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July 1, 2010

Promoting and protecting the health of the public and the environment

A. Stanley Meiburg, PhD, 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 2011

Dear Dr. Meiburg:

In accordance with the requirements of 40 CFR 58.10, the South Carolina Department of Health and Environmental Control (Department) respectfully submits the Annual Air Network Monitoring Plan and the five year Network Assessment for calendar year 2011. 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, 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.

Furthermore, 40 CFR 58.10 requires the Department to perform and submit to the Regional Administrator an assessment of the air quality monitoring network every five years. This assessment requires the Department to determine if the network meets the Appendix D network design requirements, whether new sites are needed, whether existing sites can be terminated and whether new technologies are appropriate for incorporation into the monitoring network.

A complete package, including the Annual Air Network Monitoring Plan, 5-year Network Assessment and a request for concurrence to terminate PM_{2.5} sampling at two sites in South Carolina is being sent to Doug Neeley of your office. The Department received no significant comments during the public comment period, which was held from May 28, 2010 through June 28, 2010. Should you have any questions or need additional information regarding this matter, please contact Robert Brown of my staff at (803) 898-4105.

Sincerely,

Robert W. King, Jr., P.E.
Deputy Commissioner
Environmental Quality Control

cc: Doug Neeley, US EPA Region 4 (w/attachments)
David McNeal, US EPA Region 4 (w/attachments)
Carol Kemker, US EPA Region 4 (w/o attachments)
Myra Reece, BAQ (w/o attachments)
Robert Brown, BAQ (w/o attachments)
Scott Reynolds, BES (w/o attachments)

Bureau of Air Quality

South Carolina Department of Health and Environmental Control

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

Calendar Year 2011

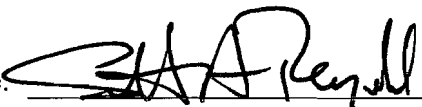


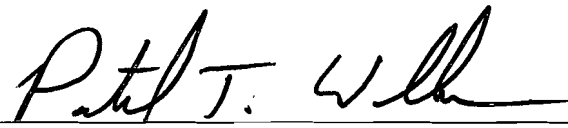
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and Environmental Control

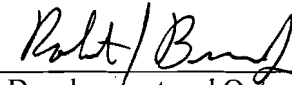
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CERTIFICATION

This document contains the planned changes and final description of the sites and monitors of the South Carolina Ambient Air Monitoring Network for criteria pollutants and related parameters for calendar year 2011. The South Carolina Department of Health and Environmental Control (Department) 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 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 2010 and during the 2011 monitoring year, some elements of the network may require modification. A notification of modifications will be posted on the Department website and provided to EPA Region 4. Where necessary, a request for approval of deviations from this plan and supporting documentation will be submitted to EPA Region 4.

Scott Reynolds Signature:  Date: 7/1/10
Director, Division of Air Quality Analysis, Bureau of Environmental Services
South Carolina Department of Health and Environmental Control

Pat Walker Signature:  Date: 7/1/10
Chief, Bureau of Environmental Services
South Carolina Department of Health and Environmental Control

Robert Brown Signature:  Date: 7/1/10
Director, Division of Planning, Development and Outreach, Bureau of Air Quality
South Carolina Department of Health and Environmental Control

Myra C. Reece Signature:  Date: 7/1/2010
Chief, Bureau of Air Quality
South Carolina Department of Health and Environmental Control

Acronyms

AQCR – Air Quality Control Region
AQI – Air Quality Index
AQS – Air Quality System
BAQ – Bureau of Air Quality
BC – Black Carbon
CAAA – Clean Air Act Amendment
CBSA – Core-Based Statistical Area
CFR – Code of Federal Regulation
CSA – Combined Statistical Area
CMS – Continuous Monitoring Site
DAQA – Division of Air Quality Analysis
EPA – Environmental Protection Agency
FDMS – Filter Dynamics Measurement System
FEM – Federal Equivalent Method
FRM – Federal Reference Method
GC/MS – Gas Chromatography / Mass Spectroscopy
HPLC – High Performance Liquid Chromatography
IC – Ion Chromatography
ICP – Inductively Coupled Plasma
IMPROVE – Interagency Monitoring of Protected Visual Environments
ICP/MS – Inductively Coupled Plasma Mass Spectroscopy
LAC – Light-Absorbing Carbon
MET - Meteorology
MSA – Metropolitan Statistical Area
mSA – Micropolitan Statistical Area
NAAQS – National Ambient Air Quality Standards
NATTS- National Air Toxics Trends Site
NADP-MDN – National Atmospheric Deposition Program Mercury Deposition Network
NATA – National Air Toxics Assessment
NCore – National Core Monitoring Network
NPAP – National Performance Audit Program
NWS – National Weather Service
PEP – Performance Evaluation Program
PSD – Prevention of Significant Deterioration

PTFE - Polytetrafluoroethylene
PUF – Polyurethane Foam
QA – Quality Assurance
QAPP – Quality Assurance Project Plan
QC – Quality Control
SAMWG – Standing Air Monitoring Working Group
DHEC – South Carolina Department of Health and Environmental Control
Department – South Carolina Department of Health and Environmental Control
SLAMS – State and Local Air Monitoring Station
SPM – Special Purpose Monitor
STN – Speciation Trends Network
TBD - To be determined
TEOM – Tapered Element Oscillating Microbalance
TOT – Thermal Optical Transmittance
TSP – Total Suspended Particulate
UV – Ultraviolet
WGS84 – World Geodetic System of 1984 revised in 2004
XRF – X-ray Fluorescence Spectroscopy

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*Cover Photo: Cape Romain monitoring site located
in Charleston County, SC*

Introduction

The South Carolina Department of Health and Environmental Control (Department) or its predecessors have operated an air quality monitoring network in South Carolina since 1959. Since that time, the network has continually evolved to meet the requirements and needs of the Department's Air Program and to comply with federal requirements. In 2011 the network will comprise of 115 monitors and samplers at 34 sites.

In October, 2006, the United States Environmental Protection Agency (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.

This plan covers the eighteen month period from July 1, 2010 through December 31, 2011. 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 2011 with the exception of some ozone monitors which may begin operation at the start of the South Carolina Ozone Monitoring Season (April-October). Stakeholder groups have committed to assist in identifying and securing access to suitable locations. These efforts will continue in this and

in subsequent monitoring plans as the Department continues to identify new monitoring needs.

The annual Network Description and Ambient Air Monitoring Plan, as required and described in 40 CFR Part 58.10, Annual Monitoring Network Plan and Periodic Network Assessment, must contain the following information for each monitoring station in the network:

- The Air Quality System (AQS) site identification number 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 PM_{2.5} NAAQS.
- The Metropolitan Statistical Area (MSA), Core-Based Statistical Area (CBSA), Combined Statistical Area (CSA) or other area represented by the monitor.

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

Network Summaries: Presenting the total number of sites and monitors for the State. Also included is a listing of all proposed changes to the current network.

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 Monitoring Network (Monitoring Network) will be reviewed

annually. Planned changes will be described in this Network Description and Ambient Air Monitoring Plan (and the annual Network Description and Ambient Air Monitoring Plan revisions) and provided for public review and comment prior to submission to the EPA Region 4 Administrator.

2011 Network Description and Ambient Air Monitoring Plan: Public Participation Opportunities

In anticipation of the need for an updated monitoring plan, heightened public interest and potential impact of the monitoring regulation changes, the Department's Air Program once again solicited involvement from both internal (to the Department) and external workgroups.

An external workgroup was convened with invited representatives of the business, environmental and health communities.

Other opportunities for public involvement include:

- A web page maintained for publication and access to draft and reference documents and announcements¹.
- Availability of the proposed 2011 Network Description and Ambient Air Network Monitoring Plan **for public review and comment runs from May 28 to June 28, 2010**. All recorded participants who registered in the outreach and discussion activities were notified when the plan became available for review.
- Meetings and conference calls with the stakeholder groups throughout the process.

The Department is committed to continuing the involvement and participation opportunities 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 South Carolina Ambient Air Monitoring

Network is assigned to the Division of Air Quality Analysis in the Bureau of Environmental 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 National Ambient Air Quality Standards (NAAQS) is verified to be accurate and reported by the Division and stored in the national Air Quality System (AQS) database.

Criteria pollutant monitoring for the purpose of comparison to the NAAQS is performed using 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 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.

Instrument QA/QC alone is not sufficient to assure monitoring data quality. For this reason, the Department, in addition to periodic site assessments, has begun conducting additional visits of monitoring sites with involvement of stakeholder groups to enable comparison with applicable siting criteria.

It is the Department's intent that all criteria pollutant monitors and samplers be sited and operated consistent with the requirements of 40 CFR Part 58 and Appendices A (Quality Assurance), C (Methods), D (Network Design)

¹<http://www.scdhec.net/environment/baq/ambientairmonitoring.aspx>

and E (Probe Siting Criteria) and the data collected by these samplers and monitors is suitable for comparison to the NAAQS. The Department 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. EPA Region 4 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 the Department's Air Program. EPA Region 4 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 EPA to provide independent audits of criteria pollutant monitoring and performance.

² The Quality System is the means by which the Department implements the quality management process through the Quality Assurance Management Plan for SC DHEC, July, 2008.

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 monitoring data including site descriptions. All ambient monitoring data is stored in AQS, including non NAAQS parameters, ambient toxics, total suspended particulate and supporting QA data.

Station Description

The network station descriptions contained in this document include the following information:

Site Description

The header for each site includes:

Site Name

The **Core Based Statistical Areas** (CBSA) as defined by the US Census. (November 2006).³

AQS Site ID: The unique site identification number used in AQS in the form:

45-0cc-ssss

Where:

45 is the federal identification code for SC,
cc 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.

County: County in which the site is located.

Coordinates: Listed in decimal degrees, Latitude (N) then Longitude (W) 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 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.

Date of most recent Site Evaluation: 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

In a table associated with each site, the parameters monitored at that site are listed 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

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

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 accounting for local sources and differing land use.

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

Objective

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

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.

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.

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; and
- 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 area dimensions most appropriate for 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

Required and long term criteria pollutant monitors described in the air quality monitoring network are designated **State and Local Air Monitoring Stations (SLAMS)**.

SLAMS: 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.

Monitoring at some locations meets the Department's Air Program needs beyond that necessary for compliance with minimum requirements. **Special Purpose Monitors (SPM)** are operated to meet specific Departmental Air Program needs and may be long term or part of special studies designed to answer specific questions.

SPM: Monitors in the air quality surveillance network not designated SLAMS are Special Purpose Monitors. Special Purpose Monitors 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 Air Quality Index.

Air Quality Index (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 EPA's AIRNow website. A daily AQI is provided for the Greenville-Spartanburg, Columbia and Charleston-North Charleston areas.

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 at approximately 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 Federal Reference (FRM) or Federal Equivalent (FEM) Methods. Where appropriate for specific monitoring objectives, well characterized non-equivalent methods may be used.

• Particulate Matter ≤ 10 microns (PM₁₀)

PM₁₀ samplers operated by the Department 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-hr 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% 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 ≤ 2.5 microns (PM_{2.5})**

All PM_{2.5} samplers operated by the Department 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 mm 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% 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% mean relative humidity. Filters are used within thirty days of initial weighing. Filters 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 $\mu\text{g}/\text{m}^3$.

Continuous PM_{2.5} monitors provide hourly measurements for AQI reporting but 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 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.

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, the Department 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 three cartridges 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 in ice chests to the EPA contract laboratory for analysis. At the laboratory the samples are analyzed using thermal optical analysis (for carbon), ion chromatography and x-ray fluorescence (for metals) to determine the presence and concentration of specific compounds. Sample results are stored in AQS.

- **Sulfur Dioxide (SO₂)**

Instruments used to continuously monitor sulfur dioxide concentrations in the atmosphere employ the FEM Ultraviolet (UV) fluorescence 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 is done dynamically using EPA protocol gas mixtures containing a known concentration of sulfur dioxide in nitrogen. This gas is diluted to give varying known concentrations of sulfur dioxide. 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 carbon monoxide 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 automated central data acquisition system.

