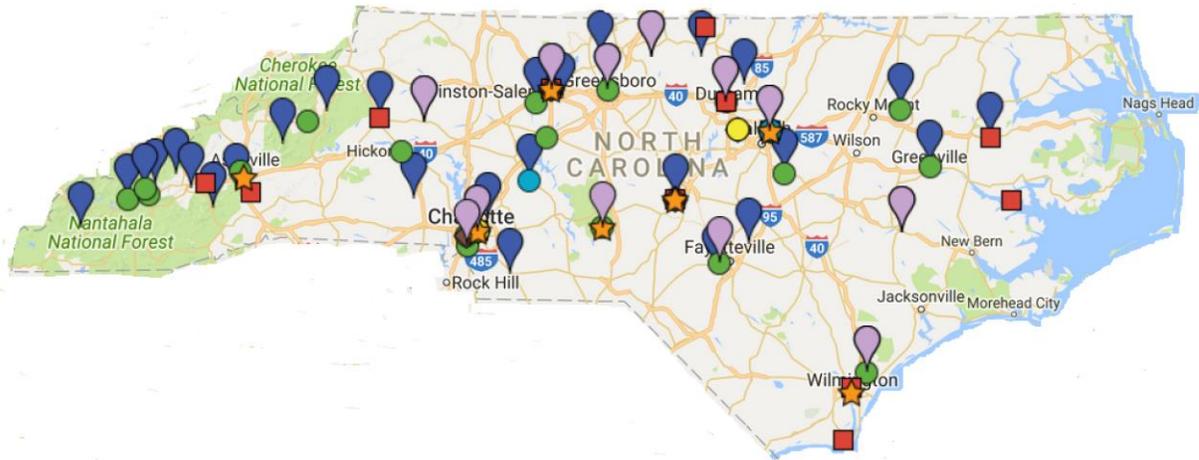


# 2017-2018 Annual Monitoring Network Plan for the North Carolina Division of Air Quality

## Volume 1 Network Descriptions



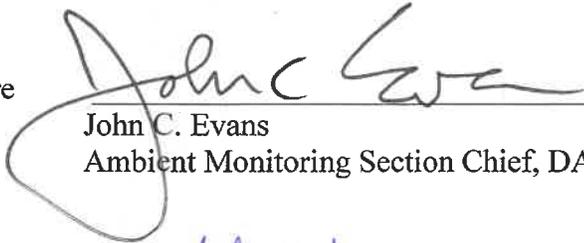
**June 30, 2017**

North Carolina Division of Air Quality  
A Division of the North Carolina Department  
of Environmental Quality  
Mail Service Center 1641  
Raleigh, North Carolina 27699-1641



**CERTIFICATION**

By the signatures below, the North Carolina Division of Air Quality, DAQ, certifies that the information contained in the 2017-2018 Annual Monitoring Network Plan is complete and accurate at the time of submittal to EPA Region 4. However, due to circumstances that may arise during the sampling year, some network information may change. A notification of change and a request for approval will be submitted to EPA Region 4 at that time.

Signature  \_\_\_\_\_  
John C. Evans  
Ambient Monitoring Section Chief, DAQ

Date 6/27/17

Signature  \_\_\_\_\_  
Michael Abraczinskas  
Director, DAQ

Date 6/27/17

## I. Introduction

The North Carolina Division of Air Quality, DAQ, works with the state's citizens to protect and improve outdoor, or ambient, air quality in North Carolina for the health and benefit of all. To carry out this mission, the DAQ has programs for monitoring air quality, permitting and inspecting air emissions sources, developing plans for improving air quality and educating and informing the public about air quality issues.

The DAQ, which is part of the N.C. Department of Environmental Quality, DEQ, also enforces state and federal air pollution regulations. In North Carolina, the General Assembly enacts state air pollution laws and the Environmental Management Commission adopts most regulations dealing with air quality. In addition, the U.S. Environmental Protection Agency, EPA, has designated the DAQ as the lead agency for enforcing federal laws and regulations dealing with air pollution in North Carolina.

The Ambient Monitoring Section, AMS, of the DAQ operates an air quality-monitoring program for the state. The AMS is responsible for measuring levels of regulated pollutants in the outdoor air by maintaining a network of 39 monitoring stations across the state and measuring the concentration of pollutants such as ozone, lead, particles, i.e., dust, nitrogen oxides, sulfur dioxide and carbon monoxide. The AMS provides these monitoring services in accordance with EPA regulatory requirements. The criteria pollutant monitoring system is designed to make measurements to assess compliance with the national ambient air quality standards, NAAQS, as set by the EPA. The NAAQS define air pollutant concentration level thresholds judged necessary to protect the public health and welfare.

The law as defined in Title 40 of the Code of Federal Regulations, CFR, Part 58.10 *Annual Monitoring Network Plan and Periodic Network Assessment* requires an annual monitoring network plan. This plan must provide the following information for each monitoring station in the network:

- The Air Quality System, AQS, site identification number;
- The location, including street address and geographical coordinates;
- The sampling and analysis method(s) for each measured parameter;
- The operating schedules for each monitor;
- Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal;
- The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to part 40 CFR 58;
- The identification of any sites that are suitable and sites that are not suitable for comparison against the annual fine particle, PM<sub>2.5</sub>, NAAQS as described in §58.30; and
- The metropolitan statistical area, MSA, core-based statistical area, CBSA, combined statistical area, CSA, or other area represented by the monitor.
- The designation of any lead, Pb, monitors as either source-oriented or non-source-oriented as required in Appendix D to 40 CFR Part 58.
- Any source-oriented monitors for which a waiver has been requested or granted by the EPA regional administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

- Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA regional administrator for the use of Pb-PM<sub>10</sub> monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.
- The identification of required nitrogen dioxide, NO<sub>2</sub>, monitors as either near-road or area-wide sites in accordance with appendix D, section 4.3 of part 40 CFR 58; and
- The identification of any PM<sub>2.5</sub> federal equivalent methods, FEMs and/or approved regional methods, ARMs, used in the monitoring agency's network where the data are not of sufficient quality such that data are not to be compared to the NAAQS.

This plan contains information on the criteria and other pollutant monitoring networks operated by the DAQ and continues in the following sections as outlined below:

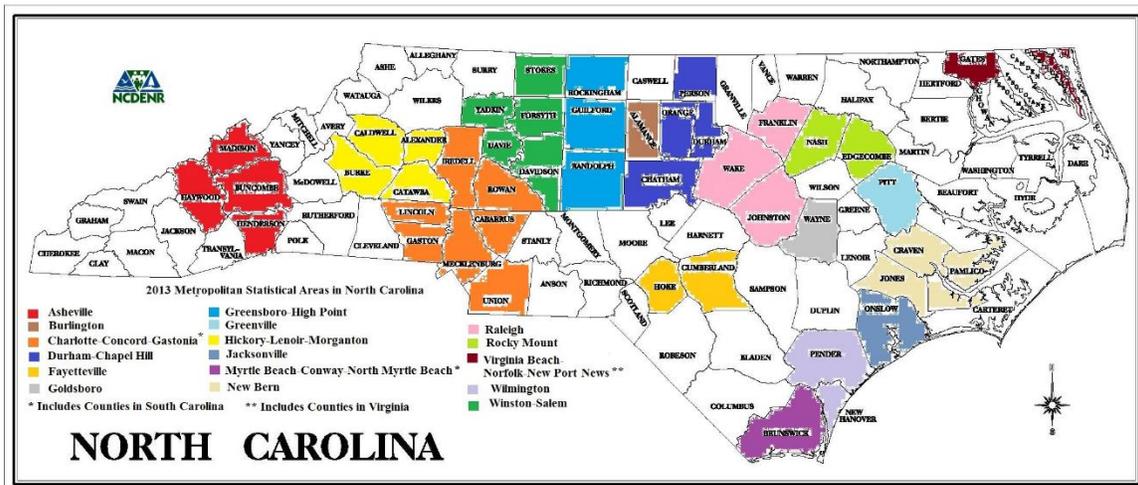
- II. Summary of Proposed Changes
- III. Carbon Monoxide, CO, Monitoring Network
- IV. Sulfur Dioxide Monitoring Network
- V. Ozone Monitoring Network
- VI. Particle Monitoring Network for Particles with Aerodynamic Diameters of 10 Micrometers or Less, PM<sub>10</sub>
- VII. Fine Particle, PM<sub>2.5</sub>, Monitoring Network
- VIII. Lead Monitoring Network
- IX. Urban Air Toxics Monitoring Network
- X. DAQ NCore Monitoring Network
- XI. Nitrogen Dioxide Monitoring Network
- XII. Photochemical Assessment Monitoring Station, PAMS, Network
- XIII. EPA Approval Dates for Quality Management Plan and Quality Assurance Project Plans
- XIV. Equipment Condition of North Carolina Monitoring Sites

A table summarizing the monitoring network and providing the types of monitors operated at each station is provided in Appendix A. Summary of Monitoring Sites and Types of Monitors. The annual network review forms filled out each year for each of the monitoring sites operated by the DAQ, the Western North Carolina Regional Air Quality Agency and Duke Progress Energy are attached as an appendix to each regional section in Volume 2 and are also available for review at the Division of Air Quality, 217 West Jones Street, Raleigh, North Carolina, 27603. The Mecklenburg County Air Quality 2017 Annual Monitoring Network Plan is provided in Appendix B. The Forsyth County Office of Environmental Assistance and Protection 2017 Annual Monitoring Network Plan is provided in Appendix C.

