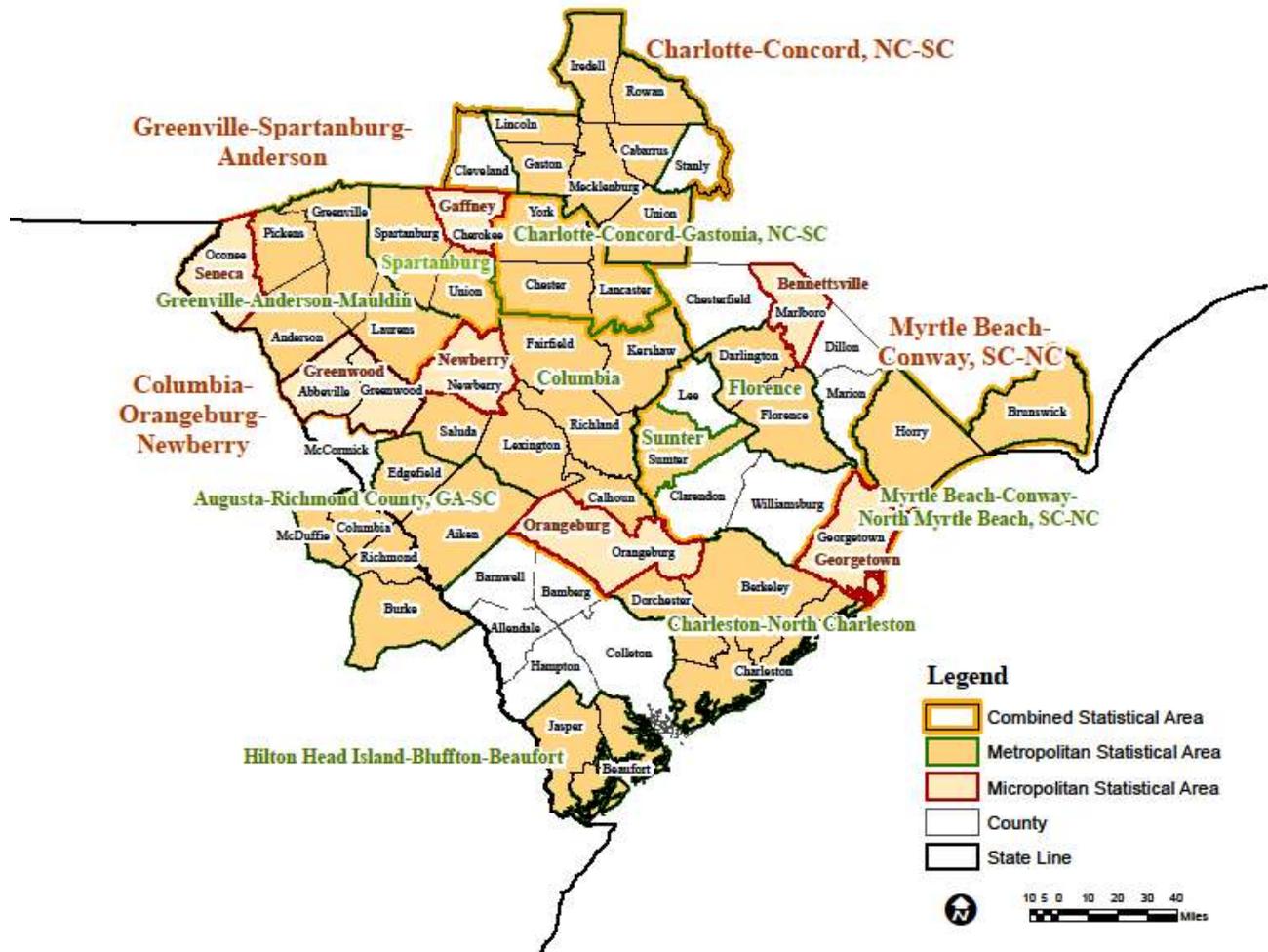
⁵ 40 CFR Part 58.11 paragraph (a)(3)(c) and Appendix D to 40 CFR Part 58.

⁶ <http://www.census.gov/population/metro/>

⁷ <http://www.census.gov/population/metro/data/>

⁸ The Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Augusta-Richmond County Metropolitan Statistical Area (MSA) was signed on October 9, 2007 by the South Carolina DHEC Bureau of Air Quality and the Georgia Environmental Protection Division-Air Protection Branch.

⁹ The Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Charlotte-Gastonia-Concord Metropolitan Statistical Area (MSA) was signed on January 12, 2006 by the South Carolina DHEC Bureau of Air Quality, the North Carolina Department of Environmental and Natural Resources-Division of Air Quality and the Mecklenburg County, North Carolina Land Use and Environmental Service Agency-Air Quality.



Population

The table below presents the latest (2013)* population estimates for each MSA in South Carolina and the total population of MSAs shared with North Carolina and Georgia.

MSA	Population
Charlotte-Concord-Gastonia, NC-SC MSA	2,335,358
Greenville-Anderson-Mauldin MSA	850,965
Columbia MSA	793,779
Charleston-North Charleston MSA	712,220
Augusta-Richmond County, GA-SC MSA	580,270
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	404,951
Spartanburg MSA	318,999
Florence MSA	206,261
Hilton Head Island-Bluffton-Beaufort MSA	198,467
Sumter MSA	108,123
*United States Census Bureau http://www.census.gov/population/metro/data/def.html and CFR 40 Part 58 Table D	

The 2013 ambient air monitoring design values can be found on the table titled 2013 Criteria Pollutant Design Values on page 13. Based on the *latest available United States Census population estimates and ambient air quality design values, the minimum monitoring requirements for each MSA are:

MSA	Ozone	PM _{2.5}	PM _{2.5} Cont.	PM ₁₀	Lead	SO ₂	NO ₂	CO
**Augusta-Richmond County, GA-SC MSA	2	2	1	1-2	0	1	1	0
Charleston-North Charleston, MSA	2	1	1	1-2	0	1	1	0
**Charlotte-Concord-Gastonia, NC-SC MSA	2	3	2	2-4	0	1	2	1
Columbia MSA (NCore)	2	2	1	1-2	1	1	1	1
Florence MSA	1	1	1	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	2	2	1	1-2	0	1	2	0
Hilton Head Island-Bluffton-Beaufort MSA	0	0	0	0	0	0	0	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1	0	0	0-1	0	0	0	0
Spartanburg MSA	1	1	1	0-1	0	0	0	0
Sumter MSA	0	0	0	0	0	0	0	0
*United States Census Bureau http://www.census.gov/population/metro/data/def.html and CFR 40 Part 58 Table D.								
** Minimum ambient air monitoring requirements are met cooperatively with the States of Georgia and North Carolina.								

Required Monitoring SO₂ – Population Weighted Emissions Index (PWEI)

On June 22, 2010, the EPA finalized revisions to the SO₂ NAAQS. As part of this rulemaking, the EPA set minimum monitoring requirements for CBSAs based on population and SO₂ emissions. The following table presents each CBSA's 2013 population, 2011 SO₂ emissions, calculated index and minimum monitoring requirements. The process for calculating the index can be found at the bottom of the table.

CBSA	2013 CBSA Population	2011 CBSA SO ₂ Emissions (Tons)	PWEI	SO ₂ Minimum Monitors Required
*Charlotte-Concord-Gastonia, NC-SC MSA	2,335,358	19,777	45,419	1
Greenville-Anderson-Mauldin MSA	850,965	7,209	6,076	1
Columbia MSA	793,779	17,194	13,493	1
Charleston-North Charleston MSA	712,220	26,443	18,442	1
*Augusta-Richmond County, GA-SC MSA	580,270	9,569	5,511	1
*Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	404,951	8,420	3,322	0
Spartanburg MSA	318,999	708	284	0
Florence MSA	206,261	8,401	1,731	0
Hilton Head Island-Bluffton-Beaufort MSA	198,467	384	74	0
Sumter MSA	108,123	158	17	0
<p>The PWEI is calculated using US Census population data and state emission inventory data at the CBSA level. The population for each CBSA (based on the most recent US Census or Census estimate) is multiplied by the CBSA total SO₂ emissions (reported in tons using the latest National Emissions Inventory data). This product is divided by 1,000,000 to derive the index.</p> <ul style="list-style-type: none"> • CBSA with index greater than 1,000,000 will require 3 monitors. • CBSA with index less than 1,000,000 but greater than 100,000 will require 2 monitors. • CBSA with index less than 100,000 but greater than 5,000 will require 1 monitor. • CBSA with index less than 5,000 will require no monitors. <p>*Monitors may be operated in the non-South Carolina portion of the CBSA.</p>				

Required Monitoring for Lead Ambient Air – facilities with annual emissions greater than 0.5 tons per year (tpy)

On December 27, 2010, the EPA published revised minimum monitoring requirements for the Lead NAAQS. Any facility with annual lead emissions exceeding 0.5 tpy will be required to have a lead sampler. Based on the state-submitted 2011 National Emissions Inventory, there are no facilities in South Carolina with lead emissions greater than 0.5 tpy.

On May 7, 2010, DHEC issued an air synthetic minor construction permit to Johnson Controls Battery Group for the Florence Recycling Center (Permit No. 1040-0129-CA). Under a settlement agreement¹⁰ with several petitioners, the Florence Recycling Center supports source-oriented ambient lead monitoring being conducted by DHEC at several sites around the facility. Additional details of the monitoring of this facility can be found in the Florence MSA section of this Monitoring Plan under the site name “Johnson Controls.”

¹⁰ http://www.scdhec.gov/environment/JCI/docs/JCI-Settlement%20Agreement_07142010.pdf

Near Road Monitoring

NO₂

On March 7, 2013, the EPA issued a rule to revise the deadlines by which the near-road monitors within the NO₂ monitoring network are to be operational. If the CBSA has 1,000,000 or more people, one near-road monitor shall be operational by January 1, 2014 (phase 1). In each CBSA required to have two near-road NO₂ monitors, the second monitor shall be operational by January 1, 2015 (phase 2). If the CBSA has at least 500,000 or more people, but less than 1,000,000, the monitor(s) shall be operational by January 1, 2017 (phase 3). All areas in South Carolina except the Charlotte-Concord-Gastonia, NC-SC MSA are part of the phase 3 deployment to be operational by 2017. The near-road monitoring requirement for the Charlotte-Concord-Gastonia, NC-SA MSA will be fulfilled by the Mecklenburg County Air Quality Commission.

Adequate funding is necessary to ensure operation of this network. To date, the EPA has not been able to guarantee that funding will necessarily be available for the third phase of the deployment. DHEC will review the Technical Assistance Document¹¹ and monitor progress of the deployment of near-road sites in other areas.

CO

The EPA requires the collocation of one CO monitor with a near-road NO₂ monitor in urban areas having populations of 1,000,000 or more. The Charlotte-Concord-Gastonia, NC-SC MSA is the only MSA in South Carolina that meets the population requirement for a collocated CO monitor. The near-road monitoring requirement for the Charlotte-Concord-Gastonia, NC-SA MSA will be fulfilled by the Mecklenburg County Air Quality Commission.

PM_{2.5}

The EPA requires the collocation of one PM_{2.5} monitor with a near-road NO₂ monitor in urban areas having populations of 1,000,000 or more. The Charlotte-Concord-Gastonia, NC-SC MSA is the only MSA in South Carolina that meets the population requirement for a collocated PM_{2.5} monitor. The near-road monitoring requirement for the Charlotte-Concord-Gastonia, NC-SA MSA will be fulfilled by the Mecklenburg County Air Quality Commission.