Calibration of the instrument is done dynamically using EPA Protocol gas mixtures containing a known concentration of carbon monoxide in air. The gas is diluted to give varying known concentrations of carbon monoxide. 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 (O₃)**

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

Monitors are routinely calibrated 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 chemiluminescence and UV methods are used in monitoring the nitrogen dioxide 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 is done dynamically using EPA protocol gas mixtures containing a known concentration of nitric oxide in nitrogen. The gas is diluted to give varying known concentrations of nitric oxide. An ozone generator and converter are used to convert nitric oxide (NO) to nitrogen dioxide (NO₂). 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.

- **Lead**

Lead concentrations are determined from the analysis of total suspended particulate collected using high volume particulate samplers as described in 40 CFR §50 Appendix G. Particulate samples are acid extracted to dissolve the metals. The lead content is determined using Flame Atomic Absorption or Inductively Coupled Plasma (ICP) spectrophotometry.

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) and for some projects, every twelfth day (1:12) depending on the data quality objectives necessary for the project. Results of the analysis are reported as averages for the period. The EPA publishes 1:3 and 1:6 day sampling schedules used nationwide and by the Monitoring Network.⁴

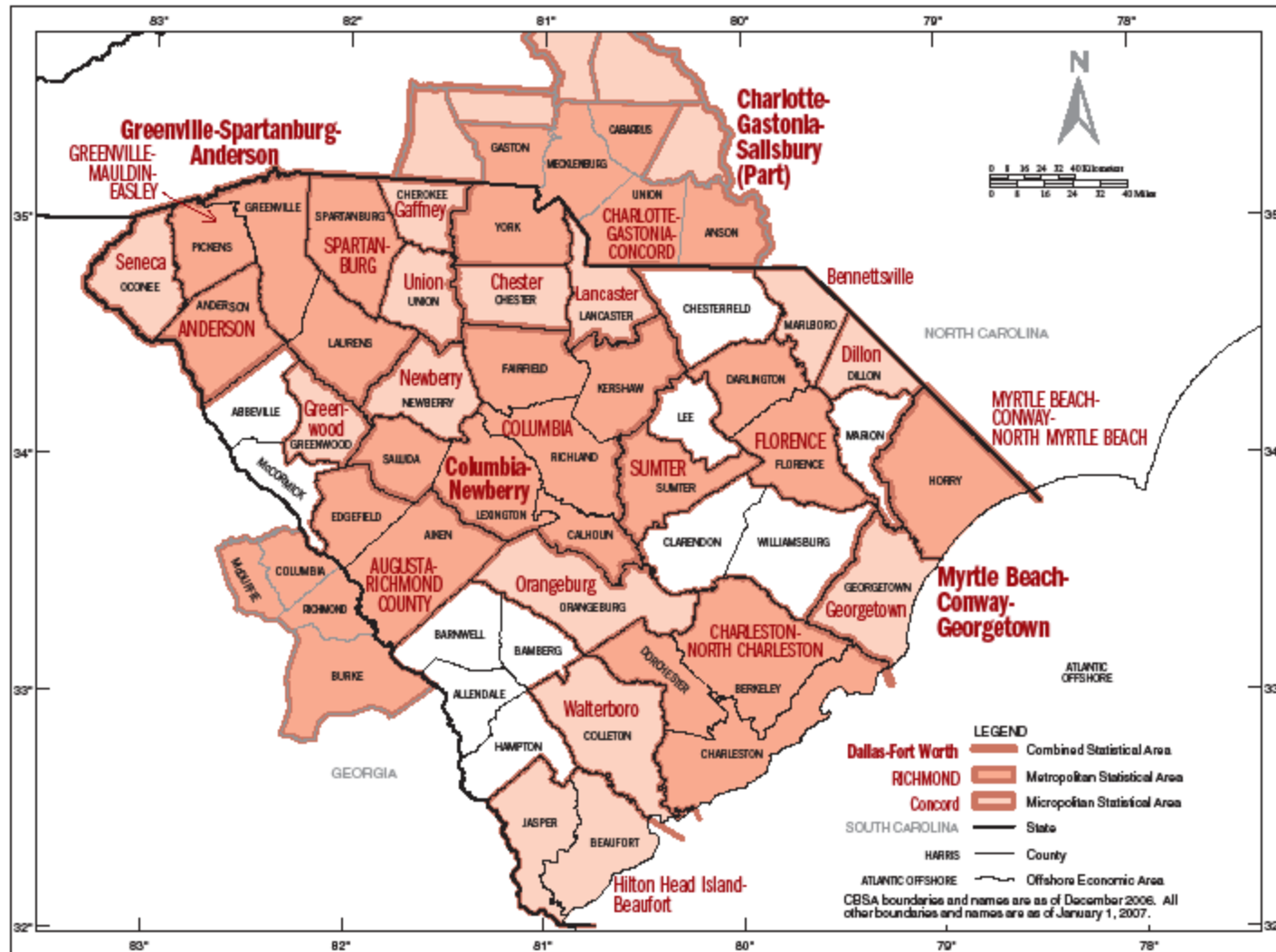
Monitoring typically uses on-site analyzers that continuously sample the air and measure the pollutant of interest. Results of the analysis are reported as hourly averages.

Changes for 2011

Any planned changes in parameters monitored, the configuration, or operations at the site planned for 2011 are described herein and summarized in the Summary of 2011 Network Changes. Unless otherwise indicated, changes at a site including the beginning of new monitoring activity will be effective January 1, 2011. Ozone monitoring for 2011 at new or special project sites may start at the beginning of the ozone monitoring season (April-October).

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

SOUTH CAROLINA - Core Based Statistical Areas and Counties



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

Network Summaries

Calendar Year 2011 Air Monitoring Stations

Region	Sites	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	TSP/Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	Mercury	Acid Rain	MET	VOC
Greenville-Spartanburg-Anderson CSA	10	6	3	1	1	0	1	7	2	1	1	1	1	0	0	0	2	2	0
Columbia CSA	8	4	2	1	4	1	2	3	3	3	1	0	1	2	3	2	1	6	0
Charlotte-Gastonia-Salisbury CSA	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Myrtle Beach-Conway-Georgetown CSA	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Augusta-Richmond County MSA	2	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Charleston-North Charleston MSA	6	4	3	1	1	0	1	2	2	2	1	1	1	0	0	0	0	1	0
Florence MSA	2	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rest of State	3	1	2	1	2	0	0	3	0	0	0	0	1	1	1	0	1	2	1
TOTALS	34	17	12	4	9	1	4	19	7	6	3	2	4	3	4	2	4	14	1

This summary table presents the elements of the South Carolina Network Description and Ambient Air Monitoring Plan after implementation of the changed described in this plan.

PM_{2.5} Samplers Suitable for Comparison to the PM_{2.5} National Ambient Air Quality Standards

Sites using Federal Reference Method	Site suitable for comparison to annual standard?	Site suitable for comparison to the 24-Hour standard?	Site Description Page number
Taylor's	Yes	Yes	16
Greenville ESC	Yes	Yes	17
Long Creek	Yes	Yes	21
T.K. Gregg Recreation Center	Yes*	Yes*	25
Irmo	Yes	Yes	28
Parklane	Yes	Yes	31
Bates House (USC)	Yes	Yes	33
Trenton	Yes	Yes	44
FAA	Yes	Yes	50
Charleston Public Works	Yes	Yes	51
North Charleston	Site not yet established	Site not yet established	52
Williams Middle School	Yes*	Yes*	55
Chesterfield	Yes	Yes	58
* Sites without a complete three year data record but expected to be suitable for comparison to primary and secondary annual and 24-hour standards.			

PM_{2.5} and Ozone Design Values 2007 – 2009

This section presents the latest PM_{2.5} and Ozone ambient air quality summary data for currently operating monitoring sites throughout South Carolina. All other criteria pollutant design values were well below the level of the standards in 2009.

PM _{2.5} Design Values 2007 – 2009			
Site ID	Site Name	Annual (µg/m ³)	Daily (µg/m ³)
45-045-0009	Taylors	12.3	25
45-045-0015	Greenville ESC	N/A	N/A
45-073-0001	Long Creek	9.3	17
45-083-0010	Westview	11.9	25
45-083-0011	T.K. Gregg Recreation Center	N/A	N/A
45-063-0008	Irmo	12.1	25
45-079-0007	Parklane	12.1	27
45-079-0019	Bates House	12.1	25
45-037-0001	Trenton	11.3	24
45-019-0048	FAA	10.0	22
45-019-0049	Charleston Public Works	9.5	22
45-041-0002	H.L. Sneed Middle School	11.2	23
45-041-0003	Williams Middle School	N/A	N/A
45-025-0001	Chesterfield	10.9	22

Ozone Design Values 2007 – 2009		
Site ID	Site Name	Design Value (ppm)
45-007-0005	Big Creek	N/A
45-021-0002	Cowpens	0.067
45-045-0016	Hillcrest	N/A
45-045-1003	Famoda Farm	N/A
45-073-0001	Long Creek	0.071
45-077-0002	Clemson CMS	0.075
45-083-0009	North Spartanburg Fire Station	0.078
45-079-0007	Parklane	0.072
45-079-0021	Congaree Bluff	0.067
45-079-1001	Sandhill	0.075
45-091-0006	York	0.072
45-003-0003	Jackson	0.075
45-037-0001	Trenton	0.069
45-015-0002	Bushy Park	0.060
45-019-0046	Cape Romain	0.067
45-031-0003	Pee Dee	0.071
45-001-0001	Due West	0.072
45-025-0001	Chesterfield	0.070
45-029-0002	Ashton	0.067

Summary of 2011 Network Changes

Throughout the rest of this document, the symbol “†” within the monitoring table will denote a new parameter being measured.

Greenville-Spartanburg-Anderson CSA

Anderson MSA

All monitoring at Anderson Library (45-007-0004) will be terminated.

Greenville-Mauldin-Easley MSA

Monitor type for continuous PM_{2.5} monitoring at Greenville ESC (45-045-0015) has been changed to SPM and non-regulatory.⁵

PM_{2.5} sampling will be added to the Hillcrest (45-045-0016) site to compare to Taylors (45-045-0009).

Spartanburg MSA

All sampling at Westview (45-083-0010) has been terminated.

Monitor type for continuous PM_{2.5} monitoring at T.K. Gregg (45-083-0011) has been changed to SPM and non-regulatory.⁵

Columbia-Newberry CSA

Columbia MSA

Monitor type for continuous PM_{2.5} monitoring at Irmo (45-063-0008) has been changed to SPM and non-regulatory.⁵

Charlotte-Gastonia-Salisbury CSA (South Carolina portion includes Chester, Lancaster and York Counties)

Charlotte-Gastonia-Concord MSA

No changes planned for 2011.

Myrtle Beach-Conway-Georgetown CSA

Georgetown mSA

All monitoring at Beck Administration (45-043-0012) will be terminated.

PM₁₀ monitoring at Georgetown CMS (45-043-0006) will be terminated.

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

Monitor type for continuous PM_{2.5} monitoring at Trenton (45-037-0001) has been changed to SPM and non-regulatory.⁵

Charleston-North Charleston MSA

Installation of a continuous PM_{2.5} site in North Charleston.

Monitor type for continuous PM_{2.5} monitoring at Cape Romain (45-019-0046) has been changed to SPM and non-regulatory.⁵

⁵ Based on Weinstock technical note on the use of non-regulatory monitor type code in AQS to denote continuous PM_{2.5} monitors that are not intended to provide data for regulatory purposes.(March 19, 2009).
<http://www.epa.gov/ttn/amtic/files/ambient/pm25/datamang/Non%20Regulatory%20Monitor%20Type%20Guidance.pdf>

All sampling and monitoring at Charleston Public Works (45-019-0049) will be terminated once a replacement site has been identified and established.

Monitor type for continuous PM_{2.5} monitoring at Charleston Public Works (45-019-0049) has been changed to SPM and non-regulatory.⁵

Florence MSA

All sampling at H. L. Sneed Middle School (45-041-0002) has been terminated.