Volume II of the annual network plan discusses the monitoring network by metropolitan statistical areas, MSAs, organized by the area of the state in which they are located. The day-to-day operations of the monitors are managed by regional office monitoring staff located in one of the seven regional DAQ Offices located in Asheville, Mooresville, Winston-Salem, Raleigh, Fayetteville, Washington and Wilmington. Volume II of the monitoring plan discusses the monitoring network for each regional

office starting with Asheville in the west and moving to Wilmington in the east. Each region is subdivided into sections based on metropolitan statistical areas. Volume II discusses the current monitoring as well as future monitoring plans or needs.

In February 2013, the Office of Management and Budget revised the definitions of MSAs based on the 2010 census as shown in Figure 1.<sup>1</sup> Due to these revisions, North Carolina gained two MSAs in the eastern part of the state: Myrtle Beach-Conway-North Myrtle Beach and New Bern. Three MSAs gained additional counties and, thus, additional people— Charlotte-Concord-Gastonia, Virginia Beach-Norfolk-New Port News and Winston-Salem. Two MSAs lost counties and, thus, people – Greenville and Wilmington. The discussions in this network monitoring plan are based on the 2013 MSA definitions.



**Figure 1. North Carolina metropolitan statistical areas as of Feb. 2013**

From 2007 through March 2015, the EPA considered the DAQ and the three local programs in North Carolina to be one primary quality assurance organization, PQAO. In 2014, the EPA determined the state and local programs did not meet the PQAO requirements listed in Section 3 of 40 CFR 58 Appendix A.<sup>2</sup> Forsyth County and MCAQ decided to become separate PQAOs starting March 19, 2015. The Western North Carolina Regional Air Quality Agency elected to remain with the DAQ as a joint PQAO. In 2016 Duke Progress Energy decided to operate two sulfur dioxide data requirement rule sites as part of the DAQ PQAO.

<sup>1</sup> Office of Management and Budget, OMB BULLETIN NO. 13-01: Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas and Combined Statistical Areas and Guidance on Uses of the Delineations of These Areas, Feb. 28, 2013, available on the worldwide web at <https://obamawhitehouse.archives.gov/sites/default/files/omb/bulletins/2013/b13-01.pdf>, accessed May 18, 2017.

<sup>2</sup> See [http://www.ecfr.gov/cgi-bin/text-idx?SID=87c8d2b6f9ef2f4c8b11437b107746b&mc=true&node=ap40.6.58\\_161.a&rgn=div9](http://www.ecfr.gov/cgi-bin/text-idx?SID=87c8d2b6f9ef2f4c8b11437b107746b&mc=true&node=ap40.6.58_161.a&rgn=div9).

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## II. Summary of Proposed Changes

This section lists the known changes to the network expected to occur during the next 18 months. Table 1 contains a list of fastest growing counties in North Carolina for reference in the discussions in this section and the following sections of the plan, which describe monitoring changes required because of population growth in the MSA. Figure 2 is a map that shows which counties grew the fastest in the past year and Figure 3 is a map that shows which counties are growing the fastest during this decade. The discussion in this section is organized as follows:

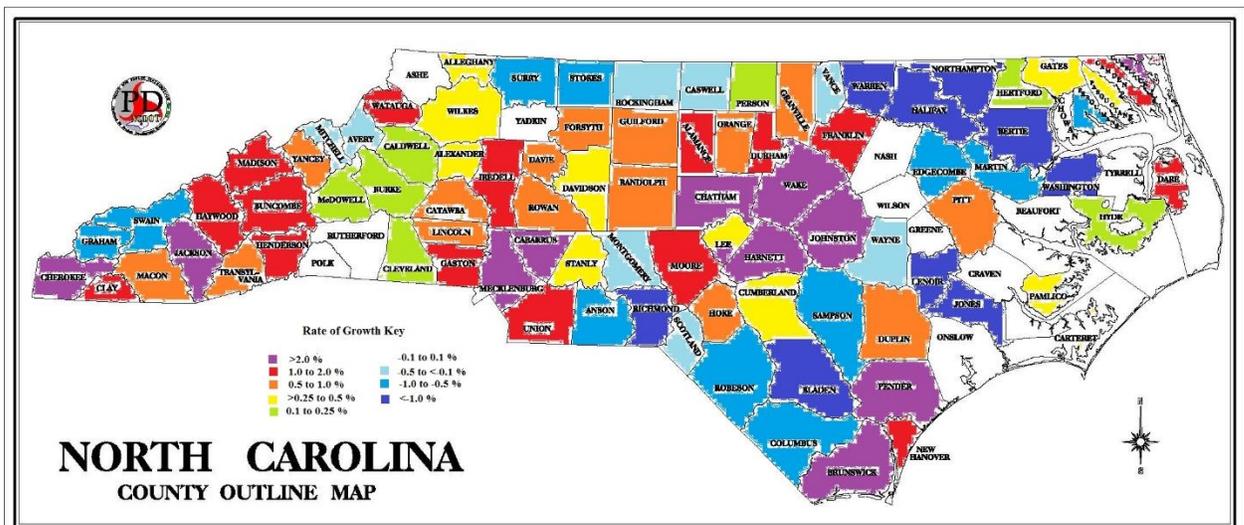
- Monitors that were or are scheduled to start-up or shut-down in 2016, 2017 or 2018 that were not included in the 2016-2017 network plan;
- Sites to be relocated, moved, or upgraded in 2017 or 2018;
- Changes to the methods used to measure fine particles for comparison to the NAAQS;
- Rotating background monitors and their operating schedules; and
- Waiver and other requests.

**Table 1. Alphabetical list of fastest growing counties in North Carolina based on population change between April 1, 2010, and July 1, 2016, or July 1, 2015, and July 1, 2016.**

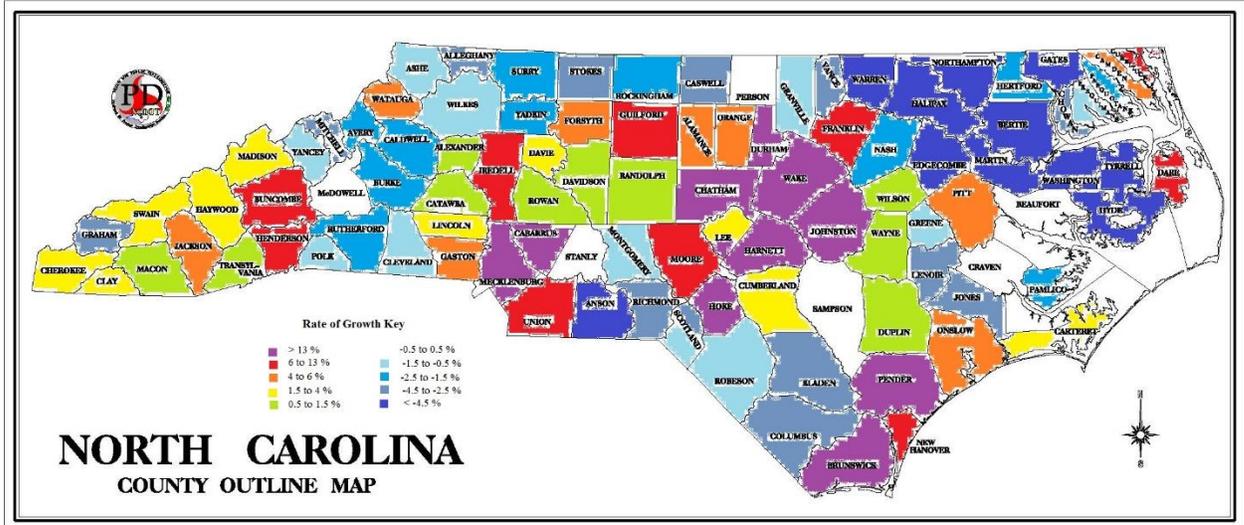
<b>County Name</b>	<b>Population Estimate July 1, 2016</b>	<b>State Ranking of Counties by 2016 Estimate</b>	<b>Reason for Selection as one of the Fastest Growing Counties in North Carolina</b>
Brunswick	126,953	24	Growth of 3.4 % from 2015 to 2016 and 18.2 % from April 1, 2010, to July 1, 2016. Nation's 37 <sup>th</sup> (annual) and 39 <sup>th</sup> (decade) fastest growing county.
Cabarrus	201,590	11	Growth of 5,082 people (2.5 %) from 2015 to 2016. Nation's 103 <sup>rd</sup> (annual) and 101 <sup>st</sup> (decade) fastest growing county (percentagewise).
Chatham	72,243	36	Growth of 1,473 people (2.0 %) from 2015 to 2016 and 13.8 % from April 1, 2010, to July 1, 2016. Nation's 88 <sup>th</sup> (decade) fastest growing county (percentagewise).
Cherokee	27,905	71	Growth of 768 people (2.8 %) from 2015 to 2016 and 1.8 % from April 1, 2010, to July 1, 2016. Nation's 87 <sup>th</sup> (annual) fastest growing county (percentagewise).
Durham	306,212	6	Growth of 38,625 people (14.4 %) from April 1, 2010, to July 1, 2016. Nation's 77 <sup>th</sup> (decade) fastest growing county (percentagewise).
Harnett	130,881	23	Growth of 14.1 % between 4/1/2010 and 7/1/2016. Nation's 83 <sup>rd</sup> fastest growing county (decade).
Hoke	53,262	53	Growth of 13.4 % between April 1, 2010 and July 1, 2016. Nation's 97 <sup>th</sup> (decade) fastest growing county.