¹¹ <http://www.epa.gov/ttn/amtic/nearroad.html>

Summary of 2015 Network Changes

Augusta-Richmond County, GA-SC MSA (South Carolina portion includes Aiken and Edgefield Counties)

No changes planned for 2015.

Charleston-North Charleston MSA

In the 2014 Monitoring Plan, an editorial error on the Jenkins Ave. Fire Station (45-019-0003) table designated SO₂ as SPM. This has been corrected to the designation of SLAMS.

Charlotte-Concord-Gastonia, NC-SC MSA

York CMS (45-091-0006) SO₂ monitor designation was changed from SLAMS to SPM to reflect that the monitor is not required by Appendix D to 40 CFR Part 58 requirements.

Columbia MSA

Irmo (45-063-0008) objective for SVOC and carbonyl has been changed to be consistent with the objective for black carbon.

Florence MSA

A collocated lead sampler was added to the JCI Entrance (45-041-8002) site for quality assurance activities.

Greenville-Anderson-Mauldin MSA

Greenville ESC (45-045-0015) NO₂ monitor designation has been changed from SPM to SLAMS. The SO₂ monitor was changed from SPM to SLAMS. Sulfate monitoring was discontinued in 2009 and table updated. National support for speciation sampling at this site may be eliminated in 2015.

Hillcrest Middle School (45-045-0016) sampling frequency for PM_{2.5} was corrected to reflect a sample taken every three days.

Clemson CMS (45-077-0002) was added back to the list of active monitoring sites for the MSA. DHEC will continue discussions with EPA Region 4 to discontinue duplicative ozone monitoring for the Greenville-Anderson-Mauldin MSA at this site.

Hilton Head Island-Bluffton-Beaufort MSA

No changes planned for 2015.

Spartanburg MSA

No changes planned for 2015.

Sumter MSA

No changes planned for 2015.

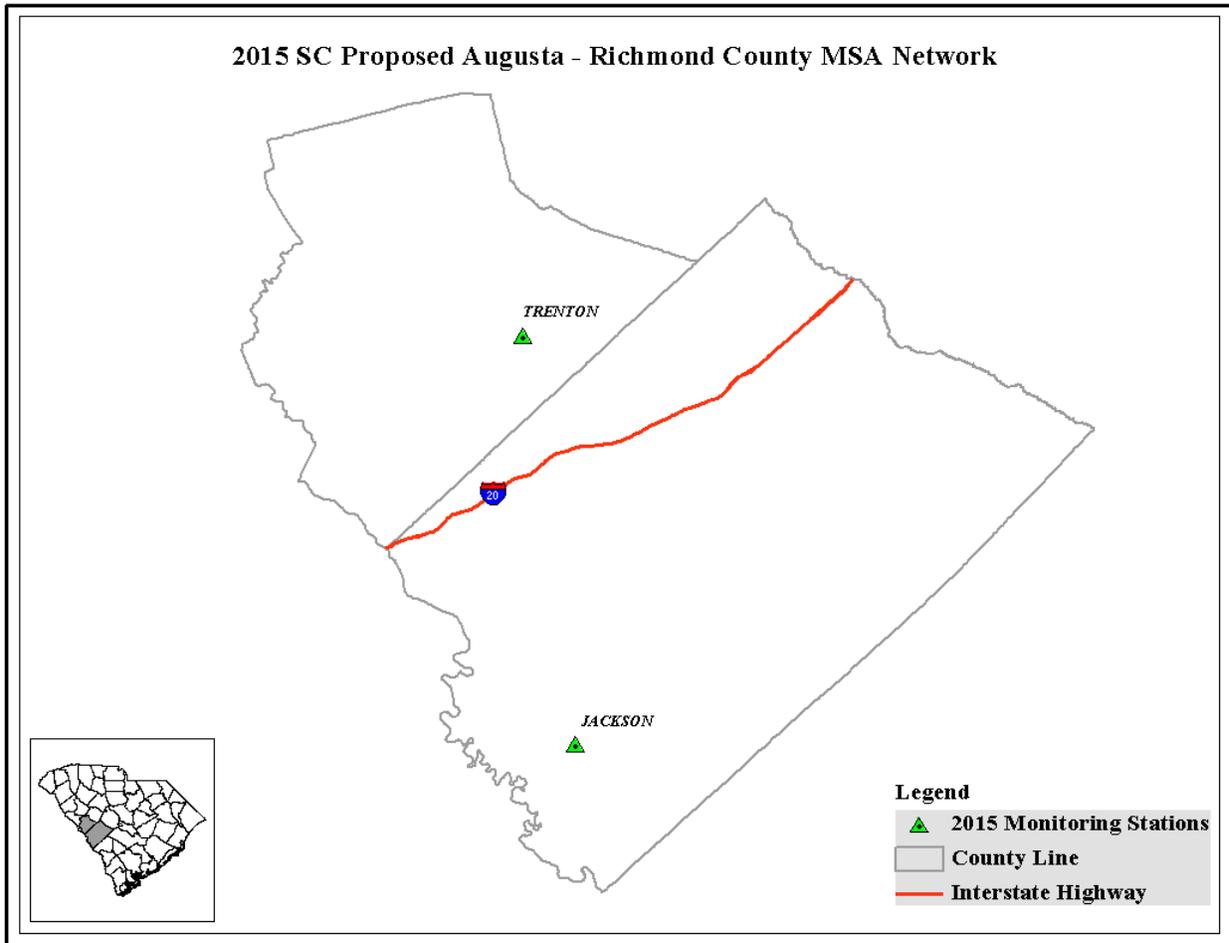
Remainder of State

Chesterfield (45-025-0001) PM_{2.5} speciation sampling may be discontinued at this site depending on the results of a national assessment of the active network.

Long Creek (45-073-0001) designation for the PM_{2.5} monitor was changed from SLAMS to SPM due to inadequate performance of the FEM.

Site Descriptions

Augusta-Richmond County, GA-SC MSA (part)



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead / TSP	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip Chem.	Precip.	MET
45-003-0003	Jackson Middle School						●												
45-037-0001	Trenton	○	○				●												
	TOTAL	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0

○ SPM / Other
 ● SLAMS
 ●●/○○ indicates duplicate / QA monitors

Jackson Middle School

CSA/MSA: none/Augusta-Richmond County MSA

AQS Site ID: 45-003-0003

Location: 8217 Atomic Road

County: Aiken

Coordinates: +33.34219, -81.78872

Date Established: October 24, 1985

Site Evaluation: The most recent site evaluation was conducted on June 14, 2006 (QA Check: March 29, 2012).



The Jackson Middle School site is located in southwestern Aiken County within the town limits of Jackson at the Jackson Middle School. Jackson is located in a suburban setting to monitor concentrations upwind of the Augusta urbanized area. The Jackson site monitors for ozone. The sample inlet is 153 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Upwind Background	SLAMS	3.38	FEM Ultraviolet Photometry	Continuous

Trenton

CSA/MSA: none/Augusta-Richmond County MSA

AQS Site ID: 45-037-0001

Location: 660 Woodyard Road (Hwy 121)

County: Edgefield

Coordinates: +33.73993, -81.85362 **Date Established:** March 28, 1980

Site Evaluation: The most recent site evaluation was conducted on March 18, 2003 (QA Check: March 29, 2012).



The Trenton site is located in southeastern Edgefield County. Trenton was originally established to monitor for ozone crossing into South Carolina from Georgia. The Trenton site has both FRM and continuous monitoring for PM_{2.5}. The sample inlets are 39 meters from the nearest road.

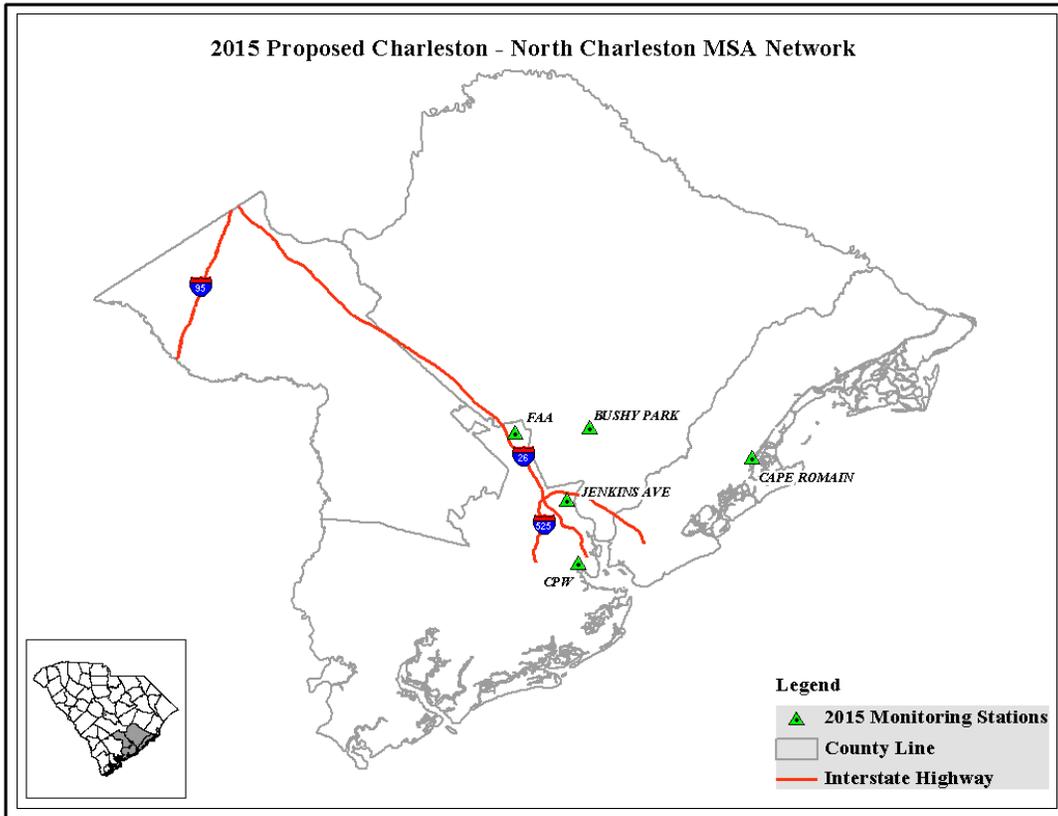
Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Urban	Extreme Downwind	SPM	4.5	FRM Gravimetric	1:3
Continuous PM _{2.5}	Urban	Extreme Downwind	SPM non-regulatory	4.5	TEOM 50°C	Continuous
Ozone	Urban	Maximum Ozone Concentration / Extreme Downwind	SLAMS	3.5	FEM Ultraviolet Photometry	Continuous

Charleston-North Charleston MSA



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead / TSP	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip. Chem.	Precip.	MET
45-015-0002	Bushy Park Pump Station						●												
45-019-0003	Jenkins Ave. Fire Station				●			●	○										
45-019-0046	Cape Romain		○				●	○	○		○	○							○
45-019-0048	FAA	○○																	
45-019-0049	CPW	●	○																
	TOTAL	3	2	0	1	0	2	2	2	0	1	1	0	0	0	0	0	0	1
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate / QA monitors																			

Bushy Park Pump Station**CSA/MSA:** none/Charleston-North Charleston MSA**AQS Site ID:** 45-015-0002**Location:** River Oak Drive (Goose Creek)**County:** Berkeley**Coordinates:** +32.98724, -79.93671 **Date Established:** June 20, 1978**Site Evaluation:** The most recent site evaluation was conducted on March 17, 2003 (QA Check: May 19, 2011).