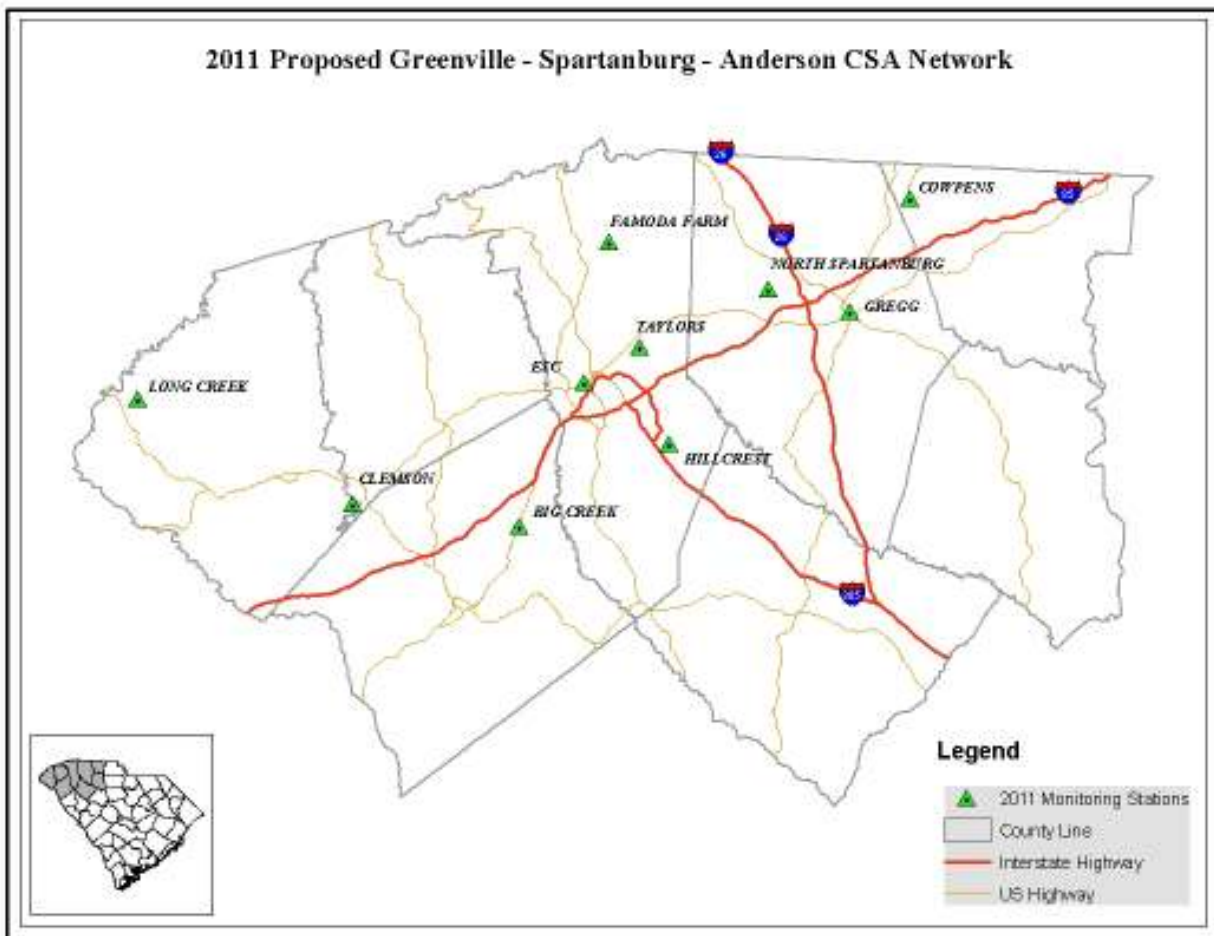
Monitor type for continuous PM_{2.5} monitoring at Williams Middle School (45-041-0003) has been changed to SPM and non-regulatory.⁵

Remainder of State

Monitor type for continuous PM_{2.5} monitoring at Chesterfield (45-025-0001) has been changed to SPM and non-regulatory.⁵

Monitor type for continuous PM_{2.5} monitoring at Ashton (45-029-0002) has been changed to SPM and non-regulatory.⁵

Site Descriptions
Greenville-Spartanburg-Anderson CSA



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	MET
45-007-0005	Big Creek							●											
45-021-0002	Cowpens							○										○	
45-045-0009	Taylors	●●																	
45-045-0015	Greenville ESC	●	○	○	●		○		○	○	○	○	○						○
45-045-0016	Hillcrest	○						●											
45-045-1003	Famoda Farms							●											
45-073-0001	Long Creek	●	○					○	○									○	○
45-077-0002	Clemson							●											
45-083-0009	North Spartanburg Fire Station #2							●											
45-083-0011	T.K. Gregg	●	○																
	TOTAL	6	3	1	1	0	1	7	2	1	1	1	1	0	0	0	0	2	2
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA samplers																			

Big Creek**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Anderson MSA**AQS Site ID:** 45-007-0005**Location:** 215 McAlister Road**County:** Anderson**Coordinates:** 34.623, -82.532**Date Established:** June 6, 2008**Site Evaluation:** PENDING (QA Check: September 15, 2009).

This site fulfills the minimum requirement for ozone monitoring in the Anderson MSA. This site is northeast of the City of Anderson in the area expected to be representative of maximum ozone concentrations in the Anderson MSA.

Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration / Upwind Background	SLAMS	4.0	FEM Ultraviolet Photometry	Continuous

Cowpens**CSA/MSA:** Greenville-Spartanburg-Anderson CSA**AQS Site ID:** 45-021-0002**Location:** McGinnis Road (Old SC 110)**County:** Cherokee**Coordinates:** +35.130396, -81.816567**Date Established:** March 25, 1988**Site Evaluation:** The most recent site evaluation was conducted on June 26, 2006 (QA Check: May 02, 2008).

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-Gastonia-Salisbury CSA. The operation of the ozone monitor fulfills the ambient monitoring commitment in the Cherokee County Maintenance Plan.⁶ In addition to ozone, the Cowpens site also supports an acid precipitation sampler. The sample inlets are 23.0 meters from the nearest road.

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

Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Upwind / Background	SPM	3.0	FEM Ultraviolet Photometry	Continuous
Acid Rain	Regional	Regional Transport	SPM	1.5	IC	Weekly

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

Taylors

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

AQS Site ID: 45-045-0009

Location: 405 Brushy Creek Road

County: Greenville

Coordinates: +34.899141, -82.313070

Date Established: May 1, 1999

Site Evaluation: The most recent site evaluation was conducted on April 7, 2005 (QA Check: September 15, 2009).



This monitoring site is in a residential area of the town of Taylors on the grounds of a city fire station. The Taylors site was originally established as the location of one of two PM_{2.5} Core samplers representing the Greenville-Spartanburg Monitoring Planning Area. The Taylors site has a FRM PM_{2.5} and a collocated FRM PM_{2.5} used for determination of method precision. The sample inlets are 27.0 meters from the nearest road.

Changes for 2011:

The Department will evaluate a more suitable monitoring location for PM_{2.5} in the Greenville urbanized area within the next 18 months. Monitoring at Taylors will be discontinued when the procedures for relocating a site have been completed.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	4.4	FRM Gravimetric	1:1
Collocated PM _{2.5}	Neighborhood	Population Exposure	QA Collocated	4.4	FRM Gravimetric	1:6

Greenville Employment Security Commission (ESC)**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Mauldin-Easley MSA**AQS Site ID:** 45-045-0015**Location:** 101 Perry Avenue**County:** Greenville**Coordinates:** +34.853985, -82.412754**Date Established:** April 11, 2008**Site Evaluation:** PENDING (QA Check: May 02, 2008).

This site was established on 4/11/2008. This site also supports continuous PM_{2.5}, PM₁₀, sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, black carbon and measurements for wind speed and wind direction. The sample inlets are 15.0 meters from the nearest road.

Changes for 2011:

Pending the final revision to the lead monitoring requirements, lead sampling at this site may be terminated. The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

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	4.4	FRM Gravimetric	1:1
PM _{2.5}	Neighborhood	Population Exposure	SPM non-regulatory	4.0	TEOM	Continuous
Speciated PM _{2.5}	Neighborhood	Population Exposure	Supplementary speciation	4.5	STN Protocol	1:6
PM ₁₀	Neighborhood	Population Exposure	SLAMS	4.0	FEM TEOM	Continuous
Lead	Neighborhood	Population Exposure	SPM	2.4	ICP	1:6
Sulfur Dioxide	Neighborhood	Population Exposure	SPM	4.0	FEM UV fluorescence	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Nitrogen Dioxide	Neighborhood	Population Exposure / General Background	SPM	4.0	FRM Chemiluminescence	Continuous
Carbon Monoxide	Middle	Max Precursor Impact	SPM	4.0	FRM Nondispersive Infrared Photometry	Continuous
Sulfate	Neighborhood	Population Exposure / General Background	non-regulatory	4.5	Catalytic thermal reduction / Pulsed fluorescence	Continuous
Black Carbon	Neighborhood	Population Exposure / General Background	non-regulatory	4.5	Optical absorption	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	Not applicable	10	Instruments for wind speed and wind direction	Continuous

Hillcrest Middle School**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Mauldin-Easley MSA**AQS Site ID:** 45-045-0016**Location:** 510 Garrison Road**County:** Greenville**Coordinates:** 34.752, -82.257**Date Established:** February 17, 2009**Site Evaluation:** PENDING (QA Check: September 15, 2009).

This site will serve as one of the two required ozone monitors in the Greenville-Mauldin-Easley MSA. It is expected that this site will represent the ozone concentrations near populated areas in southern Greenville County.

Changes for 2011:

The Department will begin sampling for $PM_{2.5}$ at this location. Once an evaluation is complete, the Department will determine if this site is an appropriate location to represent suburban $PM_{2.5}$ concentrations in the Greenville-Mauldin-Easley MSA.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Population Exposure	SLAMS	2	FEM Ultraviolet Photometry	Continuous
$\dagger PM_{2.5}$	Neighborhood	Population Exposure	SPM	Not available	FRM Gravimetric	1:1

Famoda Farms**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Mauldin-Easley MSA**AQS Site ID:** 45-045-1003**Location:** 7560 Mountain View Road**County:** Greenville**Coordinates:** 35.057, -82.373**Date Established:** August 7, 2008**Site Evaluation:** PENDING (QA Check: October 05, 2009).

This site serves as one of the two required ozone monitors in the Greenville-Mauldin-Easley MSA. It is expected that this site will represent the maximum ozone concentration for the Greenville-Mauldin-Easley MSA.

Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	2.0	FEM Ultraviolet Photometry	Continuous

Long Creek

CSA/MSA: Greenville-Spartanburg-Anderson CSA

AQS Site ID: 45-073-0001

Location: Round Mt. Fire Tower

County: Oconee

Coordinates: +34.805261, -83.237700

Date Established: August 1, 1983

Site Evaluation: The most recent site evaluation was conducted on February 18, 2005 (QA Check: March 18, 2008).



The Long Creek monitoring site is located on Round Mountain in northwest Oconee County. The Long Creek site was established as part of the Southern Oxidant Study. It provides a unique vantage for monitoring the impacts of transported pollutants. Long Creek has samplers for PM_{2.5} and acid rain and has continuous monitors for ozone, PM_{2.5}, sulfur dioxide and precipitation. The sample inlets are 11.0 meters from the nearest road.

Due to the importance of measuring region-wide sulfur dioxide, PM_{2.5} and ozone concentrations, the unique location and collocated monitoring activity, the Department has determined

that current monitoring at this site should be continued.

Changes for 2011:

The Department intends to continue to work with the land-owner to improve site exposure due to recent tree growth around the site.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Urban	General / Background	SLAMS	2.6	FRM Gravimetric	1:3
PM _{2.5}	Urban	General / Background	SPM non-regulatory	4.3	TEOM 50°C	Continuous
Ozone	Regional	General / Background	SPM	4.3	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Regional	Regional Transport	SPM	4.3	FEM UV fluorescence	Continuous
Acid Rain	Neighborhood	Trends	SPM	1.5	IC	1 week samples Tue-Tue
Precipitation	Neighborhood	Local	non-	1.5	Tipping	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
	hood	Conditions	regulatory		bucket	

Clemson CMS**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Greenville-Mauldin-Easley MSA**AQS Site ID:** 45-077-0002**Location:** 106 Hope Well Road**County:** Pickens**Coordinates:** +34.653606, -82.838659**Date Established:** July 14, 1979**Site Evaluation:** The most recent site evaluation was conducted on March 18, 2003 (QA Check: March 18, 2008).