**Table 1. Alphabetical list of fastest growing counties in North Carolina based on population change between April 1, 2010, and July 1, 2016, or July 1, 2015, and July 1, 2016.**

County Name	Population Estimate July 1, 2016	State Ranking of Counties by 2016 Estimate	Reason for Selection as one of the Fastest Growing Counties in North Carolina
Johnston	191,450	12	Growth of 5,717 people (3.0 %) from 2014 to 2016. Nation's 59 <sup>th</sup> (annual) and 99 <sup>th</sup> (decade) fastest growing county (percentagewise).
Mecklenburg	1,054,835	1	Growth of 135,207 people (14.7 %) between 4/1/2010 and 7/1/2016. Nation's 72 <sup>nd</sup> (decade) fastest growing county (percentagewise).
Pender	59,090	46	Growth of 1,410 people (2.4 %) from 2015 to 2016. Nation's 125 <sup>th</sup> (annual) and 108 <sup>th</sup> (decade) fastest growing county (percentagewise).
Union	226,606	8	Growth of 25,314 people (12.6 %) from April 1, 2010, to July 1, 2016. Nation's 124 <sup>th</sup> (decade) fastest growing county.
Wake	1,046,791	2	Growth of 24,817 people (2.4 %) from 2015-2016. Nation's 59 <sup>th</sup> (decade) fastest growing county.



**Figure 2. Estimated Percentage Growth by County from 2015 to 2016**



**Figure 3. Estimated Rate of Growth by County from April 2010 to July 2016**

*A. Monitors that were or are Scheduled to Start Up or Shut Down in 2016, 2017 or 2018 that were not included in the 2016-2017 Network Plan*

Table 2 presents a list of monitors that were or are expected to start up or shut down in 2016, 2017 or 2018 that were not included in the 2016-2017 network plan listed by metropolitan statistical area, MSA and AQS site identification number. Changes to the monitors operated by Mecklenburg County Air Quality are discussed in Appendix B. 2017 Annual Monitoring Network Plan for Mecklenburg County Air Quality. Changes to the monitors operated by Forsyth County are discussed in Appendix C. 2017 Annual Monitoring Network Plan for Forsyth County Office of Environmental Assistance and Protection. The only changes discussed here are those applying to the monitoring sites listed in the table that are operated by the DAQ, Duke and WNC.

**Table 2. Summary of Monitors Scheduled to Start Up or Shut Down in 2016, 2017, or 2018 that were not included in the 2016-2017 Network Plan**

Metropolitan Statistical Area	AQS Site Id Number	Site Name	Monitor or Pollutant	Proposed Change	Time Frame
Charlotte-Concord-Gastonia	371590021	Rockwell	NO <sub>y</sub>	Monitoring ended	11/03/2016
			Nitrate	Monitoring ended	11/04/2016
			Aethalometer	Monitoring ended	08/08/2016
Asheville	370210036	Skyland DRR	SO <sub>2</sub>	Monitor will start operating to meet the requirements in the SO <sub>2</sub> data requirements rule	1/6/2017

**Table 2. Summary of Monitors Scheduled to Start Up or Shut Down in 2016, 2017, or 2018 that were not included in the 2016-2017 Network Plan**

Metropolitan Statistical Area	AQS Site Id Number	Site Name	Monitor or Pollutant	Proposed Change	Time Frame
Myrtle Beach – Conway – North Myrtle Beach		South Port DRR	SO <sub>2</sub>	Monitor will start operating to meet the requirements in the SO <sub>2</sub> data requirements rule	1/1/2017
Wilmington	371290006	New Hanover	SO <sub>2</sub>	PWEI monitor no longer required so monitoring will end	12/31/2017

<sup>a</sup> Operated by Mecklenburg County Air Quality

<sup>b</sup> Operated by Duke Progress Energy

1. Monitoring Changes in the Charlotte-Concord-Gastonia MSA

Changes occurring in the Charlotte-Concord-Gastonia MSA being made by Mecklenburg County Air Quality to the monitors they operate are discussed in Appendix B. 2017 Annual Monitoring Network Plan for Mecklenburg County Air Quality. The three monitors in this MSA that DAQ shut down in 2016 are discussed here.

The continuous fine particle nitrate monitor and aethalometer as well as a reactive-oxides of nitrogen monitor at **Rockwell** were shut down in 2016 due to staffing considerations, the age of the equipment and the decision that additional data provided by these monitors were not needed for planning purposes. The DAQ operated these monitors to provide information for air quality planning and to evaluate state regulations. These monitors were not required by 40 CFR 58 Appendix D or any other EPA regulations. The DAQ shut down the aethalometer on Aug. 8, 2016, because the monitor broke and was removed from service.



**Figure 4. The Rockwell ozone monitoring site**

2. Monitoring Changes in the Asheville MSA

In 2015, the North Carolina Division of Air Quality, DAQ began working with Duke Energy Progress to establish a sulfur dioxide monitoring station in Arden to characterize the ambient sulfur dioxide concentrations near the Asheville steam station as required by the data requirements rule for sulfur dioxide.<sup>3</sup> Further details are available in

<sup>3</sup> Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard, Federal Register of Aug. 21, 2015, (80 FR 51052) (FRL-9928-18-OAR), 2015-20367.

Section IV. Sulfur Dioxide Monitoring Network, Facilities Subject to the SO<sub>2</sub> Data Requirements Rule, DRR and in Volume 2 A. The Asheville Monitoring Region, Appendix A-3. Duke Progress Energy Skyland Siting Analysis and Additional Site Information. This monitoring site was made available for public comment from mid-November to mid-December 2016 as an addendum to the 2016-2017 Network Monitoring Plan and submitted to the EPA on Dec. 28, 2016. The EPA approved the monitoring site on April 27, 2017. The approval letter is provided in Appendix D. EPA Approval Letter for 2016-2017 Network Plan Addendum for the Skyland DRR Monitoring Site.

### 3. Monitoring Changes in the Myrtle Beach-Conway-North Myrtle Beach MSA

In 2016, the DAQ began working with the [CPI USA North Carolina - Southport Plant](#) to establish a sulfur dioxide monitoring station in Southport to characterize the ambient sulfur dioxide concentrations near the CPI facility as required by the data requirements rule for sulfur dioxide.<sup>4</sup> Further details are available in Section IV. Sulfur Dioxide Monitoring Network, Facilities Subject to the SO<sub>2</sub> Data Requirements Rule, DRR and in Volume 2 G. The Wilmington Monitoring Region, Appendix G-3. CPI Southport Siting Analysis and Additional Site Information. This monitoring site was made available for public comment during August 2016 as an addendum to the 2016-2017 Network Monitoring Plan and submitted to the EPA on Sept. 1, 2016. The EPA approved the monitoring site on Dec. 15, 2016. The approval letter is provided in Appendix E. 2016-2017 Network Plan EPA Approval Letter.

In 2017, the CPI - Southport facility proposed changes at the facility to include raising the physical stack heights of Units 1 and 2 by approximately 9.14 meters. Based on modeling done using the higher stack heights, the Southport DRR monitor will still be appropriately sited to record maximum sulfur dioxide concentrations near the CPI-Southport facility. See the memorandum provided in **Error! Reference source not found.** for more details. The DAQ requests EPA approval of the current site for characterizing emissions near the facility after the modifications are complete.

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<sup>4</sup> Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard, Federal Register of Aug. 21, 2015, (80 FR 51052) (FRL-9928-18-OAR), 2015-20367.