The Bushy Park Pump Station site is located in southeastern Berkeley County downwind from the Charleston urban area. This site monitors for ozone and the monitoring objective is maximum ozone concentration. The sample inlets are 11 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.12	FEM Ultraviolet Photometry	Continuous

Jenkins Ave. Fire Station

CSA/MSA: none/Charleston-North Charleston MSA

AQS Site ID: 45-019-0003

Location: 4830 Jenkins Ave.

County: Charleston

Coordinates: +32.88228, -79.97755 **Date Established:** February 14, 1969

Site Evaluation: The most recent site evaluation was conducted on March 2, 2005 (QA Check: June 2, 2011).



The Jenkins Ave. Fire Station site is located in the city of North Charleston behind a fire station in an urban and central city setting. The Jenkins Ave. Fire Station site supports monitors for PM₁₀, SO₂, and NO₂. The sample inlets are 9 meters from the nearest road.

Changes for 2015:

An editorial error in the 2014 Monitoring Plan indicated that SO₂ designation was SPM. This has been corrected to SLAMS in AQS.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Neighborhood	Highest Concentration	SLAMS	3.84	FEM TEOM	Continuous
Sulfur Dioxide	Neighborhood	Population Exposure	SLAMS	4.18	FEM UV Fluorescence	Continuous
Nitrogen Dioxide	Neighborhood	Highest Concentration Source Oriented	SPM	4.18	FRM Chemiluminescence	Continuous

Cape Romain

CSA/MSA: none/Charleston-North Charleston MSA

AQS Site ID: 45-019-0046

Location: 390 Bulls Island Road (Awendaw)

County: Charleston

Coordinates: +32.94101, -79.65719

Date Established: July 11, 1983

Site Evaluation: The most recent site evaluation was conducted on June 3, 2005 (QA Check: April 21, 2011).



The Cape Romain site is located in Charleston County at the Cape Romain National Wildlife Refuge (NWR) near Moore's Landing.

The Cape Romain NWR is a Class I area about 20 miles northeast of Charleston. The majority of the Refuge area is offshore extending from Bull Island 20 miles northeast to Cape Romain. The Refuge is bordered on the west by the Intracoastal Waterway. Inland are large tracts of forests with scattered residences. Several miles inland, a primary coastal route, US Highway (Hwy) 17, parallels the coast, with some development along the section of

highway that is closest to the Refuge.

The Cape Romain site has continuous monitors for SO₂, NO₂, ozone, BC, sulfate, PM_{2.5}, and meteorological parameters. The sample inlets are 18 meters from the nearest road.

The Cape Roman site is collocated with the Interagency Monitoring of Protected Visual Environments (IMPROVE) sampling site and nearby monitoring performed by other agencies includes precipitation chemistry, PM_{2.5} speciation, and mercury deposition. The site has been used for multiple interagency and regional air monitoring projects.

Changes for 2015:

No changes planned for 2015.

Monitors:

(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Urban	General Background	SPM non-regulatory	4.70	TEOM 30°C	Continuous
Ozone	Regional	General Background	SLAMS	4.51	FEM Ultraviolet Photometry	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Sulfur Dioxide	Regional	Source Oriented	SPM	4.51	FEM UV Fluorescence	Continuous
Nitrogen Dioxide	Regional	General Background	SPM	4.51	FRM Chemiluminescence	Continuous
Sulfate	Regional	General Background	non-regulatory	4.00	Catalytic thermal reduction / Pulsed fluorescence	Continuous
Black Carbon	Regional	General Background	non-regulatory	4.00	Optical absorption	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	non-regulatory	10.00	Instruments for wind speed and direction, and precipitation	Continuous

FAA**CSA/MSA:** none/Charleston-North Charleston MSA**AQS Site ID:** 45-019-0048**Location:** 2670 Elms Plantation Blvd**County:** Charleston**Coordinates:** +32.98024, -80.06502**Date Established:** April 9, 1999**Site Evaluation:** The most recent site evaluation was conducted on May 4, 2006 (QA Check: May 19, 2011).

The Charleston FAA Beacon site is located in Charleston County approximately five miles northwest of the Charleston International Airport near Charleston Southern University. This site has collocated PM_{2.5} samplers. The sample inlets are 50 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SPM	2.35	FRM Gravimetric	1:1
Collocated PM _{2.5}	Neighborhood	Population Exposure	QA Collocated	2.38	FRM Gravimetric	1:6

Charleston Public Works (CPW)

CSA/MSA: none/Charleston-North Charleston MSA

AQS Site ID: 45-019-0049

Location: 360 Fishburne Street

County: Charleston

Coordinates: +32.79097, -79.95871

Date Established: November 20, 1998

Site Evaluation: The most recent site evaluation was conducted on April 24, 2006. (QA Check: June 02, 2011).



The CPW site is located on the western side of the Charleston peninsula near downtown Charleston. The CPW site supports the required PM_{2.5} monitors for the MSA. The sample inlets are 28 meters from the nearest road.

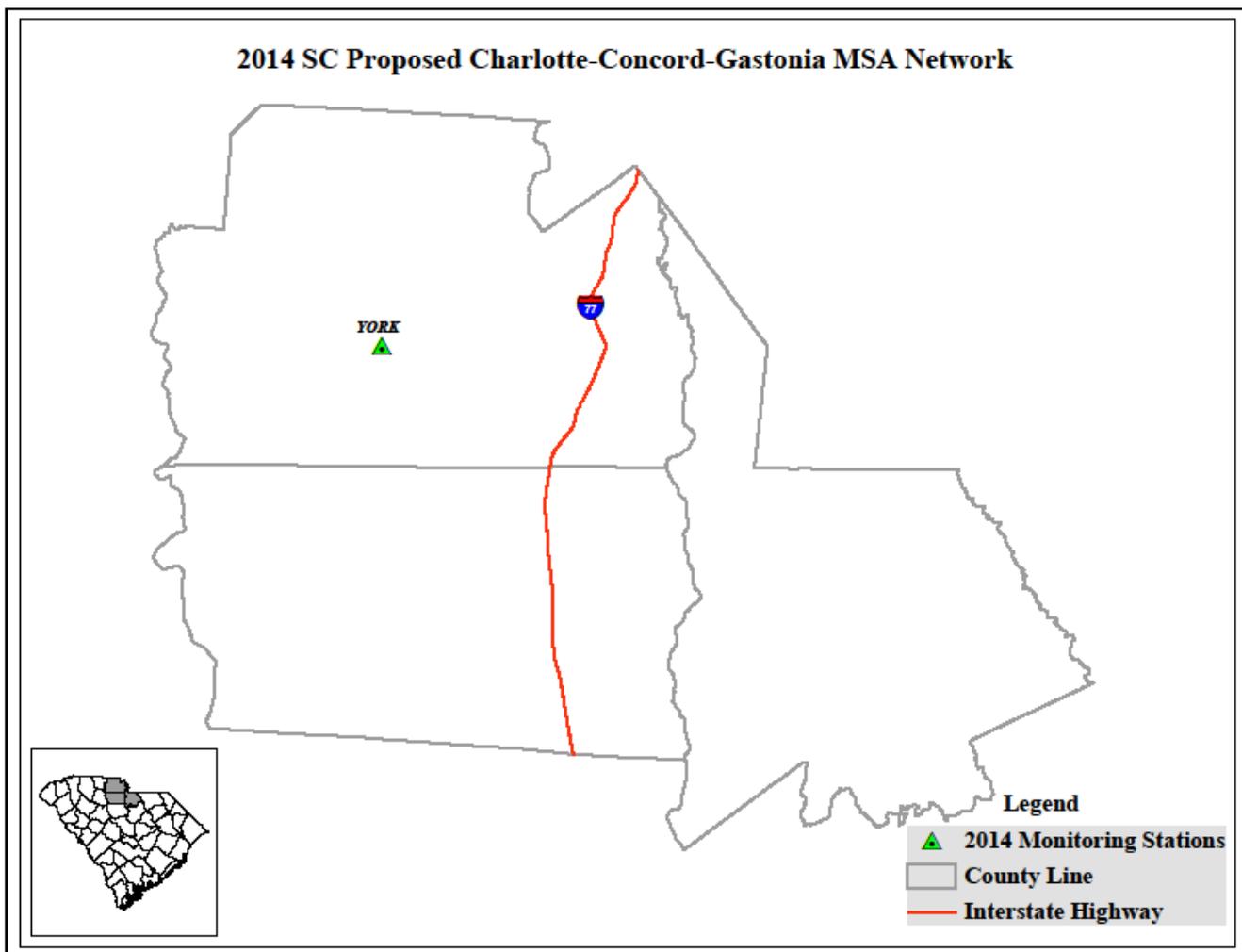
Changes for 2015:

No changes for 2015

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	2.25	FRM Gravimetric	1:1
PM _{2.5}	Neighborhood	Population Exposure	SPM non-regulatory	2.77	TEOM	Continuous

Charlotte-Concord-Gastonia MSA



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead / TSP	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip. Chem.	Precip.	MET
45-091-0006	York CMS						●	○											○
	TOTAL	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate / QA monitors																			

York Continuous Monitoring Site (CMS)

CSA/MSA: Charlotte-Concord CSA / Charlotte-Concord-Gastonia MSA

AQS Site ID: 45-091-0006

Location: 2316 Chester Hwy (US 321)

County: York

Coordinates: +34.93581, -81.22838

Date Established: March 30, 1993

Site Evaluation: The most recent site evaluation was conducted on June 13, 2006 (QA Check: May 21, 2013).



The York CMS site is located in south central York County in a rural setting. The site was established to represent background levels near the Charlotte urban area. York CMS has monitors for ozone and SO₂, as well as a wind tower. The long historical record and location of the site make the data useful to both North and South Carolina Air Programs. The sample inlets are 171 meters from the nearest road.

Access to the property occupied by this site may be lost within the next few years. DHEC will begin looking into alternative locations for ozone monitoring within York County.