The Clemson Continuous Monitoring Site (CMS) site is located on the grounds of Clemson University near the western border of Pickens County. This monitor was intended to document ozone concentrations upwind of the Greenville-Spartanburg urbanized area. The sample inlets are 27.4 meters from the nearest road.

Changes for 2011:

The Department continues to discuss with stakeholders if an alternative site that will better meet area monitoring objectives and represent Pickens County should be sought. If it is deemed appropriate to establish an alternative site, the Department will collect at least one year of monitoring data concurrent with the new site and assess the results before recommending relocation of ozone monitoring.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General background	SLAMS	3.5	FEM Ultraviolet Photometry	Continuous

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:** +34.988706, -82.075802**Date Established:** April 4, 1990**Site Evaluation:** The most recent site evaluation was conducted on June 8, 2006 (QA Check: May 02, 2008).

This monitoring site is located in rural Spartanburg County, northwest of the city of Spartanburg. This site was established as a maximum ozone concentration monitor for the Greenville-Spartanburg-Anderson urban area on 04/04/1990. This monitor is designated SLAMS and fulfills the requirement for a maximum concentration site for the Spartanburg MSA.

The sample inlets are 85.0 meters from the nearest road.

No Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.6	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:** 34.956, -81.925**Date Established:** December 29, 2008**Site Evaluation:** PENDING (QA Check: September 16, 2009).

With the cooperation of local government and stakeholders, the Department has 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. T.K. Gregg was operated concurrently with the Westview site for one year. This site also supports the required collocated PM_{2.5} continuous monitor for the Spartanburg MSA.

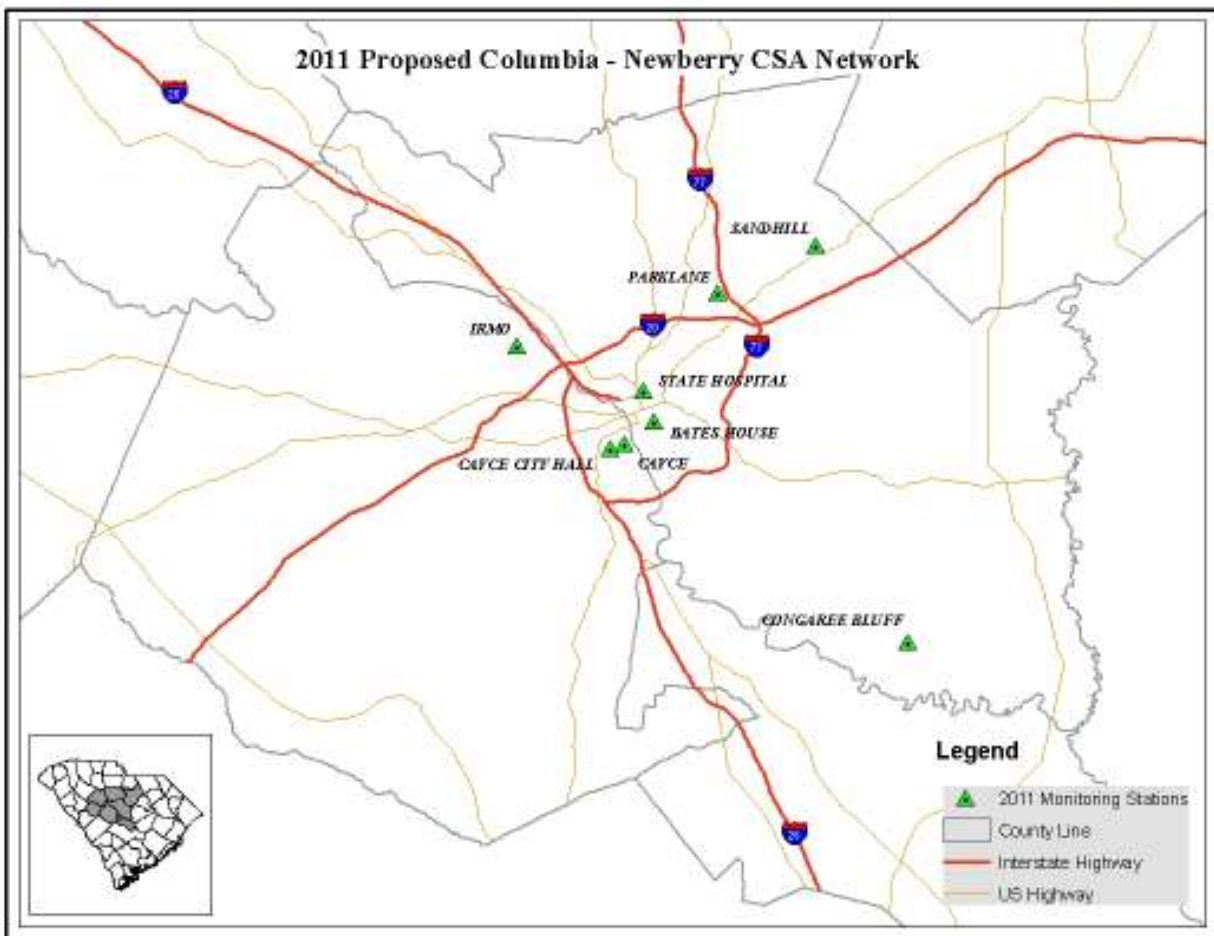
Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

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	3.0	TEOM	Continuous

Columbia-Newberry CSA



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOC	Mercury	Acid Rain	MET
45-063-0008	Irmo	●	○						○				○	○	○				
45-063-0009	Cayce CMS				○														○
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	4	1	2	3	3	3	1	0	1	2	3	0	2	1	6
○ SPM / Other ●●/○○ indicates duplicate QA samplers **see details on page for number of parameters ● SLAMS/NCore *NO and NO _y will be monitored																			

Irmo

CSA/MSA: Columbia-Newberry CSA / Columbia MSA

AQS Site ID: 45-063-0008

Location: 200 Leisure Lane

County: Lexington

Coordinates: +34.051017, -81.154950

Date Established: April 7, 1989

Site Evaluation: The most recent site evaluation was conducted on February 25, 2005 (QA Check: September 14, 2009).



This site is located in Lexington County near the town of Irmo. The Irmo site has a sampler for PM_{2.5} and continuous monitors for sulfur dioxide black carbon and PM_{2.5}. Additionally, this site has samplers collecting carbonyl and SVOC samples on a 1:6 schedule. The sample inlets are 43.4 meters from the nearest road. The Irmo site supports the required collocated PM_{2.5} continuous monitor for the MSA.

Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	5.0	FRM Gravimetric	1:1
PM _{2.5}	Neighborhood	Population Exposure	SPM non-regulatory	4.6	TEOM 30°C	Continuous
Sulfur Dioxide	Neighborhood	Source-Oriented	SPM	3.4	FEM UV fluorescence	Continuous
Black Carbon	Neighborhood	Population Exposure / General Background	non-regulatory	4.0	Optical absorption	Continuous
Carbonyls	Neighborhood	Population Exposure	non-regulatory	3.9	HPLC Ultraviolet Absorption	1:6
SVOC	Neighborhood	Population Exposure	non-regulatory	3.9	PUF/GCMS	1:6

Cayce CMS**CSA/MSA:** Columbia-Newberry CSA / Columbia MSA**AQS Site ID:** 45-063-0009**Location:** 609 Frink Street**County:** Lexington**Coordinates:** +33.973389, -81.052675**Date Established:** October 26, 1991**Site Evaluation:** The most recent site evaluation was conducted on May 8, 2006 (QA Check: September 10, 2009).

This site is located in Lexington County in the city of Cayce. The PM₁₀ is a Special Purpose Monitor and the site was established as a source-oriented monitor in an area where there is a concentration of industrial particulate sources. In addition to PM₁₀, Cayce CMS has instruments for measuring precipitation, wind speed and wind direction. Cayce CMS represents middle scale concentrations of PM₁₀ in an area dominated by point sources and dust reentrained by mobile sources. The sample inlets are 4.9 meters from the nearest road.

The data collected at this location is intended for use by the Department, local government and industry to enable quick response to the impacts of local activities to minimize emissions. While not representative of population exposure, the continued availability of the data is important to the efforts of the Department and local stakeholders to protect air quality in nearby communities.

Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Middle	Source Oriented	SPM	4.3	TEOM Gravimetric	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	non-regulatory	10	Instruments for wind speed and wind direction	Continuous
Precipitation	Not applicable	General / Background	SPM	4.2	Not applicable	Hourly

Cayce City Hall

CSA/MSA: Columbia-Newberry CSA / Columbia MSA

AQS Site ID: 45-063-0010

Location: 1800 12th Street Extension

County: Lexington

Coordinates: 33.969, -81.066

Date Established: December 6, 2007

Site Evaluation: PENDING (QA Check: September 10, 2009).



Cayce City Hall was established to measure PM₁₀ concentrations in populated areas and to demonstrate that the occasional high concentrations observed at Cayce CMS do not impact the neighborhoods surrounding the industrialized area. Cayce City Hall is in an area dominated by area sources.

The sample inlet is 32.0 meters from the nearest road.

Changes for 2011:

No changes are planned for 2011.

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-Newberry CSA / Columbia MSA**AQS Site ID:** 45-079-0007**Location:** 8311 Parklane Road**County:** Richland**Coordinates:** +34.093959, -80.962304**Date Established:** April 3, 1980**Site Evaluation:** The most recent site evaluation was conducted on March 22, 2007 (QA Check: March 13, 2008).

The Parklane site is located in north central Richland County. The Parklane site has samplers for acid rain and has continuous monitoring for ozone and precipitation. Additionally, the site has a sampler for semi-volatile compounds. The sample inlets are 57.0 meters from the nearest road.

The site was originally placed to provide downwind, edge of the Columbia urban area population exposure measurements. The site also provides a facility for training and equipment evaluation convenient to the Department's Columbia air laboratory.

Changes for 2011:

This site has been approved by the EPA as the South Carolina urban NCore site. Monitoring for all required NCore species is expected to be in operation by January 1, 2011. NCore monitoring for the criteria pollutants carbon monoxide, sulfur dioxide and nitrogen dioxide (including NO_y) will be done with high sensitivity instruments which may not be FRM or FEM.

The EPA is currently proposing a change to the monitoring requirements for lead. This proposal would establish lead sampling at NCore sites. The Department is adding lead to the list of monitoring to be done at Parklane in anticipation of this proposed requirement becoming finalized. If EPA does not finalize this requirement, the Department will remove lead from the list of monitors below and resubmit the plan to the EPA.

Monitors:

(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	5	FRM Gravimetric	1:3
PM _{2.5}	Neighbor-hood	Population Exposure	SPM non-regulatory	4.4	TEOM	Continuous
PM _{2.5} Speciated	Neighbor-hood	Population Exposure	NCore	3	Energy dispersive XRF, Ion chromatogra	1:3

Parameter Required	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
					phy, STN TOT	
PM_{10-2.5}	Neighbor-hood	Population Exposure	NCore	4.4	TEOM	Continuous
PM ₁₀	Neighbor-hood	Population Exposure	SPM	4.4	TEOM	Continuous
Ozone	Urban	Max Ozone Concentration	NCore	4.4	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Neighbor-hood	Population Exposure	NCore	4.4	UV Florescence	Continuous
Carbon Monoxide	Neighbor-hood	Population Exposure	NCore	4.4	Nondispersi ve Infrared	Continuous
Nitric Oxide	Neighbor-hood	Population Exposure	NCore	10	Chemilumin esence	Continuous
NO_y	Neighbor-hood	Population Exposure	NCore	10	Chemilumin esence	Continuous
Lead*	Neighbor-hood	Population Exposure	NCore	2.5	High Volume FRM	1:6
SVOC	Neighbor-hood	Population Exposure	SPM	2.5	PUF-GC/MS	1:6
Surface meteorology	Neighbor-hood	Local Conditions	Not applicable	1	Not applicable	Continuous
Precipitation	Neighbor-hood	Local Conditions	Not applicable	1	Not applicable	Continuous
Precipitation chemistry	Neighbor-hood	Local Conditions	Not applicable	1	Not applicable	Weekly sample
*proposed requirement						

Bates House (USC)**CSA/MSA:** Columbia-Newberry CSA / Columbia MSA**AQS Site ID:** 45-079-0019**Location:** 323 S. Bull Street**County:** Richland**Coordinates:** +33.991509, -81.024141**Date Established:** November 24, 1998**Site Evaluation:** The most recent site evaluation was conducted on March 17, 2003 (QA Check: September 14, 2009).