DIVISION OF AIR QUALITY  
April 10, 2017

**MEMORANDUM**

TO: John Evans, Chief, Ambient Monitoring Section

FROM:  Tom Anderson, Supervisor, Air Quality Analysis Branch (AQAB)

THROUGH: William Willets, Chief, Permitting Section  


SUBJECT: Justification for the Continued Operation of SO<sub>2</sub> Monitor Near Capital Power USA (CPI)  
Facility ID - 1000067  
Southport, NC Brunswick County

Pursuant to the requirements of the 2015 SO<sub>2</sub> Data Requirements Rule, an ambient SO<sub>2</sub> monitor was sited and is currently operating near the Capital Power USA (CPI) facility in Southport, Brunswick County, NC. Recent modeling has been conducted by the facility to evaluate the impacts of proposed changes at the facility to include raising the physical stack heights of Units 1 and 2 by approximately 30 feet (9.14 meters). The updated modeling including the proposed increases in stack heights results in a shift in the predicted 1-hour design impact location for SO<sub>2</sub>. The newly-predicted maximum design impact is located closer to the SO<sub>2</sub> monitor location than the previously-predicted maximum impact; the maximum predicted design value is situated just 100 meters westward and 100 meters southward of the monitor. Therefore, there is continued justification that the SO<sub>2</sub> monitor is sufficiently sited to adequately monitor ambient SO<sub>2</sub> concentrations in the area surrounding CPI.

cc: Brad Newland, WIRO  
Mike Abraczinskas  
Sushma Masemore  
Nancy Jones  
Alex Zarnowski

**Figure 5. Memo justifying the Southport DRR sulfur dioxide monitor location**

**4. Monitoring Changes in the Wilmington MSA**

On Jan. 1, 2013, the New Hanover site became the required population weighted emission inventory, PWEI, site for the Wilmington MSA. However, based on the 2014 National Emission Inventory<sup>5</sup> and 2016 population estimates,<sup>6</sup> the PWEI value for Wilmington is now under the 5,000-threshold for PWEI monitoring. (See Table 8.)

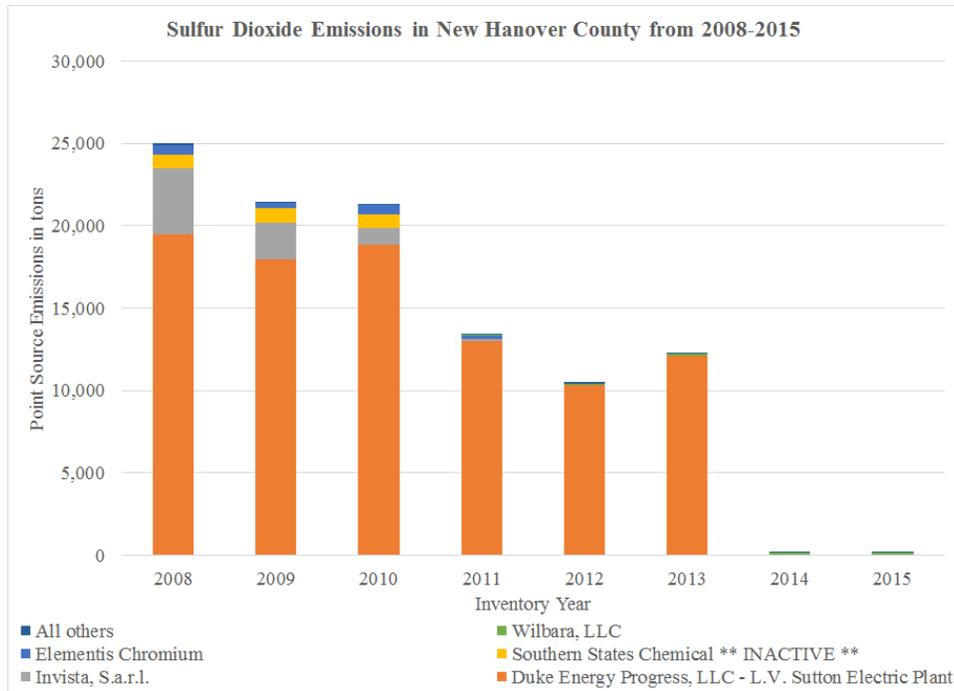
As shown in Figure 6, sulfur dioxide point source emissions have dramatically decreased in New Hanover County in the last eight years. Point source emissions

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<sup>5</sup> 2014 National Emission Inventory, Version 1, All Sectors: National-County/Tribe aggregated, Released December 2016, available on the world wide web at <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>. Accessed Jan. 4, 2017.

<sup>6</sup> Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016, U.S. Census Bureau, Population Division, Released March 23, 2017, available on the world wide web at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkml>.

dropped from 25,000 tons in 2008<sup>7</sup> to 240 tons in 2015.<sup>8</sup> Most of this decrease occurred because the Duke Energy Progress Sutton Steam Station converted from burning coal to using natural gas.<sup>9</sup> Additional reductions occurred with the closing of Southern States Chemical in 2010 and the addition of controls on other facilities.



**Figure 6. Sulfur dioxide point source emissions in New Hanover County**

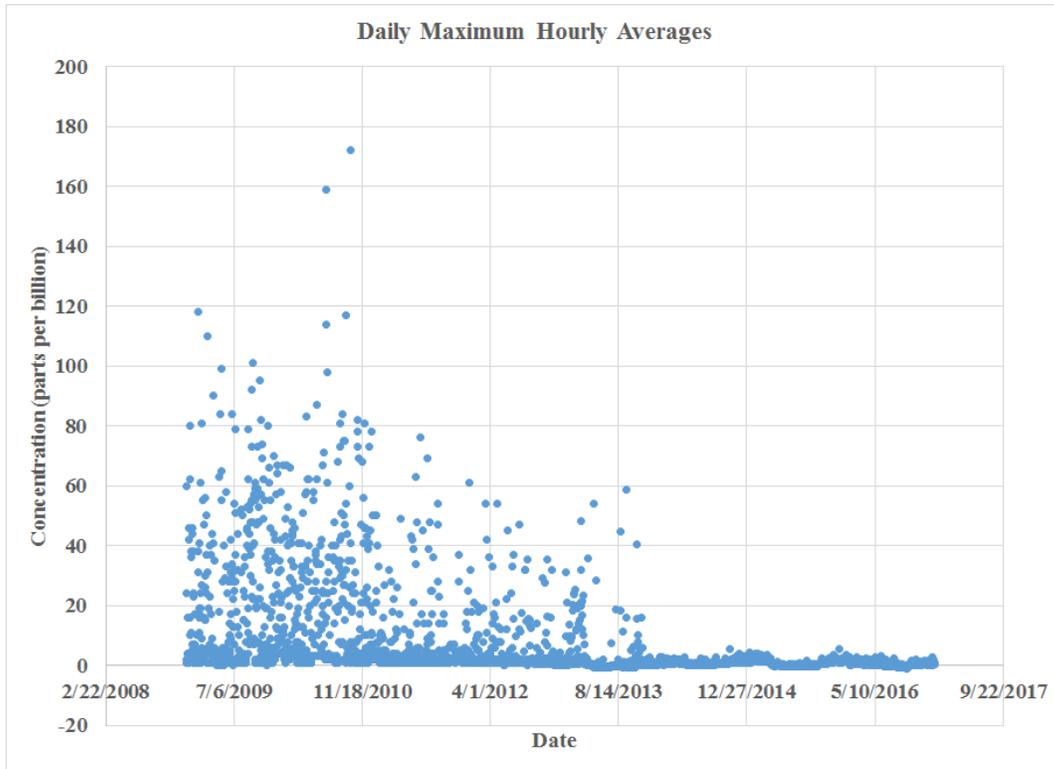
Due to the drastic reductions in emissions in New Hanover County the sulfur dioxide values measured at the New Hanover sulfur dioxide monitoring site have also decreased drastically as shown in Figure 7. Since late 2013 the measured concentrations at New Hanover have been less than 20 parts per billion. These drastic decreases in measured concentrations have resulted in the design value plummeting to less than 10 parts per billion as shown in Figure 8. The monitor has been attaining the standard for the last five years and is way below 80 percent of the NAAQS. The DAQ anticipates the concentrations at the New Hanover site will continue to be low into the future as the sulfur dioxide emissions in the county are under 300 tons and not expected to ever increase back to their former levels.

<sup>7</sup> North Carolina Point Source Emission Report, available from the world wide web at [https://xapps.ncdenr.org/aq/ToxicsReport/ToxicsReportFacility.jsp?ibeam=true&year=2008&pollutant=264&county\\_code=129](https://xapps.ncdenr.org/aq/ToxicsReport/ToxicsReportFacility.jsp?ibeam=true&year=2008&pollutant=264&county_code=129). Accessed May 12, 2017.