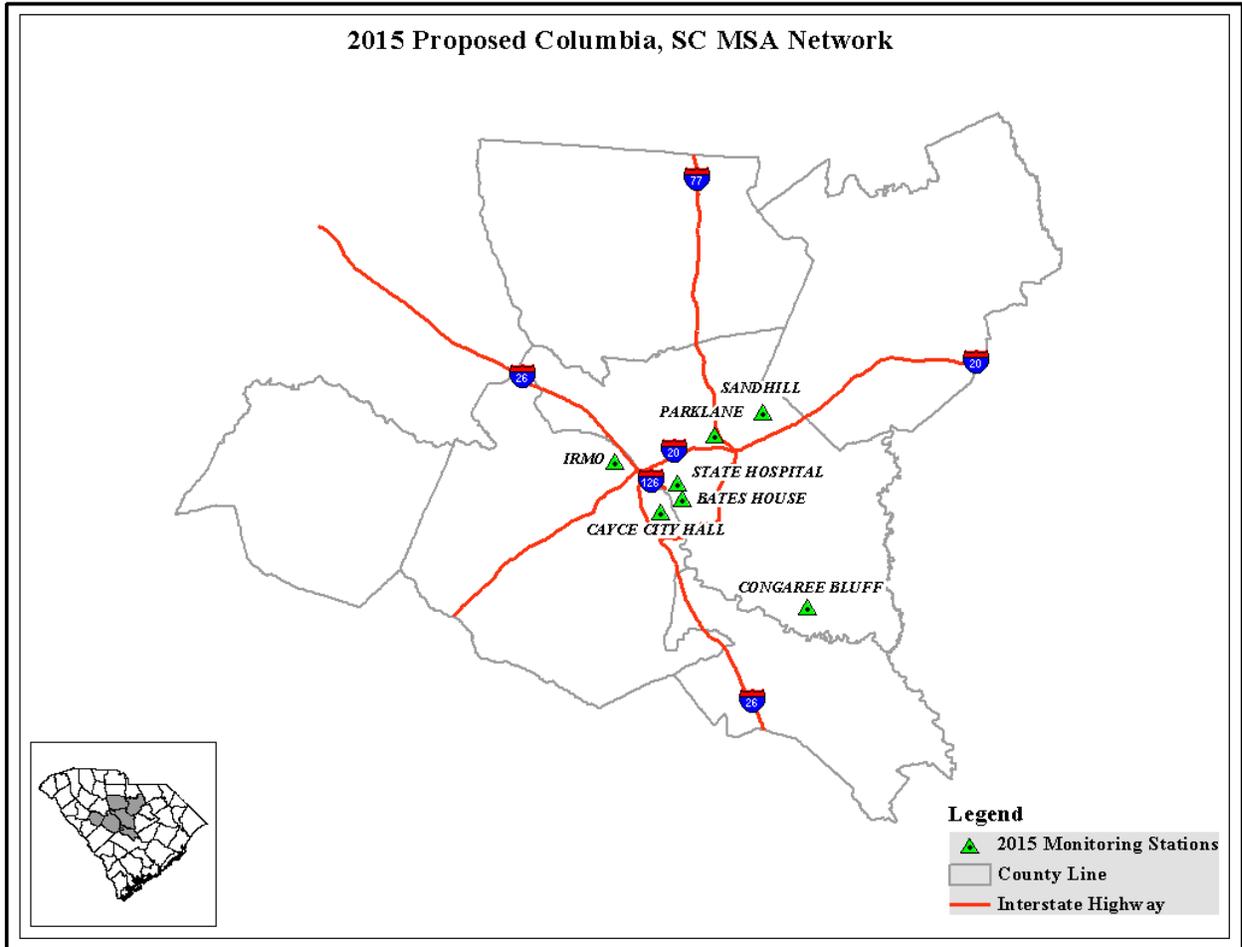
Changes for 2015:

SO₂ designation will be changed to SPM to reflect that this is not a required monitor.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Upwind Background	SLAMS	4.72	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Urban	Upwind Background	SPM	4.72	FEM UV fluorescence	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	non-regulatory	10.0	Instruments for wind speed, wind direction	Continuous

Columbia MSA



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead /TSP	Ozone	SO ₂	NO ₂ /NO/NO _y	CO	Sulfate	BC	Carbonyls	SVOC	VOC	Mercury	Precip Chem.	Precip.	MET
45-063-0008	Irmo	●	○					○				○	○	○					
45-063-0010	Cayce City Hall				●														
45-079-0007	Parklane (NCore)	●	○	●	○	●	●	●	●*	●				○			○	○	○
45-079-0019	Bates House (USC)	●●			●														
45-079-0020	State Hospital												○	○					
45-079-0021	Congaree Bluff						○	○								○○	○	○	
45-079-1001	Sandhill						●		○										○
	TOTAL	4	2	1	3	1	3	3	3	1	0	1	2	3	0	2	2	2	2
<p>○ SPM / Other ●●/○○ indicates duplicate / QA samplers ● SLAMS/NCore *NO and NO_y will be monitored</p>																			

Irmo**CSA/MSA:** Columbia-Orangeburg-Newberry CSA / Columbia MSA**AQS Site ID:** 45-063-0008**Location:** 200 Leisure Lane**County:** Lexington**Coordinates:** +34.051017, -81.15492**Date Established:** April 7, 1989**Site Evaluation:** The most recent site evaluation was conducted on February 25, 2005 (QA Check: March 06, 2012).

The Irmo site is located in Lexington County near the Town of Irmo. This site has a sampler for PM_{2.5} and continuous monitors for SO₂, BC, and PM_{2.5}. Additionally, this site has samplers collecting carbonyl and SVOC samples on a 1:6 schedule. The sample inlets are 43 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

(Table continues on next page)

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	4.95	FRM Gravimetric	1:1
PM _{2.5}	Neighborhood	Population Exposure	SPM non-regulatory	4.55	TEOM 30°C	Continuous
Sulfur Dioxide	Neighborhood	Source-Oriented	SPM	3.23	FEM UV fluorescence	Continuous
Black Carbon	Urban	Population Exposure / General Background	non-regulatory	4.0	Optical absorption	Continuous
Carbonyls	Neighborhood	Population Exposure/ General Background	non-regulatory	3.9	HPLC Ultraviolet Absorption	1:6

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
SVOC	Neighborhood	Population Exposure/ General Background	non-regulatory	3.9	PUF/GCMS	1:6

Cayce City Hall

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA

AQS Site ID: 45-063-0010

Location: 1830 Morlaine Rd.

County: Lexington

Coordinates: +33.96914, -81.06629

Date Established: December 6, 2007

Site Evaluation: PENDING (QA Check: March 06, 2012).



The Cayce City Hall site is located in the City of Cayce and measures PM₁₀. This site was established to measure PM₁₀ concentrations in populated areas and to determine the potential impact of occasional high concentrations on neighborhoods surrounding the industrialized area. The sample inlet is 32 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Neighborhood	Population Exposure	SLAMS	2.4	TEOM	Continuous

Parklane (NCore)

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA

AQS Site ID: 45-079-0007

Location: 8311 Parklane Road

County: Richland

Coordinates: +34.09398, -80.96230

Date Established: April 3, 1980

Site Evaluation: The most recent site evaluation was conducted on March 22, 2007 (QA Check: March 01, 2012).



The Parklane site is located in north central Richland County within the city limits of Columbia. Parklane was originally sited to provide downwind population exposure measurements at the edge of the Columbia urban area population and has been expanded to support the full complement of NCore parameters. The suite of samplers measure PM_{2.5}, speciated PM_{2.5}, lead, precipitation chemistry, precipitation, and SVOC. The suite of continuous monitors measure PM_{2.5}, ozone, SO₂, CO, NO, and nitrogen oxides (NO_y). The site also provides support for demonstration, training, and equipment evaluation convenient to DHEC's Columbia air laboratory. The sample inlets are 57

meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

*Bolded parameters are a NCore requirement.

(Table continues on next page)

Parameter *Required	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM_{2.5}	Neighbor -hood	Population Exposure	NCore	4.82	FRM Gravimetric	1:3
PM_{2.5}	Neighbor -hood	Population Exposure	SPM non- regulatory	4.90	TEOM	Continuous
Speciated PM_{2.5}	Neighbor -hood	Population Exposure	NCore	2.50	CSN Protocol	1:3
PM ₁₀	Neighbor -hood	Population Exposure	NCore	4.4	TEOM	Continuous
PM_{10-2.5}	Neighbor hood	Population Exposure	NCore	4.4	Gravimetric FRM Pair	1:3

Parameter *Required	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Lead	Neighbor -hood	Population Exposure	NCore	2.5	GFAA	1:6
Ozone	Urban	Max Ozone Concentration	NCore	4.13	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Neighbor -hood	Population Exposure	NCore	4.13	Pulsed Florescence	Continuous
Nitric Oxide	Neighbor -hood	Population Exposure	NCore	10	Chemi- luminescence	Continuous
NO_y	Neighbor -hood	Population Exposure	NCore	10	Chemi- luminescence	Continuous
Carbon Monoxide	Neighbor -hood	Population Exposure	NCore	4.13	Gas filter Correlation	Continuous
SVOC	Neighbor -hood	Population Exposure	SPM	2.5	PUF- GC/MS	1:6
Precipitation chemistry	Neighbor -hood	Regional Transport	Non- regulatory	1.4	Not applicable	Weekly- Tues-Tues
Precipitation	Neighbor -hood	General/ Background	Non- regulatory	1.1	Tipping bucket	Continuous and Sample
Wind Speed / Direction	Neighbor -hood	Local Conditions	Non- regulatory	10.0	Instruments for wind speed, wind direction	Continuous

Bates House-University of South Carolina (USC)

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA

AQS Site ID: 45-079-0019

Location: 323 S. Bull Street

County: Richland

Coordinates: +33.99150, -81.02413

Date Established: November 24, 1998

Site Evaluation: The most recent site evaluation was conducted on March 17, 2003 (QA Check: March 01, 2012).



The Bates House (USC) site is located in Richland County on the University of South Carolina-Columbia campus. The Bates House site has a sampler for PM_{2.5} and collocated precision sampling for PM_{2.5}. The site also has collocated wind measurement equipment (3m) operated by the USC Geography Department. The sample inlets are 28 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	2.41	FRM Gravimetric	1:1
Collocated PM _{2.5}	Neighborhood	Quality Assurance	QA Collocated	2.40	Gravimetric	1:6
PM ₁₀	Neighborhood	Population Exposure	SLAMS	2.24	TEOM	Continuous

State Hospital**CSA/MSA:** Columbia-Orangeburg-Newberry CSA / Columbia MSA**AQS Site ID:** 45-079-0020**Location:** 2100 Bull Street**County:** Richland**Coordinates:** +34.01549, -81.03418**Date Established:** January 7, 1999**Site Evaluation:** The most recent site evaluation was conducted on February 9, 2006 (QA Check: March 20, 2012).

The State Hospital site is located in Columbia near the intersection of Elmwood Avenue and Bull Street on the grounds of the South Carolina State Hospital. State Hospital has samplers for carbonyls and SVOC. The sample inlets are 10 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015. Access to this site may be lost due to recent sale and planned use of the property.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Carbonyls	Middle Scale	Highest Concentration	non-regulatory	4.23	HPLC Ultraviolet Absorption	1:6
SVOC	Neighborhood	General / Background	non-regulatory	2.87	PUF-GC/MS	1:6

Congaree Bluff

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA

AQS Site ID: 45-079-0021

Location: 1850 South Cedar Creek Road

County: Richland

Coordinates: +33.81467, -80.78113

Date Established: December 27, 1999

Site Evaluation: The most recent site evaluation was conducted on April 11, 2005 (QA Check: March 20, 2012).



The Congaree Bluff site is located in southern Richland County. The site is located in a rural setting within the boundaries of the Congaree National Park. The Congaree Bluff monitoring continues a data record begun in 1981 with the establishment of the Congaree Swamp site (45-079-1006). The original site was established in cooperation with the Department of the Interior and the support of the General Assembly to provide long term monitoring in this unique area. The Congaree Swamp site was located in the flood plain and had to be relocated to the current Congaree Bluff site in 2001. This site is also part of the National Atmospheric Deposition Program-Mercury Deposition

Network (NADP-MDN)

The Congaree Bluff site has monitors for ozone, SO₂, mercury vapor, and precipitation. Congaree Bluff also has samplers for mercury deposition and precipitation chemistry. The sample inlets are 191 meters from the nearest road. The National Park Service also collects wind data on a collocated 30 meter wind tower.

Changes for 2015:

There are no changes planned for 2015.

Monitors:

(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General / Background	SPM	4.23	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Urban	General / Background	SPM	4.23	FEM UV Fluorescence	Continuous
Mercury (vapor)	Urban	Source Oriented	non-regulatory	4.23	Cold Vapor Atomic Fluorescence	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Mercury Deposition	Urban	Source Oriented	NADP-MDN	1.71	MDN protocol	Weekly
Precipitation chemistry	Regional	Regional Transport	non-regulatory	1.5	IC	Weekly-Tue-Tue
Precipitation	Neighborhood	General/Background	non-regulatory	1.73	Tipping Bucket	Continuous and Sample

Sandhill Experimental Station**CSA/MSA:** Columbia-Orangeburg-Newberry CSA / Columbia MSA**AQS Site ID:** 45-079-1001**Location:** 900 Clemson Road**County:** Richland**Coordinates:** +34.13126, -80.86832**Date Established:** January 1, 1959**Site Evaluation:** The most recent site evaluation was conducted on July 1, 2002 (QA Check: March 01, 2012).