The Bates House (USC) site is located in Richland County on the University of South Carolina (USC)-Columbia campus. The Bates House site has a sampler for $PM_{2.5}$. Additionally, this site has collocated precision sampling for $PM_{2.5}$. The sample inlets are 28.8 meters from the nearest road.

A continuous PM_{10} sampler was installed in late 2005 as an element of the USC Particulate Study adding more timely information to the public than was available from the SLAMS PM_{10} sampler. The continuous data was intended to provide more detailed information to establish baseline and measurement of

potential impacts of a new biomass facility. The continuous monitor has replaced the filter sampling as the SLAMS monitor. The site has collocated wind measurement equipment (3m) operated by the USC Geography Department.

Changes for 2011:

Pending the final revision to the lead monitoring requirements, lead sampling at this site may be terminated.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
$PM_{2.5}$	Neighborhood	Population Exposure	SLAMS	2.3	FRM Gravimetric	1:1
Collocated $PM_{2.5}$	Neighborhood	Quality Assurance	QA Collocated	2.3	Gravimetric	1:6
PM_{10}	Neighborhood	Population Exposure	SLAMS	3.1	TEOM	Continuous
Lead	Neighborhood	Population Exposure	SLAMS	1.3	ICP	1:6

State Hospital**CSA/MSA:** Columbia-Newberry CSA / Columbia MSA**AQS Site ID:** 45-079-0020**Location:** 2100 Bull Street**County:** Richland**Coordinates:** +34.015494, -81.034179**Date Established:** January 7, 1999**Site Evaluation:** The most recent site evaluation was conducted on February 9, 2006.

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 semi-volatile organic compounds. The sample inlets are 10.0 meters from the nearest road.

Changes for 2011:

No changes are planned for 2011. Access to this site may be lost subject to pending sale and proposed use of the property.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Carbonyls	Neighborhood	General / Background	non-regulatory	3.9	HPLC Ultraviolet Absorption	1:6
SVOC	Neighborhood	General / Background	non-regulatory	5.0	PUF-GC/MS	1:6

Congaree Bluff

CSA/MSA: Columbia-Newberry CSA / Columbia MSA

AQS Site ID: 45-079-0021

Location: 1850 South Cedar Creek Road

County: Richland

Coordinates: +33.814680, -80.781135

Date Established: December 27, 1999

Site Evaluation: The most recent site evaluation was conducted on April 11, 2005 (QA Check: March 13, 2008).



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 site has monitors for ozone, sulfur dioxide, mercury vapor and precipitation. Congaree Bluff also has samplers for mercury deposition and acid rain. The sample inlets are 191.7 meters from the nearest road.

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 in the flood plain was relocated to the current Congaree Bluff site in 2001.

The National Park Service collects wind data on a collocated 30 meter wind tower.

Changes for 2011:

There are no changes planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General / Background	SPM	4.4	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Urban	General / Background	SPM	4.4	FEM UV Fluorescence	Continuous
Mercury (vapor)	Urban	Source Oriented	non-regulatory	4.4	Cold Vapor Atomic Fluorescence	Continuous
Mercury Deposition	Urban	Source Oriented	NADP-MDN	1.5	MDN protocol	Weekly samples
Acid Rain	Regional	Regional Transport	non-regulatory	1.5	IC	1 Week Tue-Tue
Precipitation	Neighborhood	Local Conditions	non-regulatory	1.5	Tipping Bucket	Continuous

Sandhill Experimental Station

CSA/MSA: Columbia-Newberry CSA / Columbia MSA

AQS Site ID: 45-079-1001

Location: 900 Clemson Road

County: Richland

Coordinates: +34.131262, -80.868318

Date Established: January 1, 1959

Site Evaluation: The most recent site evaluation was conducted on July 1, 2002 (QA Check: March 13, 2008).



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 PM_{2.5}, nitrogen dioxide, ozone, wind direction and wind speed.

The sample inlets are 33.5 meters from the nearest road.

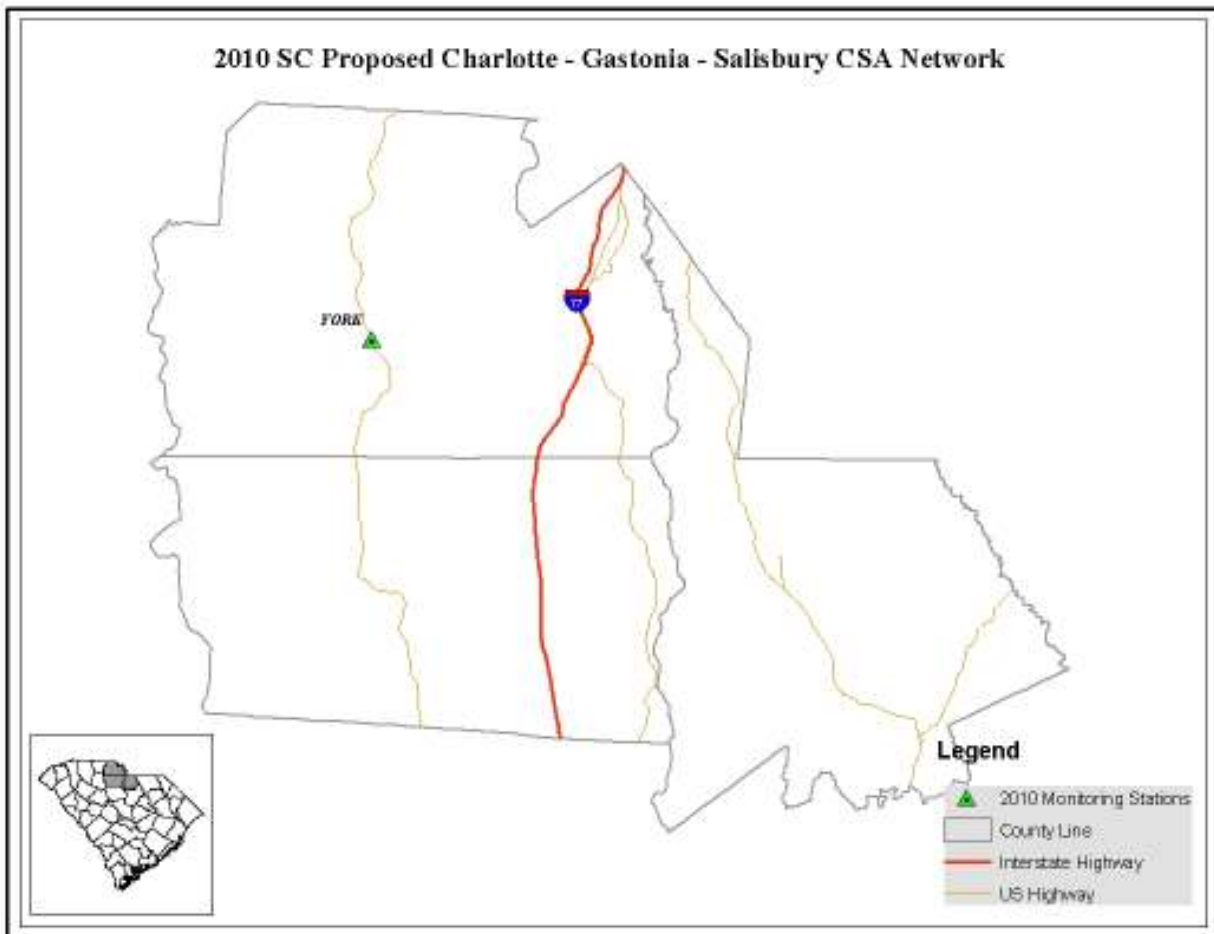
Changes for 2011:

There are no changes planned in 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	4.3	FEM Ultraviolet Photometry	Continuous
Nitrogen Dioxide	Urban	General / Background Max Precursor Emissions Impact	SPM	4.3	FRM Chemiluminescence	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	non-regulatory	10.0	Instruments for wind speed and wind direction	Continuous

Charlotte-Gastonia-Salisbury CSA (part)



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	MET
45-091-0006	York CMS							●											O
	TOTAL	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA monitors																			

York CMS

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

AQS Site ID: 45-091-0006

Location: 2316 Chester Highway (US 321)

County: York

Coordinates: +34.935817, -81.228409

Date Established: March 30, 1993

Site Evaluation: The most recent site evaluation was conducted on June 13, 2006 (QA Check: May 02, 2008).



The York CMS site is located in south-central York County. The site was established to represent background levels near the Charlotte urban area. This monitor is located in a rural setting to support Charlotte-Rock Hill reporting and forecasting. The sample inlets are 171.4 meters from the nearest road.

This site is important for forecasting ozone concentrations in the Charlotte Metropolitan area. Additionally, the long historical record and location of the site make the data useful to both North and South Carolina Air Programs. In addition to measuring ozone, the York site also measures wind speed and

wind direction.

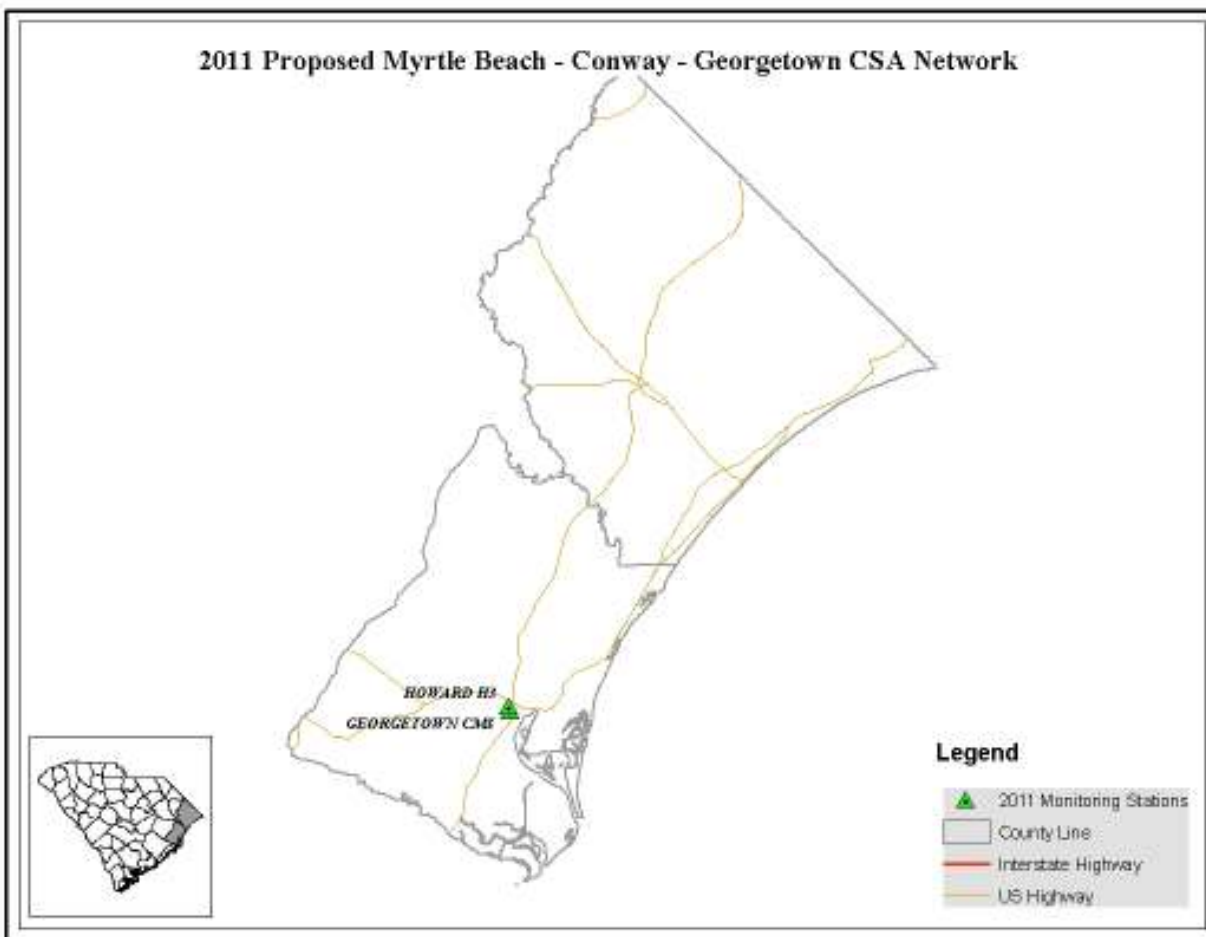
Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Upwind Background	SLAMS	3.3	FEM Ultraviolet Photometry	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	non-regulatory	10.0	Instruments for wind speed, wind direction.	Continuous