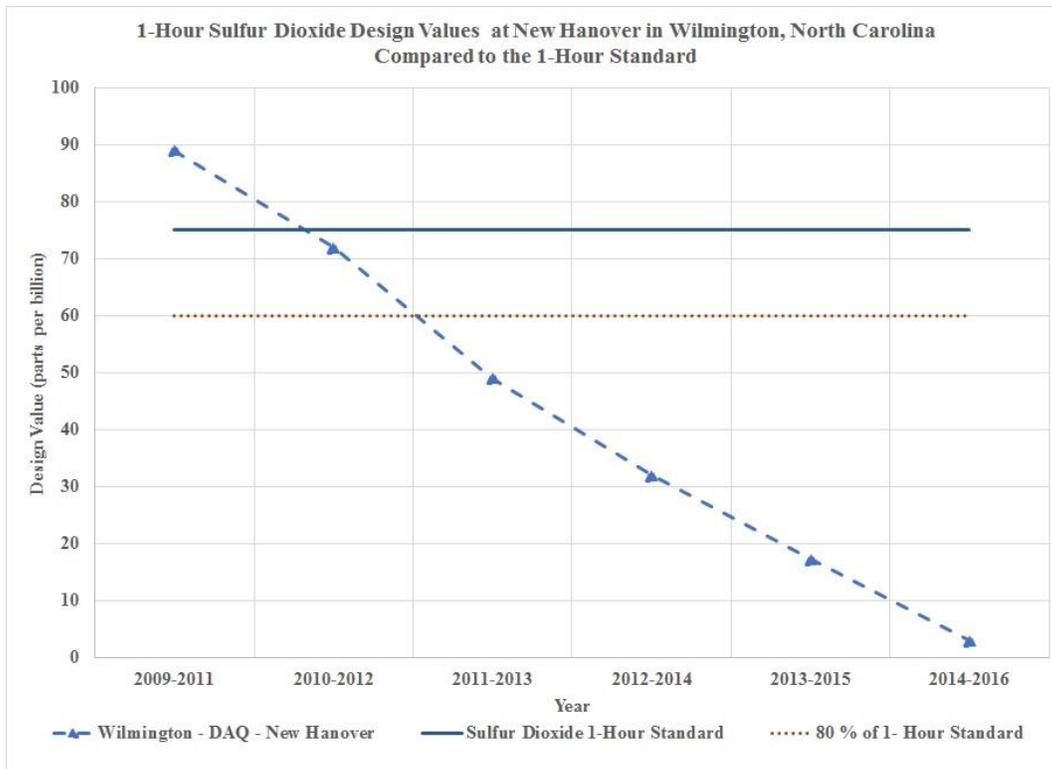
<sup>8</sup> North Carolina Point Source Emission Report, available from the world wide web at [https://xapps.ncdenr.org/aq/ToxicsReport/ToxicsReportFacility.jsp?ibeam=true&year=2015&pollutant=264&county\\_code=129](https://xapps.ncdenr.org/aq/ToxicsReport/ToxicsReportFacility.jsp?ibeam=true&year=2015&pollutant=264&county_code=129). Accessed May 12, 2017.

<sup>9</sup> Duke Energy Progress, *Sutton Plant implosion showcases Duke Energy transition to cleaner energy in the Carolinas*, Nov. 9, 2016, available on the worldwide web at <https://news.duke-energy.com/releases/sutton-plant-implosion-showcases-duke-energy-transition-to-cleaner-energy-in-the-carolinas>, accessed May 12, 2017.

Since the property owner shut down operations at the site where the monitor is located, brush has begun to grow up and soon the monitor will no longer meet 40 CFR 58 Appendix E requirements. Due to the low measured concentrations at the site, the design value attaining the standard for five years and being less than 80 percent of the NAAQS, the reduced sulfur dioxide emissions in the county, the need for a PWEI monitor in the MSA going away and challenges maintaining the site, the DAQ plans to shut down the New Hanover sulfur dioxide monitor on Dec. 31, 2017, if the EPA concurs.



**Figure 7. Plot of the maximum hourly average for each day from 2009 to 2016**



**Figure 8. Recent design values measured at the New Hanover site**

*B. Sites to be Relocated or Moved*

No sites were relocated or moved between the 2016 and 2017 ozone seasons. The DAQ does not anticipate moving any sites in the next 18 months.

*C. Changes to the Methods Used to Measure Fine Particles for Comparison to the NAAQS*

From 1999 until the end of 2015, the DAQ used an R & P Model 2025 PM<sub>2.5</sub> Sequential Monitor with a WINS impactor, Air Quality System, AQS, method code 118 and EPA reference method designation RFPS-0498-118 for determining compliance with the fine particle NAAQS for all but three of its sites. Starting on Jan. 1, 2016, the DAQ switched to using an R & P Model 2025 PM<sub>2.5</sub> Sequential Monitor with a very sharp cut cyclone, AQS method code 145 and EPA reference method designation RFPS-1006-145. The DAQ used a Ruprecht & Patshneck (R & P) TEOM Series 1400a for continuous, averaged on an hourly basis, measurement of fine particles until January 2016. The TEOM was ineligible to become an equivalent method for fine particles because it does not work as well in other parts of the nation as it does in North Carolina. Reference and equivalent methods need to work the same throughout the nation. Also, the TEOM is no longer supported by the manufacturer so its continued operation was no longer feasible.

In early 2008, the Met One beta attenuation monitor, BAM 1020, was approved as a federal equivalent method, FEM. Since 2008, the DAQ purchased numerous BAM 1020s. In 2014, the DAQ established a new site at Blackstone in Lee County and added

BAM 1020s at the Lexington and Hickory sites. In 2015, the DAQ added a BAM 1020 at the Durham Armory and BAM 1022s at the Hickory, Mendenhall and William Owen sites. In 2016 the DAQ added BAMs at the Pitt County Agricultural Center, Spruce Pine and West Johnston sites. After one-to-two-year studies, four R & P Model 2025 PM2.5 sequential monitors have been replaced by BAM 1020s. These BAM monitors are located at the Lexington, 37-057-0002, Candor, 37-123-0001, Wilmington Castle Hayne, 37-129-0002, and Bryson City, 37-173-0002, monitoring sites. The Hickory R & P Model 2025 PM2.5 sequential monitor has been replaced by a BAM 1022. Table 3 lists the current sites with BAMs that are operating but not being compared to the NAAQS. On July 16, 2015, the EPA approved operating the Blackstone BAM 1020 as an AQI monitor only. See Appendix F. 2014-2015 Network Plan EPA Approval Letter. On Dec. 15, 2016, the EPA approved operating the Raleigh Millbrook BAM 1020 as an AQI monitor only. See Appendix E. 2016-2017 Network Plan EPA Approval Letter.

**Table 3. List of Monitoring Sites with Special Purpose Non-Regulatory and Air Quality Index Continuous Fine Particle Monitors**

<b>Metropolitan Statistical Area</b>	<b>AQS Site Id Number</b>	<b>Site Name</b>	<b>Proposed Change</b>	<b>Time Frame</b>
Charlotte-Concord-Gastonia	371190041	Garinger	Swapped out TEOM for a BAM 1020	4/1/2016
	371190042	Montclair	Will swap out TEOM for a BAM	1/1/2017
	371190045	Remount Road	Add BAM 1022	1/1/2017
Raleigh	371010002	West Johnston	Added BAM 1022	7/1/2016
	371830014	Millbrook	BAM 1020 converted to AQI only	1/1/2016
Greensboro-High Point	370810013	Mendenhall	Swapped out TEOM for a BAM 1022	12/1/2015
Durham-Chapel Hill	370630015	Durham Armory	Swapped out TEOM for a BAM 1020	5/31/2015
Asheville	370210034	Board of Education	Swapped out TEOM for a BAM 1022	1/1/2017
Fayetteville	370510009	William Owen	Swapped out TEOM for a BAM 1022	12/30/2015
Greenville	371470006	Pitt County Ag Center	Added BAM 1022	4/8/2016
None	371050002	Blackstone	BAM 1020 started	1/1/2014
	371210004	Spruce Pine	Added BAM 1022	1/1/2017

#### *D. Rotating Background Monitors*

The DAQ operates two rotating background monitoring networks for providing background concentration data for prevention of significant deterioration, PSD, modeling. PSD modeling is a federal requirement necessitating the collection of one calendar year of background data.<sup>10</sup> Monitors for sulfur dioxide, SO<sub>2</sub>, or PM<sub>10</sub> rotate to

<sup>10</sup> 42 U.S.C. United States Code, 2013 Edition Title 42 - THE PUBLIC HEALTH AND WELFARE CHAPTER 85 - AIR POLLUTION PREVENTION AND CONTROL SUBCHAPTER I - PROGRAMS AND ACTIVITIES Part C - Prevention of Significant Deterioration of Air Quality subpart i - clean air Sec. 7475 - Preconstruction requirements, available on the worldwide web at

these sites every three years. The rotating sites are selected to provide the greatest possible spatial coverage from the coastal plain to the foothills. Table 4 and Table 5 provide the background monitoring sites with their operating schedules.

#### *E. Current Waivers and New Requests*

Every five years DAQ is required to request that any existing waivers be renewed. This subsection describes existing waivers approved by the EPA as well as new requests for waivers and other actions.