The Sandhill Experimental Station site is located in northeastern Richland County, downwind from the Columbia metropolitan area. This site is located in a rapidly urbanizing portion of the city of Columbia. The Sandhill site measures NO₂, ozone, wind direction, and wind speed. The sample inlets are 33 meters from the nearest road.

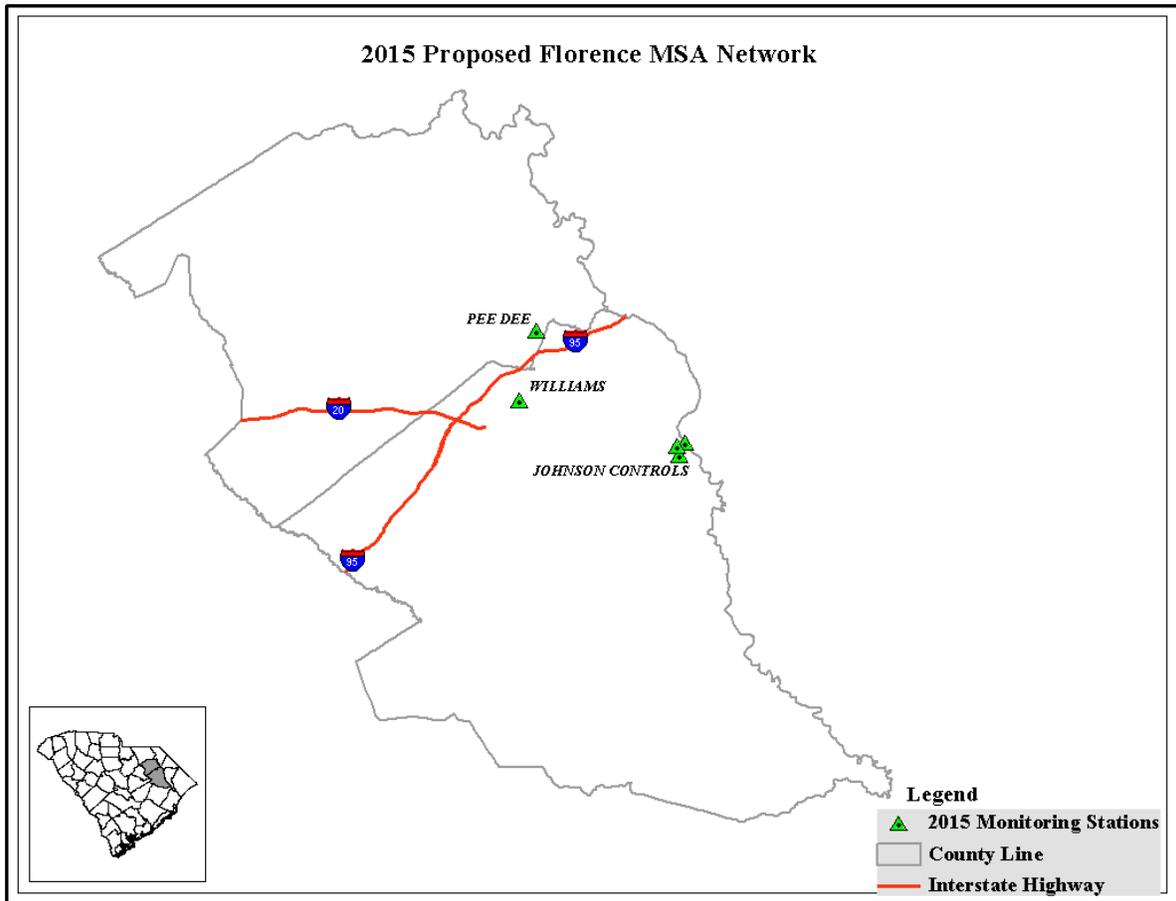
Changes for 2015:

There are no changes planned in 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	4.15	FEM Ultraviolet Photometry	Continuous
Nitrogen Dioxide	Urban	General / Background Max Precursor Emissions Impact	SPM	4.15	FRM Chemiluminescence	Continuous
Wind Speed / Direction	Neighbor-hood	Local Conditions	non-regulatory	10.0	Instruments for wind speed and wind direction	Continuous

Florence MSA



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead / TSP	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip Chem.	Precip.	MET
45-031-0003	Pee Dee Exp. Station						●												
45-041-0003	Williams Middle School	●	○																
45-041-8001, 8002, 8003	Johnson Controls					○*													
	TOTAL	1	1	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0

○ SPM / Other
 ● SLAMS
 ●●/○○ indicates duplicate / QA monitors
 * See details on page for number of samplers

Pee Dee Experimental Station

CSA/MSA: none/Florence MSA

AQS Site ID: 45-031-0003

Location: 2200 Pocket Road (Darlington)

County: Darlington

Coordinates: +34.28569, -79.74485

Date Established: February 25, 1993

Site Evaluation: The most recent site evaluation was conducted on March 14, 2006 (QA Check: May 5, 2011).



The Pee Dee Experimental Station site is located in northeastern Darlington County. This site serves as the required ozone monitor in the Florence MSA. The sample inlets are 91 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration/ General Background	SLAMS	3.92	FEM Ultraviolet Photometry	Continuous

Williams Middle School**CSA/MSA:** none/Florence MSA**AQS Site ID:** 45-041-0003**Location:** 1119 N. Irby Street**County:** Florence**Coordinates:** +34.21427, -79.76735**Date Established:** August 4, 2008**Site Evaluation:** PENDING (QA Check: May 5, 2011).

The Williams Middle School site is located in Florence County. DHEC established the Williams site to meet the 40 CFR Part 58 Appendix D requirements for objective and collocated continuous monitoring and reporting.

The Florence MSA requires one PM_{2.5} sampler. A collocated continuous monitor is also required to provide timely reporting of concentrations to the public. The sample inlets are 91 meters from the nearest road.

Changes for 2015:

There are no changes planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure Highest Concentration	SLAMS	2.70	FRM Gravimetric	1:3
PM _{2.5}	Neighborhood	Population Exposure Highest Concentration	SPM non-regulatory	3.04	TEOM	Continuous

Johnson Controls (3 Sites-JCI Railroad, JCI Entrance, JCI Woods)

CSA/MSA: none/Florence MSA

AQS Site ID: 45-041-8001, 8002, 8003

Location: Liberty Chapel @ Bethel Rd., Liberty Chapel @ Paper Mill Rd., Liberty Chapel @ Paper Mill Rd.

County: Florence

Coordinates: +34.15567, -79.56981; +34.16413, -79.572330; +34.16747, -79.56266

Site Evaluation: PENDING



Johnson Controls Incorporated (JCI) is located in Florence County. On May 7, 2010, DHEC issued an air synthetic minor construction permit to Johnson Controls Battery Group for the Florence Recycling Center (Permit No. 1040-0129-CA). Under a settlement agreement⁷ with several petitioners, the Florence Recycling Center will conduct source-oriented ambient lead monitoring at three locations around the facility.

Sampling frequency may be increased if needed for special investigations.

Changes for 2015:

A collocated lead sampler was added to JCI Entrance site for quality assurance activities.

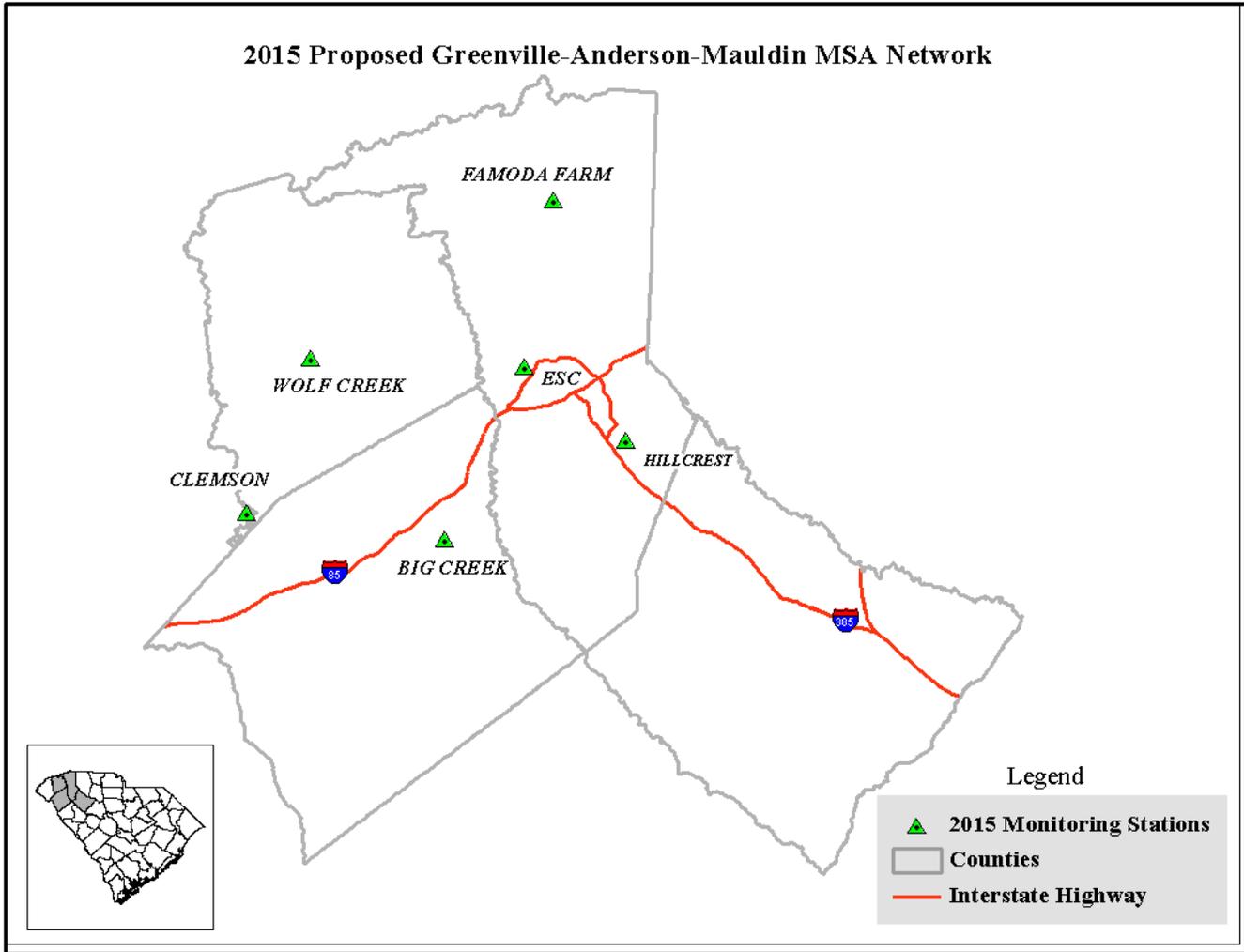
Monitors:

Site ID	Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency*
041-8001	Lead	Middle	Source oriented	SPM	2.4	GFAA	1:6
041-8002	Lead	Middle	Source oriented	SPM	2.5	GFAA	1:6
041-8002	Collocated Lead	Middle	Source oriented	SPM	2.5	GFAA	1:6
041-8003	Lead	Middle	Source oriented	SPM	2.5	GFAA	1:6

*Sampling frequency no less than 1:6

⁷ http://www.scdhec.gov/environment/JCI/docs/JCI-Settlement%20Agreement_07142010.pdf

Greenville-Anderson-Mauldin MSA



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead /TSP	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip Chem.	Precip.	MET
45-007-0005	Big Creek						●												
45-045-0015	Greenville ESC	●	○	○	●			●	●			○							○
45-045-0016	Hillcrest	●●					●												
45-045-1003	Famoda Farm						●												
45-077-0002	Clemson CMS						●												
45-077-0003	Wolf Creek						○												
	TOTAL	3	1	1	1	0	5	1	1	0	0	1	0	0	0	0	0	0	1

○ SPM / Other

● SLAMS

●●/○○ indicates duplicate / QA samplers

Big Creek**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA**AQS Site ID:** 45-007-0005**Location:** 215 McAlister Road**County:** Anderson**Coordinates:** +34.62324, -82.53206**Date Established:** June 4, 2008**Site Evaluation:** PENDING (QA Check: December 4, 2012).