Myrtle Beach-Conway-Georgetown CSA



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	MET
45-043-0006	Georgetown CMS																		OO
45-043-0011	Howard High School #3				O														
	TOTAL	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
O SPM / Other ● SLAMS ●●/OO indicates duplicate QA monitors																			

Georgetown CMS

CSA/MSA: Myrtle Beach-Conway-Georgetown CSA

AQS Site ID: 45-043-0006

Location: 1369 Dock Street

County: Georgetown

Coordinates: +33.362014, -79.394251

Date Established: October 25, 1972

Site Evaluation: The most recent site evaluation was conducted on April 2, 2007.



The Georgetown CMS site is located in Georgetown County. Georgetown CMS is located in an industrial area dominated by point sources and is not intended to represent PM₁₀ concentrations in populated areas. The sample inlets are 21 meters from the nearest road.

The site is in very close proximity to several local sources (e.g., truck parking, material handling and road dust) and is not near inhabited buildings or locations where the general public can be expected to have access. The data collected at this location is intended for use by the Department, local government and

industry to enable quick response to the impacts of local activities to minimize emissions. While not representative of population exposure, the continued availability of the data is important to the efforts of the Department and local stakeholders to protect air quality in nearby communities.

Previous monitoring in the local residential areas at the Maryville, Howard High and Winyah sites have confirmed this location is representative of no more than middle scale.

Changes for 2011:

PM₁₀ monitoring will be terminated in 2011. The Department will evaluate a pending revision to the monitoring requirements for the sulfur dioxide NAAQS and determine if it is appropriate to reinstate monitoring at this location. The Department will evaluate the requirements of the monitoring portion of the sulfur dioxide NAAQS and amend the monitoring plan if necessary.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Wind Speed/ Direction	Neighborhood	Local Conditions	non-regulatory	10.0	Instruments for wind speed and wind direction	Continuous
Precipitation	Not applicable	Local Conditions	non-regulatory	Not applicable	Tipping Bucket	Continuous

Howard High School #3**CSA/MSA:** Myrtle Beach-Conway-Georgetown CSA**AQS Site ID:** 45-043-0011**Location:** S. Kaminski Street**County:** Georgetown**Coordinates:** 33.369,-79.297**Date Established:** July, 15 2008**Site Evaluation:** PENDING

This site represents a continuation of PM₁₀ monitoring in this area of Georgetown that has been ongoing since 1970 and the establishment of the original Howard High site.

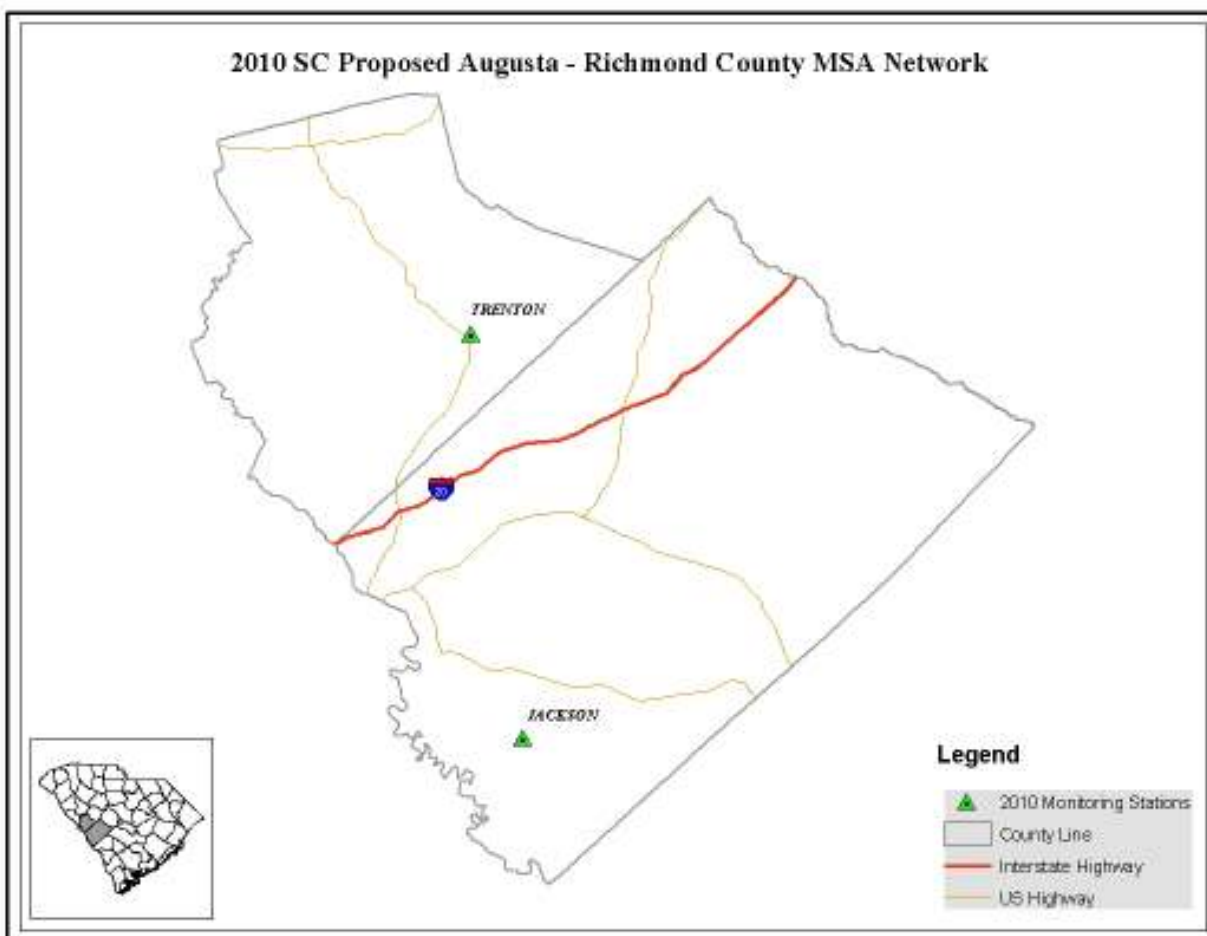
Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Neighborhood	Population Exposure Highest Concentration	SPM	2.0	TEOM	Continuous

Augusta-Richmond County MSA (part)



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	MET
45-003-0003	Jackson Middle School							●											
45-037-0001	Trenton	○	○					●											
	TOTAL	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA monitors																			

Jackson Middle School**CSA/MSA:** Augusta-Richmond County MSA**AQS Site ID:** 45-003-0003**Location:** 8217 Atomic Road**County:** Aiken**Coordinates:** +33.342226, -81.788731**Date Established:** October 24, 1985**Site Evaluation:** The most recent site evaluation was conducted on June 14, 2006 (QA Check: April 07, 2008).

The Jackson Middle School site is located in southwestern Aiken County at the Jackson Middle School. Jackson is located in a suburban setting to monitor concentrations upwind of the Augusta urbanized area. The sample inlet is 138.8 meters from the nearest road.

Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Upwind Background	SLAMS	4.0	FEM Ultraviolet Photometry	Continuous

Trenton**CSA/MSA:** Augusta-Richmond County MSA**AQS Site ID:** 45-037-0001**Location:** 660 Woodyard Road (Hwy 121)**County:** Edgefield**Coordinates:** +33.739963, -81.853635**Date Established:** March 28, 1980**Site Evaluation:** The most recent site evaluation was conducted on March 18, 2003 (QA Check: April 07, 2008).

The Trenton site is located in southeastern Edgefield County. Trenton was originally placed in this area 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 39.4 meters from the nearest road.

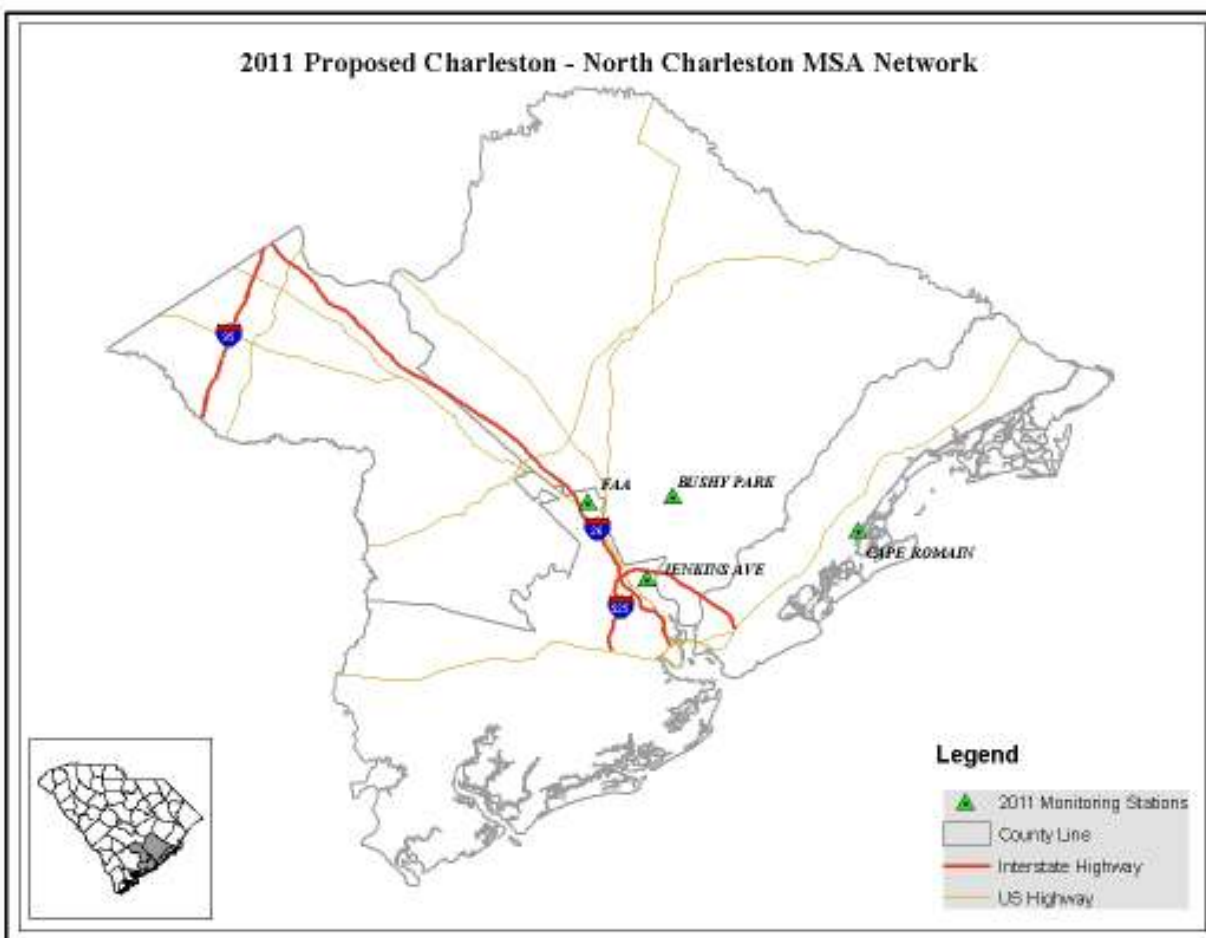
Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Urban	Extreme Downwind	SPM	4.5	Gravimetric	1:3
Continuous PM _{2.5}	Urban	Extreme Downwind	SPM non-regulatory	1.8	TEOM 50°C	Continuous
Ozone	Urban	Highest Concentration / Extreme Downwind	SLAMS	3.6	FEM Ultraviolet Photometry	Continuous

Charleston-North Charleston MSA



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	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	●	○																
45-019-xxxx	North Charleston	●	●																
	TOTAL	4	3	1	1	0	1	2	2	2	1	1	1	0	0	0	0	0	1
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA monitors																			

Bushy Park Pump Station**CSA/MSA:** Charleston-North Charleston MSA**AQS Site ID:** 45-015-0002**Location:** 1530 Bushy Park Road (Goose Creek)**County:** Berkeley**Coordinates:** +32.987252, -79.936700**Date Established:** June 20, 1978**Site Evaluation:** The most recent site evaluation was conducted on March 17, 2003 (QA Check: March 19, 2008).