##### *1. Current Waivers Approved by the EPA in 2015*

In 2015 the EPA approved the following waivers:

##### **Waiver for a PWEI Sulfur Dioxide Monitor in the Asheville MSA**

The population-weighted emission index, PWEI, for the Asheville MSA using the 2011 national emission inventory, NEI, and 2014 population estimates is 5074, just over the 5000-threshold for monitoring. Forty CFR Part 58, Appendix D, 4.4 states that “For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 1,000,000, a minimum of one SO<sub>2</sub> monitor is required within that CBSA.”<sup>11</sup> The EPA's previous calculations show the Asheville PWEI to be below the PWEI threshold for requiring a sulfur dioxide monitor. The DAQ is electing to conduct sulfur dioxide monitoring in the Asheville CBSA beginning in 2017 under the Data Requirements Rule.<sup>12</sup> The EPA is working with DAQ to determine the appropriate sulfur dioxide monitoring requirements for this CBSA. The EPA granted a waiver for the PWEI sulfur dioxide monitoring requirement for 2016, so that the DAQ, the Western North Carolina Regional Air Quality Agency, WNCRAQA, and the EPA can determine the appropriate sulfur dioxide monitoring requirements for this CBSA.<sup>13</sup> DAQ has addressed the sulfur dioxide monitoring requirements for the Asheville CBSA elsewhere in the network plan. The version 1 of the 2014 NEI was released in December 2016.<sup>14</sup> Calculations using the 2014 NEI and 2016 population estimates results in a PWEI value of 4188, which is below the 5,000-threshold.

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<https://www.gpo.gov/fdsys/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partC-subparti-sec7475.htm>.

<sup>11</sup> Title 40: Protection of Environment, PART 58—AMBIENT AIR QUALITY SURVEILLANCE, APPENDIX D TO PART 58—NETWORK DESIGN CRITERIA FOR AMBIENT AIR QUALITY MONITORING, available on the worldwide web at [http://www.ecfr.gov/cgi-bin/text-idx?SID=da14c4661eddf14519d93a82e410ec9&mc=true&node=ap40.6.58\\_161.d&rgn=div9](http://www.ecfr.gov/cgi-bin/text-idx?SID=da14c4661eddf14519d93a82e410ec9&mc=true&node=ap40.6.58_161.d&rgn=div9).

<sup>12</sup> Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO<sub>2</sub>) Primary National Ambient Air Quality Standard (NAAQS), Federal Register, Vol. 80, No. 162, Friday, Aug. 21, 2015, pp 51052- 51088, available on the worldwide web at <https://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf>.

<sup>13</sup> 2015 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, p7, available at <http://xapps.ncdenr.org/air/documents/DocsSearch.do?dispatch=download&documentId=7440>.

<sup>14</sup> United States Environmental Protection Agency , 2014 National Emission Inventory, Version 1, All Sectors: National-County/Tribe aggregated, Released December 2016, available on the world wide web at <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>. Accessed Jan. 4, 2017.

**Table 4 The 2017-2019 Rotating Background Sulfur Dioxide Monitoring Network**

<b>AQS Site Id Number:</b>	37-157-0099	37-051-0010	37-027-0003	37-117-0001
<b>Site Name:</b>	Bethany	Honeycutt E.S.	Lenoir	Jamesville
<b>Street Address:</b>	6371 NC 65	4665 Lakewood Drive	291 Nuway Circle	1210 Hayes Street
<b>City:</b>	Bethany	Fayetteville	Lenoir	Jamesville
<b>Latitude:</b>	36.308889	35.00	35.935833	35.810690
<b>Longitude:</b>	-79.859167	-78.99	-81.530278	-76.897820
<b>MSA, CSA or CBSA represented:</b>	Greensboro-High Point	Fayetteville	Hickory	Not in an MSA
<b>Monitor Type:</b>	Special purpose	Special purpose	Special purpose	Special purpose
<b>Operating Schedule:</b>	Hourly- every third year	Hourly- every third year	Hourly – every third year	Hourly – every third year
<b>Statement of Purpose:</b>	Industrial expansion monitoring for PSD modeling.			
<b>Monitoring Objective:</b>	General/ background	Population exposure	General/ background	Upwind/ background general/ background
<b>Scale:</b>	Urban	Neighborhood	Regional	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	No	No	No	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Is operating 5/2017 to 4/2018	Will operate 8/1/2018 to 7/31/2019	Operated 4/2016 to 3/2017	Operated 4/2016 to 3/2017

**Table 5 The 2017-2019 Rotating Background PM<sub>10</sub> Monitoring Network**

<b>AQS Site Id Number:</b>	37-003-0005	37-129-0002	37-033-0001	37-107-0004	37-117-0001	371230001
<b>Site Name:</b>	Taylorsville-Liledoun	Castle Hayne	Cherry Grove	Lenoir Community College	Jamesville	Candor
<b>Street Address:</b>	700 Liledoun Road	6028 Holly Shelter Road	7074 Cherry Grove Road	231 Highway 58 S	1210 Hayes Street	112 Perry Drive
<b>City:</b>	Taylorsville	Castle Hayne	Reidsville	Kinston	Jamesville	Candor
<b>Latitude:</b>	35.9139	34.364167	36.307033	35.231459	35.810690	35.262490
<b>Longitude:</b>	-81.191	-77.838611	-79.467417	-77.568792	-76.897820	-79.836613
<b>MSA, CSA or CBSA represented:</b>	Hickory	Wilmington	Not in an MSA	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	Special purpose	Special Purpose				
<b>Operating Schedule:</b>	Hourly 3-year rotation	Every 6 <sup>th</sup> day 3-year rotation	Hourly 3-year rotation	Hourly 3-year rotation	Hourly 3-year rotation	Hourly 3-year rotation
<b>Statement of Purpose:</b>	Industrial expansion monitoring for PSD modeling	Industrial expansion monitoring for PSD modeling.	Industrial expansion monitoring for PSD modeling			
<b>Monitoring Objective:</b>	General/ background	General/ background	Population exposure general/ background	Population exposure general/ background	Upwind/ background general/ background	Population exposure general/ background
<b>Scale:</b>	Urban	Urban	Urban	Neighborhood	Urban	Regional
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	EQPM-0798-122	RFPS-1298-127	EQPM-0798-122	EQPM-0798-122	EQPM-0798-122	EQPM-0798-122
<b>Meets Requirements of Part 58 Appendix D:</b>	No	No	No	No	No	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Operated 4/1/2016 to 3/31/2017	Is operate 10/15/2016 to 10/31/2017	Operate 4/1/2016 to 3/31/2017	Is operating 5/1/2017 to 4/30/2018	Will operate 6/1/2018 to 5/31/2019	Is operating 5/1/2017 to 4/30/2018

### Waiver for Lead Monitoring at St. Gobain Containers

40 CFR Part 58, Appendix D, 4.5 requires that “At a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year ...”<sup>15</sup> Section 4.5(a)(ii) provides the following provisions for a waiver of the lead monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the state or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50 percent of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every *five* years as part of the network assessment required under 58.10(d).”<sup>16</sup>

In its approval of the state's 2011 Network Plan, pursuant to the provisions of the above section, the EPA granted waivers of the source-oriented ambient air monitoring requirements at two sources: Blue Ridge Paper Products, Inc. in Canton and Saint Gobain Containers in Wilson.<sup>17</sup> The waivers must be renewed every five years as part of the network assessment required under 40 CFR §58.10(d).

The Saint Gobain Containers facility is the only facility in North Carolina with 2011 National Emissions Inventory lead emissions over 0.5 tons per year.<sup>18</sup> This facility is estimated to emit 0.53 tons per year. The 2011 modeling of this facility used lead emissions of 1.3 tons per year. The EPA believes that the previously submitted modeling is sufficiently conservative and approved the renewal of the source-oriented ambient air lead monitoring requirements at Saint Gobain Containers in Wilson for five years, until 2020.<sup>19</sup>

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<sup>15</sup> Title 40: Protection of Environment, [PART 58—AMBIENT AIR QUALITY SURVEILLANCE, APPENDIX D TO PART 58—NETWORK DESIGN CRITERIA FOR AMBIENT AIR QUALITY MONITORING](#), available on the worldwide web at [http://www.ecfr.gov/cgi-bin/text-idx?SID=da14c4661eddf14519d93a82e410ec9&mc=true&node=ap40.6.58\\_161.d&rgn=div9](http://www.ecfr.gov/cgi-bin/text-idx?SID=da14c4661eddf14519d93a82e410ec9&mc=true&node=ap40.6.58_161.d&rgn=div9).

<sup>16</sup> *ibid.*

<sup>17</sup> 2011 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, p4, available at <http://xapps.ncdenr.org/air/documents/DocsSearch.do?dispatch=download&documentId=7843>.

<sup>18</sup> 2011 National Emission Inventory, NEI, Data, available on the worldwide web at <https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data>.

<sup>19</sup> 2015 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, p7, available at <http://xapps.ncdenr.org/air/documents/DocsSearch.do?dispatch=download&documentId=7440>.