The Big Creek site is located northeast of the City of Anderson. The site was established to represent maximum ozone concentrations in the Anderson MSA downwind of Anderson and upwind background for the Greenville MSA. In February 2013, the MSA definitions were changed and this site is now contained within the Greenville-Anderson-Mauldin MSA. The sample inlet is 49 feet from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration / Upwind Background	SLAMS	4.24	FEM Ultraviolet Photometry	Continuous

Greenville Employment Security Commission (ESC)

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA

AQS Site ID: 45-045-0015

Location: 133 Perry Avenue

County: Greenville

Coordinates: +34.84389, -82.41458

Date Established: April 11, 2008

Site Evaluation: PENDING (QA Check: April 30, 2013).



The Greenville ESC site is located in the city of Greenville and was established on April 11, 2008. This site supports a FRM PM_{2.5} sampler and a continuous FEM TEOM monitoring for PM_{2.5}. It also supports speciated PM_{2.5}, PM₁₀, SO₂, NO₂, sulfate, BC, and measurements for wind speed and wind direction. The sample inlets are 15 meters from the nearest road.

The EPA Region 4 has selected this site as one of the locations for a Regional Administrator required NO₂ monitor to help protect susceptible and vulnerable populations as required by 40 CFR, Part 58, Appendix D, Section 4.3.4.

Changes for 2015:

The NO₂ site was selected as the Regional Administrator required NO₂ monitor and has changed designation from SPM to SLAMS.

The SO₂ monitor was changed from SPM to SLAMS.

Sulfate monitoring was discontinued in 2009 and table updated.

National support for speciation sampling at this site may be eliminated in 2015.

Monitors:

(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure / Welfare Related Impacts	SLAMS	3.39	FRM Gravimetric	1:1
PM _{2.5}	Neighborhood	Population Exposure Required FEM Collocation	SPM non-regulatory	4.40	FEM TEOM	Continuous
Speciated PM _{2.5}	Neighborhood	Population Exposure	Supplementary speciation	3.34	CSN Protocol	1:6

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Neighborhood	Population Exposure	SLAMS	4.35	FEM TEOM	Continuous
Sulfur Dioxide	Neighborhood	Population Exposure	SLAMS	4.51	FEM UV fluorescence	Continuous
Nitrogen Dioxide	Neighborhood	Population Exposure	SLAMS	4.51	FRM Chemiluminescence	Continuous
Black Carbon	Neighborhood	Population Exposure / General Background	non-regulatory	4.44	Optical absorption	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	Not applicable	10.00	Instruments for wind speed and wind direction	Continuous

Hillcrest Middle School**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA**AQS Site ID:** 45-045-0016**Location:** 510 Garrison Road**County:** Greenville**Coordinates:** +34.75185, -82.25670**Date Established:** February 17, 2009**Site Evaluation:** PENDING (QA Check: April 30, 2013).

The Hillcrest Middle School site represents suburban areas near the interstate corridors in the Greenville MSA. Initiated in 2008, this site was selected as a monitoring location based on results of the Greenville MSA Ozone study. This site supports an ozone monitor, a FRM PM_{2.5} sampler, and a collocated PM_{2.5} sampler. The sample inlets are 61 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015. The PM_{2.5} sampling frequency was changed to reflect a 1:3 sampling schedule.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Urban	Population Exposure	SLAMS	3.48	FRM Gravimetric	1:3
Collocated PM _{2.5}	Urban	Population Exposure	QA Collocated	3.48	FRM Gravimetric	1:3
Ozone	Urban	Population Exposure	SLAMS	3.81	FEM Ultraviolet Photometry	Continuous

Famoda Farm**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA**AQS Site ID:** 45-045-1003**Location:** 7401 Mountain View Road**County:** Greenville**Coordinates:** +35.05739, -82.37288**Date Established:** October 24, 1969**Site Evaluation:** PENDING (QA Check: April 30, 2013).

The Famoda Farm site is located in a rural area of northern Greenville County. It was originally established in 1969 and operated until 1982. In 2008, this site was reactivated as part of the Greenville MSA Ozone study, which was designed to investigate ozone concentration variability across the Upstate by providing information to help refine the monitoring network to better meet monitoring objectives. The site has been retained to represent rural ozone impacts downwind of the Anderson and Greenville urbanized areas. This site supports an ozone monitor. The sample inlet is 24 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.47	FEM Ultraviolet Photometry	Continuous

Clemson CMS

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA

AQS Site ID: 45-077-0002

Location: 106 Hope Well Road

County: Pickens

Coordinates: +34.65366, -82.83865

Date Established: July 14, 1979

Site Evaluation: The most recent site evaluation was conducted on March 18, 2003 (QA Check: October 23, 2012).



The Clemson CMS site is located on the grounds of Clemson University near the western border of Pickens County. This monitor measures ozone concentrations upwind of the Greenville-Spartanburg urbanized area.

This site was part of the Greenville MSA Ozone study, initiated in 2008 and designed to investigate ozone concentration variability across the Upstate and provide information to help refine the monitoring network to better meet monitoring objectives. The sample inlets are 27 meters from the nearest road.

Changes for 2015:

The DHEC will continue discussions with EPA Region 4 to discontinue duplicative ozone monitoring for the Greenville-Anderson-Mauldin MSA at this site.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General background	SLAMS	4.59	FEM Ultraviolet Photometry	Continuous

Wolf Creek

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA

AQS Site ID: 45-077-0003

Location: 901 Allgood Bridge Road

County: Pickens

Coordinates: +34.85154, -82.74458

Date Established: August 10, 2010

Site Evaluation: QA Check: October 23, 2012



The Wolf Creek site is located in central Pickens County and was established to gain an understanding of ambient ozone concentrations in this area.

In 2013, Anderson County was reincorporated into a Greenville-Anderson-Mauldin MSA. DHEC will continue to evaluate the Greenville-Spartanburg-Anderson CSA network to determine the configuration of ozone monitors that most appropriately represents ozone concentrations in the area. The sample inlet is 71 meters from the nearest road.

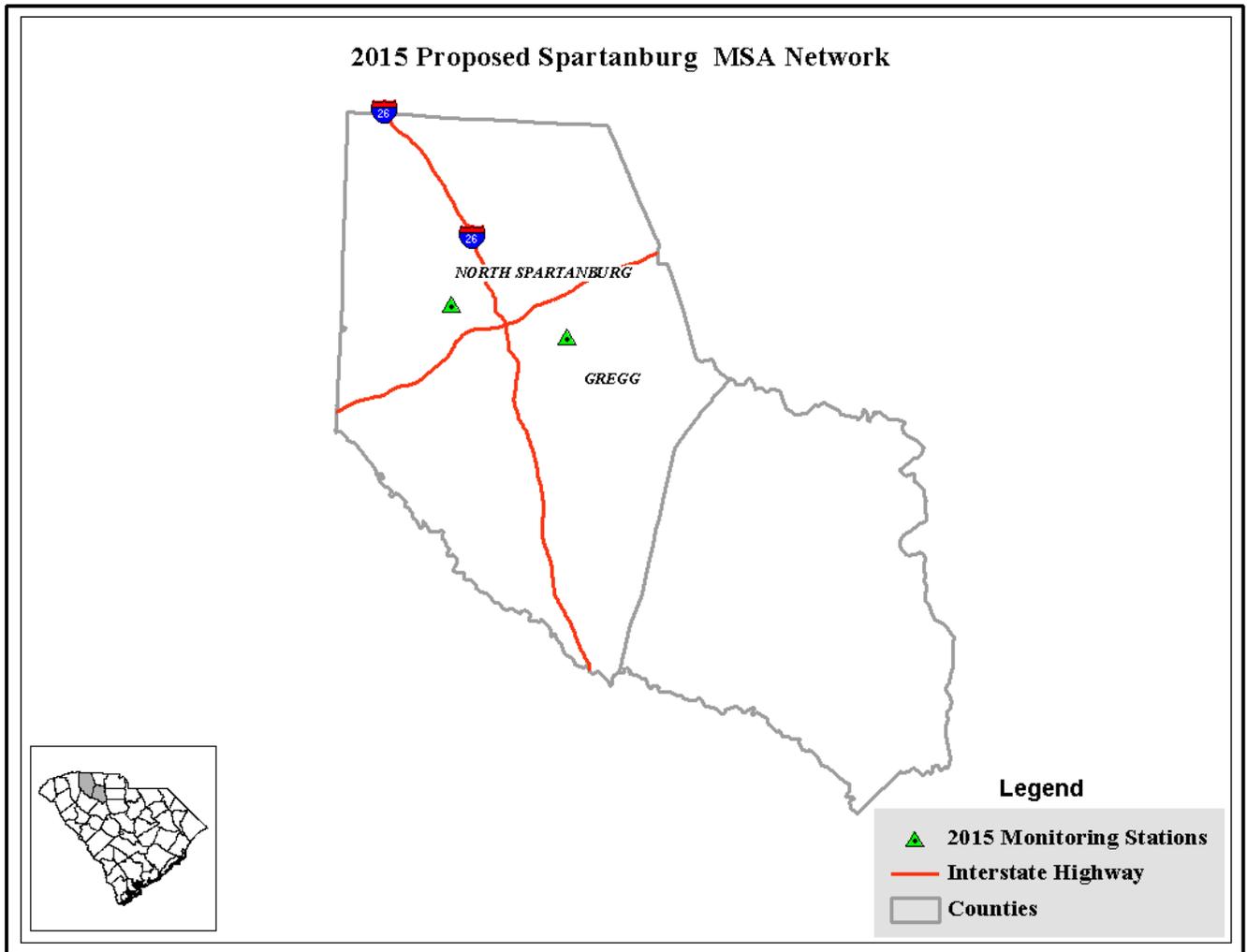
Changes for 2015:

No changes for 2015. DHEC continues to evaluate the Greenville MSA ozone network to determine the configuration of ozone monitors that most appropriately represent ozone concentrations across the area.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General / Background	SPM	2.77	FEM Ultraviolet Photometry	Continuous

Spartanburg MSA



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead /TSP	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip Chem.	Precip.	MET
45-083-0009	North Spartanburg Fire Station #2						●												
45-083-0011	T.K. Gregg	●	○																
	TOTAL	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate / QA samplers																			

North Spartanburg Fire Station #2

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Spartanburg MSA

AQS Site ID: 45-083-0009

Location: 1556 John Dodd Road

County: Spartanburg

Coordinates: +34.98874, -82.07573

Date Established: April 4, 1990

Site Evaluation: The most recent site evaluation was conducted on June 8, 2006 (QA Check: May 14, 2013).