The Bushy Park Pump Station site is located in southeastern Berkeley County downwind from the Charleston urban area. The sample inlets are 11.3 meters from the nearest road.

Changes for 2011:

Within the next 18-months, the Department intends to search for an alternative maximum ozone concentration monitoring site for the Charleston-North Charleston MSA to better meet monitoring objectives.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.0	FEM Ultraviolet Photometry	Continuous

Jenkins Ave. Fire Station**CSA/MSA:** Charleston-North Charleston MSA**AQS Site ID:** 45-019-0003**Location:** 4830 Jenkins Ave.**County:** Charleston**Coordinates:** +32.882289, -79.977538**Date Established:** February 14, 1969**Site Evaluation:** The most recent site evaluation was conducted on March 2, 2005 (QA Check: September 24, 2009).

The Jenkins Ave. Fire Station site is located in the city of North Charleston. The site is located in an urban and center city setting. The Jenkins Ave. Fire Station site supports monitors for PM₁₀, sulfur dioxide and nitrogen dioxide. The sample inlets are 9.6 meters from the nearest road.

Changes for 2011:

Pending the outcome of a proposed final revision to the lead monitoring requirements, lead sampling at this site may be terminated.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM ₁₀	Neighborhood	Highest Concentration	SLAMS	4.3	FEM TEOM	Continuous
Lead	Neighborhood	Population Exposure	SLAMS	3.8	ICP	1:6
Sulfur Dioxide	Neighborhood	Population Exposure	SPM	4.3	FEM UV Fluorescence	Continuous
Nitrogen Dioxide	Neighborhood	Highest Concentration Source Oriented	SPM	4.3	FRM Chemiluminescence	Continuous

Cape Romain

CSA/MSA: Charleston-North Charleston MSA

AQS Site ID: 45-019-0046

Location: 390 Bulls Island Road (Awendaw)

County: Charleston

Coordinates: +32.941023, -79.657187

Date Established: July 11, 1983

Site Evaluation: The most recent site evaluation was conducted on June 3, 2005 (QA Check: September 24, 2009).



The Cape Romain site is located in Charleston County at the Cape Romain National Wildlife Refuge (NWR) near Moores 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 17, parallels the coast, with some development along

the section of highway that is closest to the Refuge.

The Cape Romain site has samplers for PM_{2.5} speciation and continuous monitors for carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, black carbon, meteorological parameters and PM_{2.5}. 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 and mercury deposition. The site has been used for multiple interagency and regional air monitoring projects.

Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

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	3.0	TEOM 30°C	Continuous
Speciated PM _{2.5}	Urban	Visibility	IMPROVE	3.0	IMPROVE protocol	1:3
Ozone	Regional	General Background	SLAMS	4.0	FEM Ultraviolet Photometry	Continuous
Sulfur	Regional	Source	SPM	4.0	FEM UV	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Dioxide		Oriented			Fluorescence	
Nitrogen Dioxide	Regional	General Background	SPM	4.0	FRM Chemiluminescence	Continuous
Carbon Monoxide	Urban	General Background	SPM	4.0	FRM Nondispersive Infrared	Continuous
Sulfate	Regional	General Background	non-regulatory	4.0	Catalytic thermal reduction / Pulsed fluorescence	Continuous
Black Carbon	Regional	General Background	non-regulatory	4.0	Optical absorption	Continuous
Wind Speed / Direction	Neighborhood	Local Conditions	non-regulatory	10.0	Instruments for wind speed and direction and precipitation	Continuous

FAA**CSA/MSA:** Charleston-North Charleston MSA**AQS Site ID:** 45-019-0048**Location:** 2670 Elms Plantation Blvd**County:** Charleston**Coordinates:** +32.980254, -80.065010**Date Established:** April 9, 1999**Site Evaluation:** The most recent site evaluation was conducted on May 4, 2006 (QA Check: September 24, 2009).

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 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SPM	2.3	FRM Gravimetric	1:1
Collocated PM _{2.5}	Neighborhood	Population Exposure	QA Collocated	2.3	FRM Gravimetric	1:6

Charleston Public Works

CSA/MSA: Charleston-North Charleston MSA

AQS Site ID: 45-019-0049

Location: 360 Fishburne Street

County: Charleston

Coordinates: +32.790984, -79.958694

Date Established: November 20, 1998

Site Evaluation: The most recent site evaluation was conducted on April 24, 2006. (QA Check: September 24, 2009).



The Charleston Public Works (CPW) site is located on the western side of the Charleston peninsula near downtown Charleston. In addition to the PM_{2.5} sampler, CPW has a PM_{2.5} speciation sampler that is the South Carolina station for the national Speciation Trends Network (STN). The CPW site supports the required collocated PM_{2.5} continuous monitor for the MSA. The sample inlets are 28 meters from the nearest road.

Recent measurements of PM_{2.5} concentrations in the Charleston Neck/North Charleston area⁷ indicate relatively higher concentrations than measured at both FAA and CPW.

Changes for 2011:

Within the next 18-months the Department will work with local stakeholders to establish an alternative site in the Charleston Neck/North Charleston area. Once an appropriate location has been found, the Department will collect at least one year of monitoring data concurrent with the new site and assess the results before recommending relocation of PM_{2.5} sampling and monitoring.

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	2.4	Gravimetric	1:1
PM _{2.5}	Neighborhood	Population Exposure	SPM non-regulatory	3.0	TEOM	Continuous

⁷ <http://www.dhec.sc.gov/environment/baq/CharlestonNeckStudy.aspx>

North Charleston PM_{2.5} SPM Site**CSA/MSA:** Charleston-North Charleston MSA**AQS Site ID:** 45-019-xxxx**Location:** TBD**County:** Charleston**Coordinates:****Date Established:****Site Evaluation:**

No picture available.

Recent measurements of PM_{2.5} in the Charleston Neck/North Charleston area⁷ indicate a need to better understand the distribution of concentrations and population exposure in areas that have not been monitored in the past. A North Charleston site will be established to provide data representative of the area exposure and monitor possible changes related to changes in industry, transportation and land use.

Once sufficient data has been collected, further evaluation of the appropriate monitoring network for the Charleston-North Charleston MSA will be conducted.

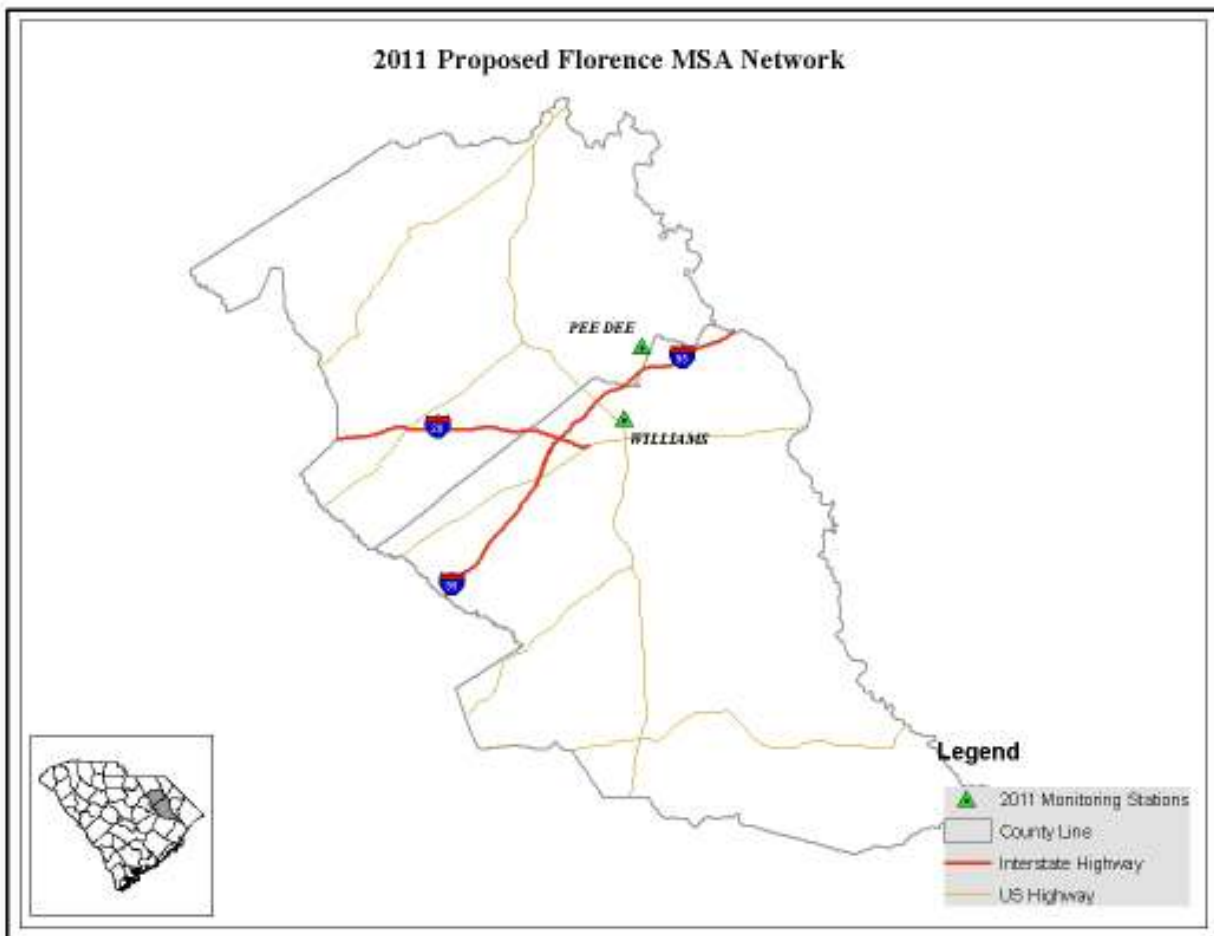
Changes for 2011:

Establish site with cooperation of municipality, community and Port Authority.

Monitors: (Proposed)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
†PM _{2.5}	Neighborhood	Population Exposure	SPM	TBD	TBD	TBD
†Black Carbon	Neighborhood	Source Impact	non-regulatory	TBD	Optical absorption	Continuous

Florence MSA



Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	MET
45-031-0003	Pee Dee Exp. Station							●											
45-041-0003	Williams Middle School	●	○																
	TOTAL	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA monitors																			

Pee Dee Experimental Station**CSA/MSA:** Florence MSA**AQS Site ID:** 45-031-0003**Location:** 2200 Pocket Road (Darlington)**County:** Darlington**Coordinates:** +34.285696, -79.744859**Date Established:** February 25, 1993**Site Evaluation:** The most recent site evaluation was conducted on March 14, 2006 (QA Check: March 20, 2008).