### **Waiver for the Second PM<sub>10</sub> Monitor in Raleigh**

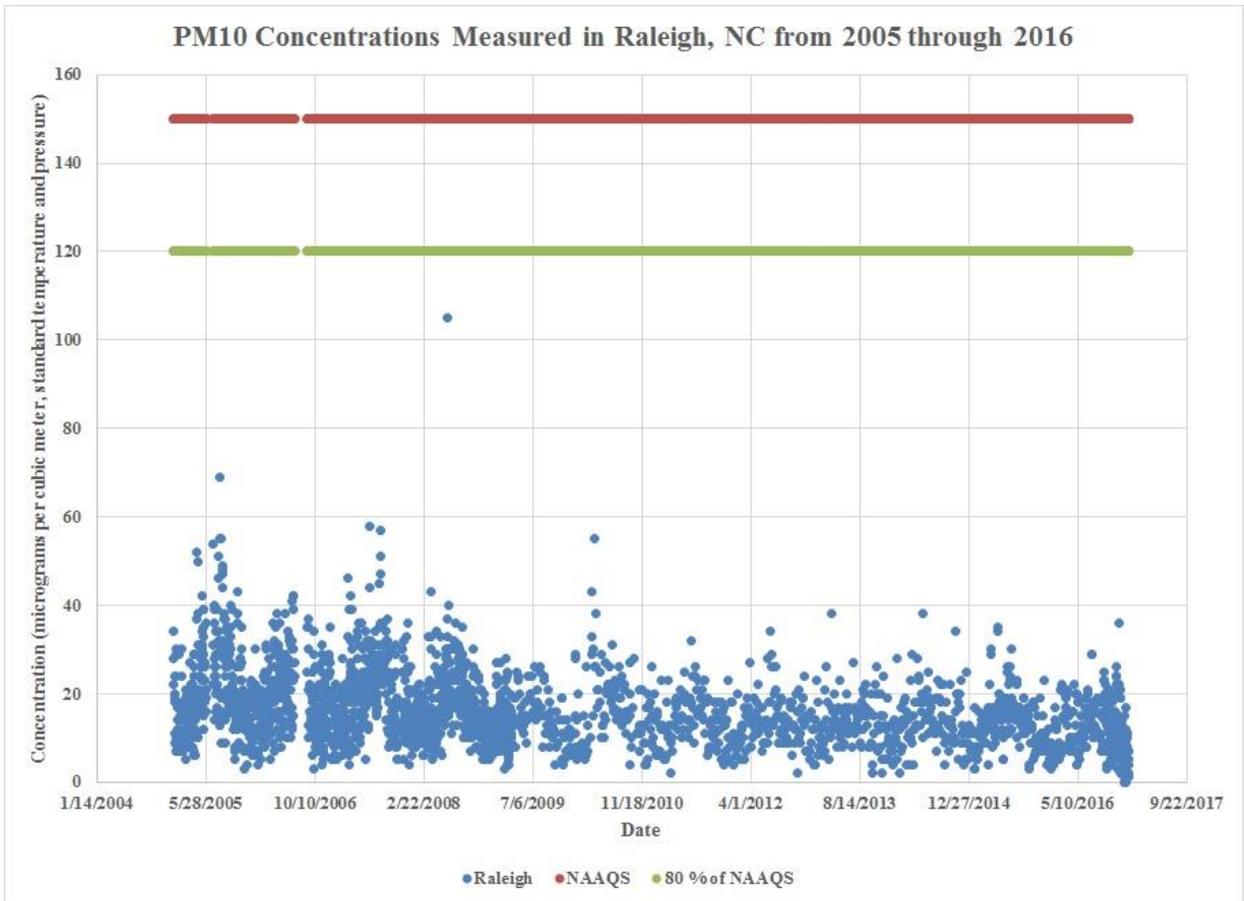
In 2015, the DAQ requested that the waiver for the second PM<sub>10</sub> monitor in Raleigh be renewed. Other than changing to a low volume method in 2009 to meet NCore requirements, nothing changed with PM<sub>10</sub> in the Raleigh area within the past decade. As shown in Figure 9 all the measured concentrations are less than 80 percent of the NAAQS and all but two concentrations measured in the past decade are less than 40 percent of the NAAQS. As such, there is no danger of exceeding the NAAQS. In addition, PM<sub>10</sub> has not been responsible for determining what the air quality index will be in the Raleigh MSA during 2012, 2013, 2014, 2015, or 2016.<sup>20</sup> Thus, the PM<sub>10</sub> concentrations in Raleigh are not expected to cause any harm to people's health and wellbeing. The DAQ point source emission inventory for PM<sub>10</sub> reports 131 facilities in the Raleigh MSA emitting 529.3 tons of PM<sub>10</sub> in 2015. This number is down from 143 facilities reporting 781.7 tons of PM<sub>10</sub> emissions in 2008.<sup>21</sup> For these reasons as well as because the state is working with limited resources to meet additional monitoring requirements for sulfur dioxide, carbon monoxide and fine particles in 2017, the DAQ requested that the waiver for the second PM<sub>10</sub> monitor in the Raleigh MSA be renewed. Since PM<sub>10</sub> levels have been significantly lower than the NAAQS for the last decade, the EPA granted a waiver of the requirement for a second PM<sub>10</sub> monitor in the Raleigh MSA.<sup>22</sup>

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<sup>20</sup> Air quality index summary information is available on the worldwide web at <https://www.epa.gov/outdoor-air-quality-data/air-quality-index-report>.

<sup>21</sup> NC DAQ - North Carolina Point Source Emissions Report, Available on the world wide web at <https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overrideType=All&toxics=263&sortorder=103>.

<sup>22</sup> 2015 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, p7, available at <http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=7440>.



**Figure 9. PM<sub>10</sub> concentrations measured in Raleigh from 2005 through 2016**

### **Waiver Request for Third Fine Particle NAAQS Monitor in the Raleigh MSA**

The 2012-2014 annual fine particle design value for the Raleigh MSA was 86 percent of the standard, requiring the Raleigh MSA to add a third fine particle monitor. Because the MSA will be adding a third fine particle monitor in 2017 at the near road site, the EPA approved a waiver for the third fine particle monitor for 2016.<sup>23</sup> The 2014-2016 design value for the MSA is now below the 85 percent threshold.

### **Waiver Request for Millbrook Meteorological Tower**

In 2015 the DAQ requested the waiver for the meteorological tower at the East Millbrook Middle School NCore site be renewed. This site has been in operation since 1989. The tower is located approximately due south and 15.5 meters from the shelters that house the various monitors, see Figure 10. The wind direction/speed sensors are located at a height of 10 meters above ground and the relative humidity sensor is located at two meters. Ambient temperature sensors are located at 2 meters and 10 meters above ground. The tower is in an open, grassy area that is free from any obstructions in a 270° arc to the

<sup>23</sup> 2015 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, p9, available at <http://xapps.ncdenr.org/air/documents/DocsSearch.do?dispatch=download&documentId=7440>.

prevailing winds that come from the south/west direction. The tower is positioned 15.5 meters from the shelters on a 3 percent uphill grade. This grade adds approximately one meter to the height of the tower above the shelters. This siting does not meet the EPA requirement for the tower being a distance 10 times the height of the shelter, which is 3.7 meters. Additionally, a single tree, approximately 7 meters tall, is located 18 meters to the south southwest of the tower. Since the position of the meteorological tower is free from any obstructions in a 270° arc to the prevailing winds that come from the south and west direction, DAQ is confident the measurements are representative of meteorological conditions at the site. The state, therefore, requests that the EPA renew the waiver and deem the position of the tower to be acceptable.



**Figure 10. Millbrook NCore Site**  
(from City of Raleigh and Wake County iMAPS, <http://maps.raleighnc.gov/iMAPS/> )

## 2. Current Waivers Approved by the EPA in 2016

In 2016 the EPA approved the following waiver requests:

### **Waiver Request for March 1 Start of the Ozone Season at Remote Sites**

The 2016 ozone monitoring season for North Carolina was April through October. EPA's 2015 ozone rule extended this season from March through October. In 2016 North Carolina requested that the ozone season for the high elevation mountain sites remain at April through October.

DAQ's concern was that the remote high elevation sites might not be accessible for a March start date. The roads are sometimes not passable, or closed by federal or local authorities, well into March due to winter weather conditions, e.g., ice, snow, fallen trees or rocks, damage to the driving surface, etc. The earlier start date would require DAQ to get to the mountain tops in February to calibrate equipment and perform other quality assurance, QA, functions. Depending on the weather it may be possible in some years. In other years, it is questionable whether it could be done safely, if at all.

The specific sites covered by this request and their elevations above sea level:

- Linville Falls, AQS site 37-011-0002, 3,238 feet.
- Joanna Bald, AQS site 37-075-0001, 4,688 feet;
- Frying Pan, AQS site 37-087-0035, 5,200 feet;
- Purchase Knob, AQS site 37-087-0036, 5,085 feet;
- Mt. Mitchell, AQS site 37-199-0004, 6,502 feet.

The current regulation, 40 CFR Part 58, Appendix D, Section 4.l(i) gives Region IV the authority to approve a deviation to the ozone monitoring season.