The North Spartanburg Fire Station #2 site is located in rural Spartanburg County, northwest of the City of Spartanburg. This site supports an ozone monitor and was established as a maximum ozone concentration monitor for the Greenville-Spartanburg-Anderson urban area on April 4, 1990. This monitor is designated SLAMS and fulfills the requirement for a maximum concentration site for the Spartanburg MSA. The sample inlet is 85 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.9	FEM Ultraviolet Photometry	Continuous

T.K. Gregg Recreation Center

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Spartanburg MSA

AQS Site ID: 45-083-0011

Location: 267 Northview Street

County: Spartanburg

Coordinates: +34.95557, -81.92480

Date Established: December 29, 2008

Site Evaluation: PENDING (QA Check: May 14, 2013).



The T. K Gregg Recreation Center site is located in Spartanburg County. With the cooperation of local government and stakeholders, DHEC established this PM_{2.5} site in the downtown Spartanburg area to meet the 40 CFR Part 58 Appendix D requirements for monitoring objective and collocated continuous monitoring and reporting. This site also supports the required collocated PM_{2.5} continuous monitor for the Spartanburg MSA. The sample inlets are 49 meters from the nearest road.

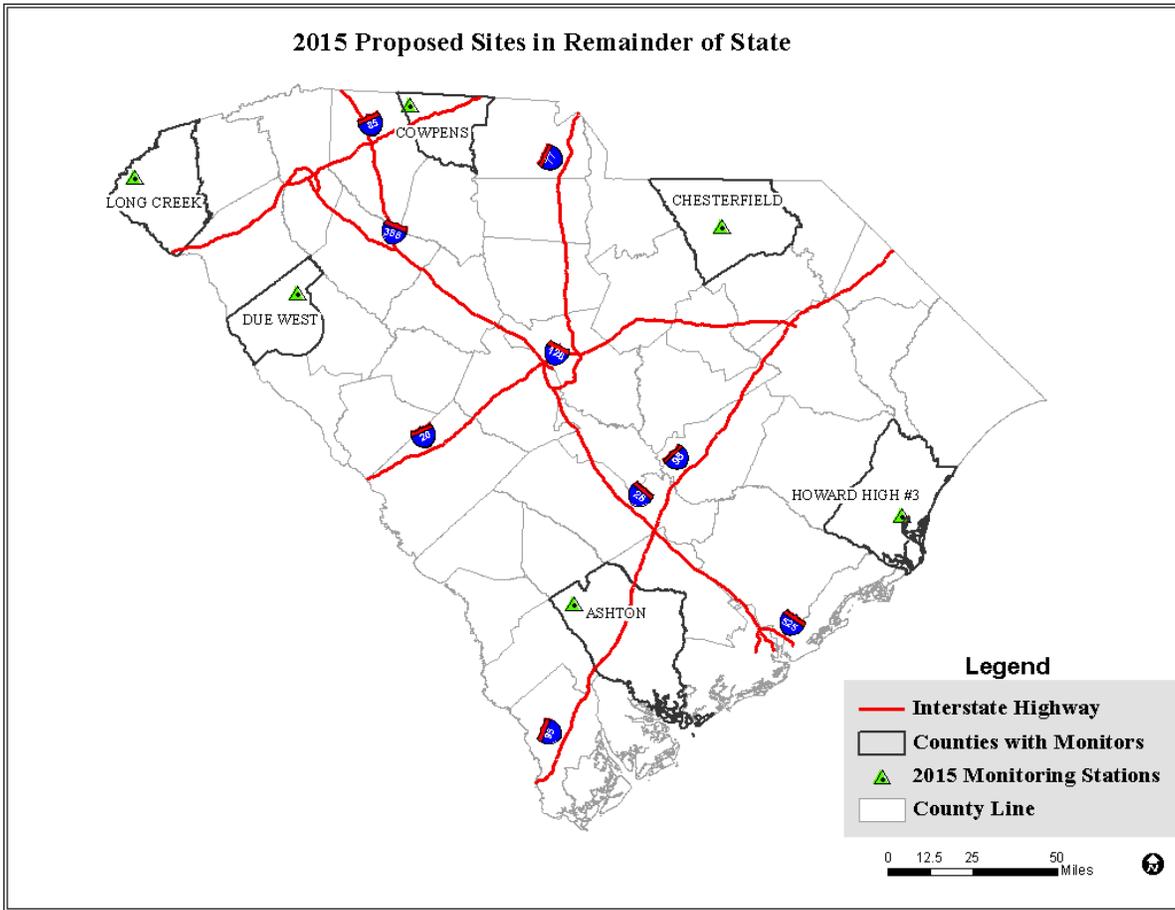
Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Highest Concentration	SLAMS	2.5	FRM Gravimetric	1:1
PM _{2.5}	Neighborhood	Highest Concentration	SPM non-regulatory	2.5	TEOM	Continuous

Remainder of State



Classification of Monitoring Type by Site

Site ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	Lead	Ozone	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Precip Chem.	Precip.	MET
45-001-0001	Due West						●										○	○	
45-021-0002	Cowpens						○										○		
45-025-0001	Chesterfield	●	○	○	○○		○					○	○	○	○				○
45-029-0002	Ashton		●				○												
45-043-0011	Howard High School #3				○														
45-073-0001	Long Creek		○				○	○											
	TOTAL	1	3	1	3	0	5	1	0	0	0	1	1	1	1	0	2	1	1
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA monitors																			

Due West**CSA/MSA:** Greenville-Spartanburg-Anderson CSA/ None**AQS Site ID:** 45-001-0001**Location:** 59 Jim Scott Lane**County:** Abbeville**Coordinates:** +34.32527, -82.38653**Date Established:** April 2, 1991**Site Evaluation:** The most recent site evaluation was conducted on June 27, 2006 (QA Check: May 7, 2013).

The Due West site is located in northeastern Abbeville County. In addition to monitoring for ozone, Due West has a gauge for precipitation and a sampler for precipitation chemistry. The sample inlets are 76 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General / Background	SLAMS	4.2	FEM Ultraviolet Photometry	Continuous
Precipitation Chemistry	Regional	Regional Transport	non-regulatory	1.5	IC	Weekly-Tue-Tue
Precipitation	Neighborhood	General/ Background	non-regulatory	3.0	Tipping bucket	Continuous and Sample

Cowpens**CSA/MSA:** Greenville-Spartanburg-Anderson CSA/ None**AQS Site ID:** 45-021-0002**Location:** McGinnis Road (Old SC Hwy 110)**County:** Cherokee**Coordinates:** +35.13045, -81.81656**Date Established:** March 25, 1988**Site Evaluation:** The most recent site evaluation was conducted on June 26, 2006 (QA Check: May 14, 2013).

The Cowpens site is located in northwestern Cherokee County at the Cowpens National Battlefield. Cowpens is sited to represent ozone concentrations between the Greenville-Spartanburg-Anderson CSA and the Charlotte-Concord CSA. The operation of the ozone monitor fulfills the ambient monitoring commitment in the Cherokee County Maintenance Plan.¹² In addition to ozone, the Cowpens site also supports a precipitation chemistry sampler. The sample inlets are 23 meters from the nearest road.

The monitor will be operated through the 2014 ozone season to fulfill the Cherokee County Maintenance Plan commitments.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Upwind / Background	SPM	3.05	FEM Ultraviolet Photometry	Continuous
Precipitation Chemistry	Regional	Regional Transport	Non-regulatory	1.50	IC	Weekly-Tue-Tue

¹² 110(a)(1) Maintenance Plan: 8-hour Ozone National Ambient Air Quality Standard, Cherokee County, South Carolina, December, 2007.

Chesterfield (NATTS)

CSA/MSA: none/none

AQS Site ID: 45-025-0001

Location: SC Hwy 145, McBee (Route 2 Box 100)

County: Chesterfield

Coordinates: +34.61538, -80.19878

Date Established: January 6, 2000

Site Evaluation: The most recent site evaluation was conducted on April 21, 2003 (QA Check: June 9, 2011).



The Chesterfield site is located in central Chesterfield County. The Chesterfield site has continuous monitors for BC, PM_{2.5}, ozone, and meteorological parameters. Sampling is done for PM_{2.5} and PM₁₀. This site also serves as the required regional transport site for PM_{2.5}. In addition to the CSN protocol PM_{2.5} speciation sampling, this site is a precision site with collocated FRM samplers for PM_{2.5} and PM₁₀. The sample inlets are 45 meters from the nearest road. The Chesterfield site is also a rural National Air Toxics Trends Site (NATTS) which includes carbonyls, VOC, SVOC, and metals sampling.

Changes for 2015:

There are no changes planned for 2015.

National support for speciation sampling at this site may be eliminated in 2015.

Monitors:

(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Regional	Regional Transport	SLAMS	4.83	FRM Gravimetric	1:3
PM _{2.5}	Regional	Regional Transport	SPM non-regulatory	3.86	TEOM – 50° C	Continuous
Speciated PM _{2.5}	Regional	Regional Transport	Supplemental Speciation	3.96	CSN Protocol	1:6
PM ₁₀	Regional	General / Background	SPM	2.43	Gravimetric ICP/MS	1:6
Collocated	Regional	General /	QA	2.43	Gravimetric	1:6

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀		Background	Collocated			
Ozone	Regional	General / Background	SPM	4.64	FEM Ultraviolet Photometry	Continuous
Black Carbon	Neighborhood	General / Background	non-regulatory	3.92	Optical absorption	Continuous
Carbonyls	Urban	NATTS	non-regulatory	3.00	DNPH/IC	1:6
SVOC	Urban	NATTS	SPM	3.00	PUF/GCMS	1:6
Volatile Organic Compounds	Urban	NATTS	non-regulatory	3.00	Canister/GCMS	1:6
Wind speed / direction	Neighborhood	Local Conditions	non-regulatory	10.00	Instruments for wind speed and direction	Continuous

Ashton

CSA/MSA: none/none

AQS Site ID: 45-029-0002

Location: Ashton Road (S-13-18) Islandton

County: Colleton

Coordinates: +33.00784 -80.96504

Date Established: March 7, 1990

Site Evaluation: The most recent site evaluation was conducted on April 18, 2005 (QA Check: May 19, 2011).



The Ashton site is located in northwestern Colleton County and was established on March 7, 1990. The site serves as a required regional background for PM_{2.5}, representing one of two major and different physiographic regions in South Carolina. It also monitors ozone concentrations. The sample inlets are 8 meters from the nearest road.

Changes for 2015:

There are no changes planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Regional	General / Background	SLAMS	4.40	TEOM 50°C	Continuous
Ozone	Urban	General / Background	SPM	4.70	FEM Ultraviolet Photometry	Continuous

Howard High School #3

CSA/MSA: Myrtle Beach-Conway SC,NC CSA/none

AQS Site ID: 45-043-0011

Location: 594 Gilbert Street

County: Georgetown

Coordinates: +33.36892,-79.29662

Date Established: July, 15 2008

Site Evaluation: PENDING (QA Check: April 21, 2011).



The Howard High #3 site is located in Georgetown County on the grounds of Howard High School and supports a PM₁₀ monitor. PM₁₀ monitoring in this area of Georgetown has been ongoing since 1970, when the original Howard High site was established. The sample inlet is 55 meters from the nearest road.

Changes for 2015:

No changes are planned for 2015.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Neighborhood	Population Exposure/ Highest Concentration	SPM	2.23	TEOM	Continuous

Long Creek

CSA/MSA: Greenville-Spartanburg-Anderson CSA/ none

AQS Site ID: 45-073-0001

Location: Round Mt. Tower Rd.

County: Oconee

Coordinates: +34.80524, -83.23779

Date Established: August 1, 1983

Site Evaluation: The most recent site evaluation was conducted on February 18, 2005 (QA Check: December 4, 2012).