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 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.0	FEM Ultraviolet Photometry	Continuous

Williams Middle School**CSA/MSA:** Florence MSA**AQS Site ID:** 45-041-0003**Location:** 1119 N. Irby Street**County:** Florence**Coordinates:** 34.214, -79.767**Date Established:** August 4, 2008**Site Evaluation:** PENDING (QA Check: September 22, 2009).

The Florence MSA requires one PM_{2.5} sampler in a population oriented area of expected maximum concentration. A collocated continuous monitor is also required to provide timely reporting of concentrations to the public.

The Department established the Williams site to meet the 40 CFR Part 58 Appendix D requirements for objective and collocated continuous monitoring and reporting.

Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure Highest Concentration	SLAMS	2.5	FRM Gravimetric	1:3
PM _{2.5}	Neighborhood	Population Exposure Highest Concentration	SPM non-regulatory	3.0	TEOM	Continuous

Remainder of State

Classification of monitoring type by site

AIRS ID	Site Name	PM _{2.5}	PM _{2.5} Cont.	Speciation	PM ₁₀	PM _{10-2.5}	Lead	O ₃	SO ₂	NO ₂	CO	Sulfate	BC	Carbonyls	SVOC	VOCs	Mercury	Acid Rain	MET
45-001-0001	Due West							●										○	○
45-025-0001	Chesterfield	●	○	○	○○			○					○	○	○	○			○
45-029-0002	Ashton		○					○											
	TOTAL	1	2	1	2	0	0	3	0	0	0	0	1	1	1	1	0	1	2
○ SPM / Other ● SLAMS ●●/○○ indicates duplicate QA monitors																			

Due West**CSA/MSA:** None**AQS Site ID:** 45-001-0001**Location:** 59 Jim Scott Lane**County:** Abbeville**Coordinates:** +34.325318, -82.386376**Date Established:** April 2, 1991**Site Evaluation:** The most recent site evaluation was conducted on June 27, 2006 (QA Check: April 01, 2008).

The Due West site is located in northeastern Abbeville County. In addition to monitoring for ozone, Due West has a monitor for precipitation and a sampler for acid precipitation.

The sample inlets are 76 meters from the nearest road.

Changes for 2011:

No changes are planned for 2011.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General / Background	SLAMS	4.0	FEM Ultraviolet Photometry	Continuous
Acid Rain	Neighborhood	Trends	non-regulatory	1.5	IC	Weekly
Precipitation	Neighborhood	Local Conditions	non-regulatory	3.0	Tipping bucket	Continuous

Chesterfield

CSA/MSA: None

AQS Site ID: 45-025-0001

Location: SC145, McBee (Rt 2 Box 100)

County: Chesterfield

Coordinates: +34.615367, -80.198787

Date Established: January 6, 2000

Site Evaluation: The most recent site evaluation was conducted on April 21, 2003 (QA Check: March 20, 2008).



The Chesterfield site is located in the central part of Chesterfield County. The Chesterfield site has continuous monitors for black carbon, PM_{2.5}, ozone and meteorological parameters. Sampling is done for PM_{2.5} and PM₁₀. In addition to the STN protocol PM_{2.5} speciation sampling, this site also 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 a Rural National Air Toxics Trends Site (NATTS) which includes carbonyls, VOC, SVOC and metals sampling.

Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

Monitors:

(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Regional	Regional Transport	SLAMS	3.0	FRM Gravimetric	1:3
PM _{2.5}	Regional	Regional Transport	SPM non-regulatory	3.0	TEOM – 50° C	Continuous
Speciated PM _{2.5}	Regional	Regional Transport	CSN	3.0	Energy dispersive XRF, Ion chromatography, STN TOT	1:6
PM ₁₀	Regional	General / Background	SPM	3.0	Gravimetric ICP/MS	1:6
Collocated PM ₁₀	Regional	General / Background	QA Collocated	3.0	Gravimetric	1:6
Ozone	Regional	General / Background	SPM	2.0	FEM Ultraviolet Photometry	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Black Carbon	Regional	General / Background	non-regulatory	4.5	Optical absorption	5 minutes
Carbonyls	Regional	NATTS	non-regulatory	3.0	DNPH/IC	1:6
Semi-volatiles	Regional	NATTS	non-regulatory	3.0	PUF/GCMS	1:6
Volatile Organic Compounds	Regional	NATTS	non-regulatory	3.0	Canister/GCMS	1:6
Wind speed / direction	Neighborhood	Local Conditions	non-regulatory	10.0	Instruments for wind speed and direction	Continuous

Ashton**CSA/MSA:** None**AQS Site ID:** 45-029-0002**Location:** Ashton Road (S-13-18)**County:** Colleton**Coordinates:** +33.007866 -80.965038**Date Established:** March 7, 1990**Site Evaluation:** The most recent site evaluation was conducted on April 18, 2005 (QA Check: March 19, 2008).

The Ashton site is located in northwestern Colleton County. The site was established as a general/background location on 03/07/1990. In addition to monitoring ozone, the Ashton site also monitors PM_{2.5} concentrations. The sample inlets are 8 meters from the nearest road.

Changes for 2011:

The PM_{2.5} continuous monitor designation was changed to SPM/non-regulatory.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Regional	General / Background	SPM non-regulatory	4.0	TEOM 50°C	Continuous
Ozone	Urban	General / Background	SPM	4.0	FEM Ultraviolet Photometry	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 Total Suspended Particulate, lead, carbon monoxide, nitrogen oxides and sulfur dioxide and the increasing concern about the impact of fine particles and ozone on public health.

As resources become available and after the extra monitoring needed in this transition is completed, a series of studies are planned for the major urban areas 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 will be developed during this transition and implemented as resources again 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 evaluations the Department has identified for several years and are important for evaluating and improving our knowledge of air quality in the State. However, current budget issues and lack of additional federal funding has led to a high level of uncertainty and makes planning of implementation schedules highly uncertain. The Department will begin the process of evaluating and prioritizing each of the studies listed below as resources once again become available.

Areas where long term strategies are being considered include:

- Columbia MSA Ozone Study - addition of supplementary SPM ozone sites to investigate variability and refine the monitoring network to meet objectives.
- Columbia MSA Particulate Surveillance - rotation of SPM PM_{2.5} sites through areas with higher rates of growth and changes in land use to determine trends and understand spatial variability of concentrations (Parklane, Sandhill and potentially Lower Richland, Lexington and Chapin).
- Aiken County portion of the Augusta-Richmond County MSA Ozone Study - addition of supplementary SPM ozone site to investigate proper size of the network appropriate to represent the MSA.
- Aiken County portion of the Augusta-Richmond County MSA Particulate Study – investigation of PM_{2.5} concentrations in North Augusta and Aiken along with existing rural data to determine population exposure and possible need for monitoring of mass or the components of particulate to assist in area air quality improvement efforts.
- York County Ozone Study - limited investigation of ozone population exposure, spatial variability and transport to supplement existing North and South Carolina monitoring. This study is necessary because of siting issues and lack of long term commitment at the current York CMS monitoring site.

Sites Discontinued

The remainder of this document contains information on monitoring sites the Department is scheduling for discontinuance. These sites will be discontinued by January 1, 2011 unless otherwise indicated.

Site	ID	Date Established	Notes
Anderson Library	45-007-0004	03/25/2008	This site was established to conduct a limited study of PM _{2.5} in Anderson County. This study has concluded and the site will be shut down.
H.L. Sneed	45-041-0002	01/15/1999	Site no longer met network design requirements. PM _{2.5} sampling has been relocated to Williams Middle School site.
Beck Administration Center	45-043-0012	07/23/2008	Monitoring does not support current monitoring needs for the area. PM ₁₀ will continue to be measured in Georgetown at the Howard High complex.
Westview	45-083-0010	11/10/1998	Site no longer met network design requirements. PM _{2.5} sampling has been relocated to T.K. Gregg site.

Anderson Library**CSA/MSA:** Greenville-Spartanburg-Anderson CSA / Anderson MSA**AQS Site ID:** 45-007-0004**Location:** 300 N. McDuffie Street**County:** Anderson**Coordinates:** 34.506, -82.648**Date Established:** March 25, 2008**Site Evaluation:** PENDING (QA Check: September 10, 2009).

While there are no minimum requirements for PM_{2.5} monitoring in the Anderson MSA, the Department operates a continuous PM_{2.5} monitor in the City of Anderson. With the cooperation of local government and stakeholders, the Department established a site in the City of Anderson to better understand the spatial distribution of PM_{2.5} in the Upstate.

Changes for 2011:

This site will be terminated at the end of 2011. This site was established to be a short term site to assess PM_{2.5} concentrations in the City of Anderson. This assessment has concluded and the Department will terminate the site.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighbor-hood	Population Exposure	SPM	2.0	TEOM	Continuous

H. L. Sneed Middle School

CSA/MSA: Florence MSA

AQS Site ID: 45-041-0002

Location: 3300 Thornblade Drive

County: Florence

Coordinates: +34.167636, -79.850404

Date Established: January 15, 1999

Site Evaluation: The most recent site evaluation was conducted on March 16, 2006 (QA Check: September 22, 2009).



The H. L. Sneed Middle School site is located in Florence County approximately 2 miles SSW of the I-20/I-95 interchange. The site was established to represent population exposure to $PM_{2.5}$ concentrations on the neighborhood scale. The site is located on the edge of the Florence urban area. The sample inlets are 70 meters from the nearest road. Recent changes to monitoring regulations specified that at least one $PM_{2.5}$ site in each MSA was required to have continuous monitoring for public notification. The H. L. Sneed Middle School site was not large enough to house both the FRM and continuous monitors.

Changes for 2011:

$PM_{2.5}$ sampling at this site has been terminated. Williams Middle School has been designated as the $PM_{2.5}$ SLAMS site for the Florence MSA.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
$PM_{2.5}$	Neighborhood	Population Exposure	SLAMS	2.5	FRM Gravimetric	1:3

Beck Administration Center**CSA/MSA:** Myrtle Beach-Conway-Georgetown CSA**AQS Site ID:** 45-043-0012**Location:** 2018 Church Street**County:** Georgetown**Coordinates:** 33.383, -79.294**Date Established:** July 23, 2008**Site Evaluation:** PENDING

The Beck Administration Center site is located in Georgetown County in the city of Georgetown. This site was established with cooperation with local stakeholders to represent local concentrations of PM_{10} and provide context for other monitoring in the town of Georgetown. The Beck Administration Center site has continuous PM_{10} monitoring.

Changes for 2011:

This site will be terminated at the end of 2010. This site was originally established to assess PM_{10} concentration on the fringe of the City of Georgetown. Due to other critical monitoring needs, the Department has determined that this site will be terminated but will retain PM_{10} sampling closer to the residential areas of the City of Georgetown through the site at Howard High.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM_{10}	Neighborhood	Population Exposure	SPM	3.0	TEOM	Continuous

West View

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

AQS Site ID: 45-083-0010

Location: 4198 Copper Line Road

County: Spartanburg

Coordinates: +34.926839, -82.005211

Date Established: November 10, 1998

Site Evaluation: The most recent site evaluation was conducted on March 29, 2006 (QA Check: September 16, 2009).



The West View site is located in Spartanburg County at the West View Elementary School, west of the City of Spartanburg. The site was established as a PM_{2.5} population exposure sampler on 11/10/1998 and one of the two Core samplers placed to represent the Greenville-Spartanburg Monitoring Planning Area.

The sample inlets are 99.0 meters from the nearest road.

Redefinition of MSA boundaries, the requirement for a maximum exposure/population oriented site and requirement for collocation of continuous monitoring for reporting to the public necessitate relocation of this monitor.

Changes for 2011:

PM_{2.5} sampling at this site has been terminated. T.K. Gregg has been designated as the PM_{2.5} SLAMS site for the Spartanburg MSA.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
PM _{2.5}	Neighborhood	Population Exposure	SLAMS	2.6	FRM Gravimetric	1:1

APPENDIX A: Errata

This section will list corrections to the 2011 Monitoring Plan that may arise after submittal to the EPA. The updated plan along with this errata sheet will be posted to the Department's webpage.

Date	Item