The Long Creek site is located on Round Mountain in northwest Oconee County. The Long Creek site was also established as part of the Southern Oxidant Study. It provides a unique vantage for monitoring the impacts of transported pollutants. Long Creek has continuous monitors for ozone, SO₂, and PM_{2.5}. The sample inlets are 11 meters from the nearest road.

Due to the importance of measuring region-wide SO₂, PM_{2.5}, and ozone concentrations, the unique location, and collocated monitoring activity, DHEC has determined that current monitoring at this site should be continued.

DHEC intends to continue to work with the land-owner to improve site exposure due to continued tree growth around the site.

Changes for 2015:

The designation for the PM_{2.5} monitor was changed from SLAMS to SPM due to inadequate performance of the FEM at this location.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Urban	General / Background	SPM non-regulatory	4.14	FEM TEOM	Continuous
Ozone	Regional	General / Background	SPM	4.22	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Regional	Regional Transport	SPM	4.22	FEM UV fluorescence	Continuous

Network Development

The Monitoring Network provides data to support an array of decisions ranging from development of emissions strategies to protect and improve air quality to the level of activity appropriate for individuals in sensitive populations. To support these varied data users, the network must provide both stable, long term measures to document trends and rapid reporting of conditions to the public. In response to land use, population, and urban areas growth, the network must be evaluated and adjusted to meet the changing conditions and needs.

The Monitoring Network described in this plan continues to build upon a significant transition from the network that has evolved over the last thirty-five years. It reflects the successes in reducing ambient concentrations of TSP, lead, CO, NO₂, and SO₂ and the increasing concern about the impact of fine particles and ozone on public health and the environment.

A series of studies are planned for the major urban areas, as resources permit, to gain better understanding of the air quality and provide information to improve the monitoring network. In addition to the intensive studies that provide a detailed ‘snapshot,’ it is intended that SPM sites be established and monitored in rotation to provide regular checks and long term tracking of the trends in air quality in all areas of the state including smaller cities, towns, and rural areas. The implementation of this long term strategy is contingent on sufficient federal funding to support the core-required monitoring and will be developed and evaluated as resources become available. Project plans will be developed for the monitoring and data analysis activity to better define the scope of these strategies prior to implementation. These studies are long term needs DHEC has identified and are important tools for evaluating and improving the representativeness of the ambient air monitoring network and our knowledge of air quality in the State.

Areas where long term strategies are being considered include:

- Near road NO₂ Monitoring Network Implementation – the 2010 Primary National Ambient Air Quality Standards for Nitrogen Dioxide and the 2013 Revision to Ambient Nitrogen Dioxide Monitoring Requirements requires each CBSA having 1,000,000 or more persons to have one near-road NO₂ monitor operational by January 1, 2014 and each CBSA having 500,000 or more persons (but less than 1,000,000), to have one near-road NO₂ monitor operational by January 1, 2017. DHEC, in conjunction with local stakeholders, will apply the methodology found in The Near Road NO₂ Monitoring Technical Assistance Document, identify an appropriate list of road segments, and propose these sites to the EPA.
- Myrtle Beach-Conway-North Myrtle Beach SC-NC MSA Ozone monitoring – in February, 2013, OMB added Brunswick County, North Carolina to the Myrtle Beach-Conway-North Myrtle Beach SC-NC MSA, which resulted in this MSA being required to have one Ozone monitor. DHEC, in conjunction with North Carolina, will work with internal and external partners to identify and propose appropriate sites to the EPA.
- Charleston Port Monitoring – the Charleston Port Expansion project has a projected completion date of 2017-2019. At that time, DHEC will work with local stakeholders to identify and establish an appropriate PM_{2.5} site.

Appendix A: Summary of Public Comments Received

Below is a summary of the comments received and DHEC's response. A copy of the comments received will be submitted with this Monitoring Plan.

Comments from Dave Cole: Resident, Chester County, SC

Mr. Cole stated that the 2015 Monitoring Plan is inadequate because Chester County does not have any monitoring sites and is concerned about air pollution from facilities located in the county. Mr. Cole wants to be advised on the process for the reestablishment of a monitoring site in Chester County. Finally, Mr. Cole requested a public hearing.

DHEC Response: It is not necessary for a monitor to be located in every county to have an indicator of an area's air quality. One of the core functions of ambient air monitoring is a focus on the areas where pollutant concentrations are expected to be highest. Areas with fewer sources of air pollution have been demonstrated to have better air quality than areas with many sources. DHEC periodically reviews data from existing sites, compares it with historical data and from data at surrounding sites to ensure that the assumptions made when the monitor was initially established are still valid. For example, DHEC currently has two ozone monitors that reasonably represent the all of the rural coastal plain – based on data from previous monitoring conducted between the current locations.

Each monitor provides data that indicate the pollutant concentrations in an area that may range from a very small area to many miles across. This is called the "scale" of the monitor. Monitor scales in the South Carolina network may range from "microscale" of ten to three hundred feet across to "regional scale," which could represent air quality across an area that may extend a hundred miles. Most South Carolina Network monitors represent areas with dimensions ranging from one to twenty-five miles. The scale of each monitor at a site has is stated in the plan and can be used to approximate the area its data represents. The scales may be different for different pollutant monitors at the same location depending on local sources and the objective of the monitoring.

Every five years, South Carolina is required by EPA to assess its ambient air monitoring network to account for changes such as population, emissions, and type of monitoring. The next network assessment will be submitted to EPA on or before July 1, 2015 and will account for changes such as new facilities, population shifts, and pollutant transport. The annual monitoring plan and the five year network assessment, with stakeholder input and EPA oversight, help assure effective and representative monitor placements.

An advisory group has been established in Chester County to consider monitoring questions associated with air quality and health issues. This workgroup is open to interested members of the community. DHEC looks forward to continued collaboration to determine if ambient air monitoring is an appropriate method to address questions specific to this area.

As for the request for a public hearing on the monitoring plan, EPA regulations found in Chapter 40 of the Code of Federal Regulations, part 58.10 paragraphs (a)(1) and (a)(2) requires South Carolina to provide 30 days for public inspection and comment prior to submission of the monitoring plan to EPA.

There are no provisions in either federal or state regulations to provide more than the opportunity to comment associated with the development of the monitoring plan. DHEC has held the required public inspection and comment period for the proposed plan and has considered changes to this plan in response to the comments submitted.

Comment from Kathy McKay: National Park Service – Cowpens National Battlefield

Ms. McKay thanked DHEC for continuing to include the Cowpens monitoring site in the current monitoring plan.

DHEC Response: We acknowledge the comment.

Comment from Sandra Yúdice, Assistant to the County Administrator, Greenville County

Ms. Yúdice noted that the *Changes for 2015* section for the Hillcrest Middle School (45-045-0016) site states the sampling frequency for PM_{2.5} was corrected to reflect a sample taken every three days. She asked, “How often was/has the sample been taken before the correction?” She also asked for an explanation of the statement, “National support for speciation sampling at this site may be eliminated in 2015”, which is found in the *Changes for 2015* section on the Greenville Employment Security Commission (ESC) (45-045-0015) site page.

DHEC Response: The sampling schedule for both of the PM_{2.5} samplers at the Hillcrest Middle School (45-045-0016) site was set to an every third day schedule when the monitors were established in 2011. The sampling frequency was incorrectly identified as an every day for the primary sampler and an every sixth day for the duplicate sampler in previous Plans.

In May, 2014, the EPA proposed recommendations to discontinue federal funding for laboratory analysis of low value PM_{2.5} chemical speciation monitors. The PM_{2.5} chemical speciation monitor at the Greenville ESC (45-045-0015) site was identified by EPA as a low value sampler. If EPA approves this proposal, the collection of samples and laboratory analysis, which is very costly, would end. Speciation monitoring at this site could continue, however, if other funding sources could be secured. It is expected that EPA will release their final assessment rankings by the end of 2014. Any changes to the speciation network will be noted in next year’s monitoring plan.

Comment from David McNeal, US EPA, Region 4

David McNeal stated, “On Page 23, the analysis type listed for the PM_{2.5} monitor at the Trenton site is Gravimetric. For all of the other sites with similar monitors, the analysis type is listed as FRM Gravimetric.”

DHEC response: DHEC agrees with this comment. The analysis method for the PM_{2.5} monitor at the Trenton (45-037-0001) site had an inadvertent error and should be described as “FRM Gravimetric.” This table has been corrected.

Comments from Dan Powell: Air Quality Advocate, Greenville, SC

Dan Powell stated that more PM_{2.5} and Ozone monitors are needed in the highly populated areas of Greenville. He expressed concern that there are no Ozone monitors in downtown Greenville. Also, the PM_{2.5} and Ozone monitors at the Hillcrest Middle School (45-045-0016) site were not representative of downtown Greenville.

DHEC response: DHEC agrees that the Greenville area is growing, but cannot concur with the comment that more Ozone monitors are needed downtown and the PM_{2.5} and Ozone monitors at the Hillcrest Middle School (45-045-0016) site is not representative of the Greenville area. Currently there are two Ozone monitors which are located in the central and northern part of the Greenville County. Both of

these Ozone monitors have design values below the National Ambient Air Quality Standard (NAAQS). Ozone is the result of chemical reactions between Nitrogen Oxides, Volatile Organic Compounds (VOCs) and sunlight, which is then “cooked” and transported in the atmosphere. The highest expected concentrations of Ozone would be measured downwind of the precursor sources. The Ozone monitor at the Hillcrest Middle School (45-045-0016) site is sited downwind of the Interstate 85/Interstate 385 highway corridors. In the downtown areas where there are continuing NO_x emissions throughout the day from mobile sources, the Ozone concentrations will be suppressed below the measured concentrations at the existing sites. Continued attainment of the standard at the existing sites is sufficient to indicate that concentrations in the downtown area are below the level of the standard.

There is also a PM_{2.5} monitor on the east (Hillcrest Middle School (45-045-0016) site) and another PM_{2.5} monitor on the west side (Greenville ESC (45-045-0015) site) of the city of Greenville. Both of these monitors were established to monitor population exposure and have design values below the NAAQS.

As stated above, the five year network assessment will be conducted next year and the Ozone and PM_{2.5} networks will again be reviewed in detail.

Comments from Upstate Forever, non-profit conservation organization, Greenville and Spartanburg, SC

Upstate Forever recognizes and appreciates the continuation of air quality monitoring at the Clemson CMS (45-077-0002) site location. Upstate Forever recommends that VOC monitoring should be initiated and another NO_x monitor should be added to the Upstate region because population and transportation continues to grow. Also, they would like the NO₂ near-road monitoring in Greenville to be changed from Phase 3 to Phase 2, which requires implementation by January 1, 2015.

DHEC Response: DHEC understands the concerns expressed in this comment; however, DHEC does not believe that there would be any benefit to an additional area-wide NO₂ monitor. Statewide, design values for the annual NO₂ NAAQS are approximately 20 percent of the NO₂ NAAQS. For the 1-hour standard, no monitor in South Carolina exceeds 50 percent of the NAAQS. Due to the prevalence of biogenic sources, VOCs typically play a minor role in Ozone formation in the southeastern United States. DHEC does not believe that monitoring for VOCs is necessary at this time.

The Greenville MSA was placed into the Phase 3 deployment of near-road NO₂ monitoring by EPA in a final rule published on March 14, 2013¹³, based on the MSA’s population and road traffic counts. Establishing a monitoring site is very expensive and adequate funding from EPA is necessary to plan and implement this monitoring network. To date, EPA has not made funding available for Phase 3 monitoring sites.

¹³ 78 FR 16184, March 14, 2013. Revisions to Ambient Nitrogen Dioxide Monitoring Requirements. <http://www.gpo.gov/fdsys/pkg/FR-2013-03-14/pdf/2013-05939.pdf>