In EPA's "Guideline for Selecting and Modifying the Ozone Monitoring Season Based on an 8-hour Ozone Standard" (EPA-454R-98-001), it is noted:

“For the initial formulation of the ozone monitoring season ... The basic premise was that areas with monthly mean maximum temperatures predominantly below 55 degrees Fahrenheit (F) are expected to have hourly concentrations less than 0.08 ppm...”

North Carolina used to operate meteorology stations at two of the five sites, Joanna Bald and Linville. The monthly mean maximum temperature for March for 2007 to 2011 was 53 degrees F at Joanna Bald and 55 degrees F at Linville, the lowest elevation of the five sites. Additionally, data from the North Carolina State Climate Office show the highest monthly mean maximum temperatures are about 9 degrees F colder in February when DAQ would be accessing these remote mountain areas to recalibrate equipment and perform other QA functions.

DAQ does operate three of these sites year-round, Purchase Knob, Joanna Bald and Frying Pan. However, DAQ cannot always get to the sites to perform QA functions during the winter, so DAQ does not report or certify the off-season data. The monitors run simply to provide raw, invalidated data for public information on the National Park Service's Great Smoky Mountains National Park and U.S. Forest Service's websites.

Based on these considerations, DAQ requested that Linville Falls, Joanna Bald, Frying Pan, Purchase Knob and Mount Mitchell be exempt from ozone monitoring earlier than April. This waiver to the ozone monitoring requirements will ensure a measure of safety to DAQ staff and assist DAQ in planning and managing limited resources.

The EPA approved DAQ's request and granted a waiver due to accessibility issues and since temperatures are typically colder in March at these sites than at other sites in the network.<sup>24</sup> However, the EPA requested that the DAQ begin monitoring at these sites as soon as access and weather permits but no later than April 1 of each year.

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<sup>24</sup> 2016 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, Dec. 16, 2016, p 2-5, available at <http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=8964>.

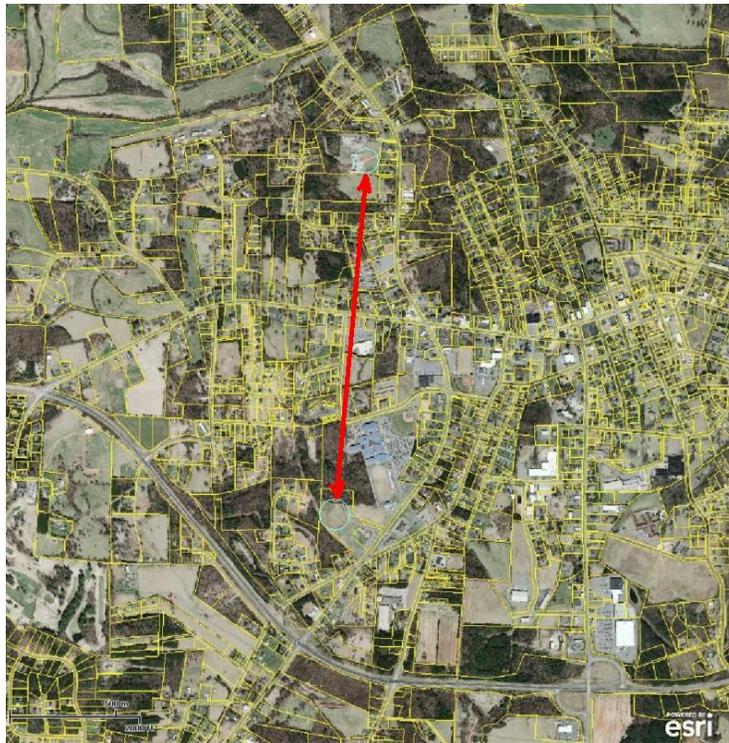
**Request Permission to Combine Ozone Data for Design Value Calculations for the Monitors at Waggin Trail, 37-003-0004 and Taylorsville Liledoun, 37-003-0005 and Honeycutt, 37-051-0010 and Golfview, 37-051-1003**

The DAQ requests approval to combine data from the discontinued Waggin Trail site, 37-003-0004, with the relocated Taylorsville Liledoun site, 37-003-0005, for calculating a design value for a relocated site in accordance with 40CFR Part 50 Appendix U(2)(c):

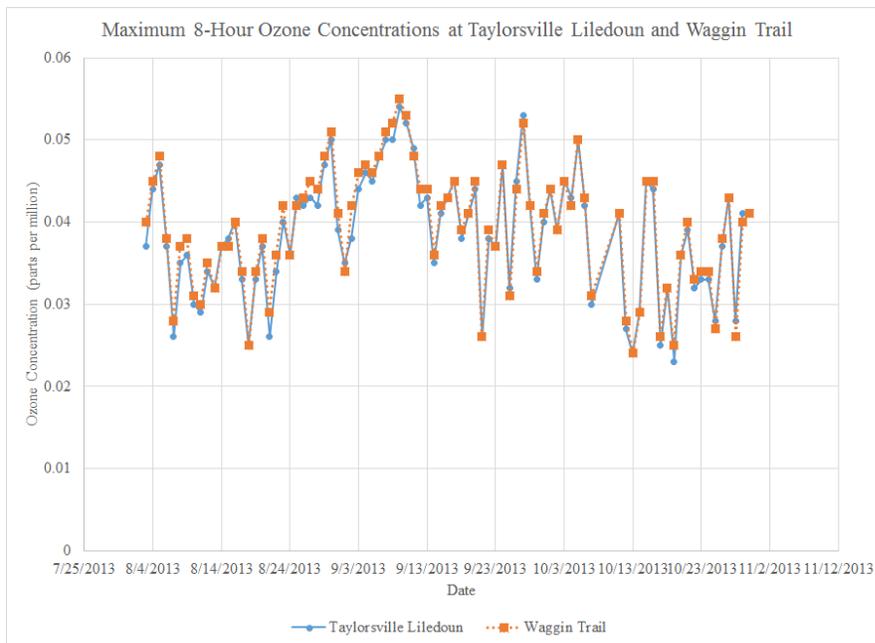
“In certain circumstances, including but not limited to site closures or relocations, data from two nearby sites may be combined into a single site data record for the purpose of calculating a valid design value. The appropriate Regional Administrator may approve such combinations after taking into consideration factors such as distance between sites, spatial and temporal patterns in air quality, local emissions and meteorology, jurisdictional boundaries and terrain features.”

**As shown in**

Figure 11, the Taylorsville Liledoun site is approximately 1.6 kilometers south from where the Waggin Trail site was located. The monitors operated simultaneously from Aug. 2, 2013 through Oct. 30, 2013, and as shown in Figure 12 are representative of the same air shed in the Hickory area. Thus, this request meets the relocation requirements of 40 CFR § 58.14(c)(6) and the data from these two sites should be eligible to be combined for design value calculations as described in 40 CFR § 50 Appendix U(2)(c).



**Figure 11. Relationship between Waggin Trail site and Taylorsville Liledoun Site**



**Figure 12. Comparison of maximum daily 8-hour ozone concentrations**

The DAQ also requests approval to combine data from the discontinued Golfview site, 37-051-1003, with the relocated Honeycutt site, 37-051-0010, for calculating a

design value for a relocated site in accordance with 40CFR Part 50 Appendix U(2)(c). As shown in

Figure 13, the Honeycutt site is approximately 9 Kilometers northwest from where the Golfview site was located. Because of the timing of the request, the two monitors could not be operated simultaneously. However, the two monitors are representative of the same air shed in the Fayetteville area based on distance between sites, spatial and temporal patterns in air quality, local emissions and meteorology, jurisdictional boundaries and terrain features. Thus, this request meets the relocation requirements of 40 CFR § 58. I 4(c)(6) and the data from these two sites should be eligible to be combined for design value calculations as described in 40 CFR § 50 Appendix U(2)(c).

**Figure 13. Location of Honeycutt site, no dot, in relation to Golfview, dot**

### 3. New Waiver and Other Requests

The DAQ makes the following requests:

- A waiver for exclusion of BAM data from nonattainment determinations for William Owen, 37-051-0009, the Durham Armory, 37-063-0015, Pitt Ag Center, 37-147-0006, and Raleigh; 37-183-0014;
- For permission to operate the federal reference monitors at Board of Education, 37-021-0034, and Pitt Ag Center, 37-147-0006 on a one-in-six-day schedule; and
- A waiver for the trees behind the monitor at the Triple Oak near-road monitoring station in Raleigh.



### **Renewal Request for Exclusion of BAM Data from Nonattainment Determinations**

DAQ requests permission to exclude BAM data from nonattainment determinations for BAMs at William Owen, 37-051-0009, the Durham Armory, 37-063-0015, Pitt Ag Center, 37-147-0006, and Raleigh; 37-183-0014. The request for excluding these data is provided in **Appendix G. Request for Exclusion of PM2.5 Continuous FEM data from Comparison to the NAAQS.**

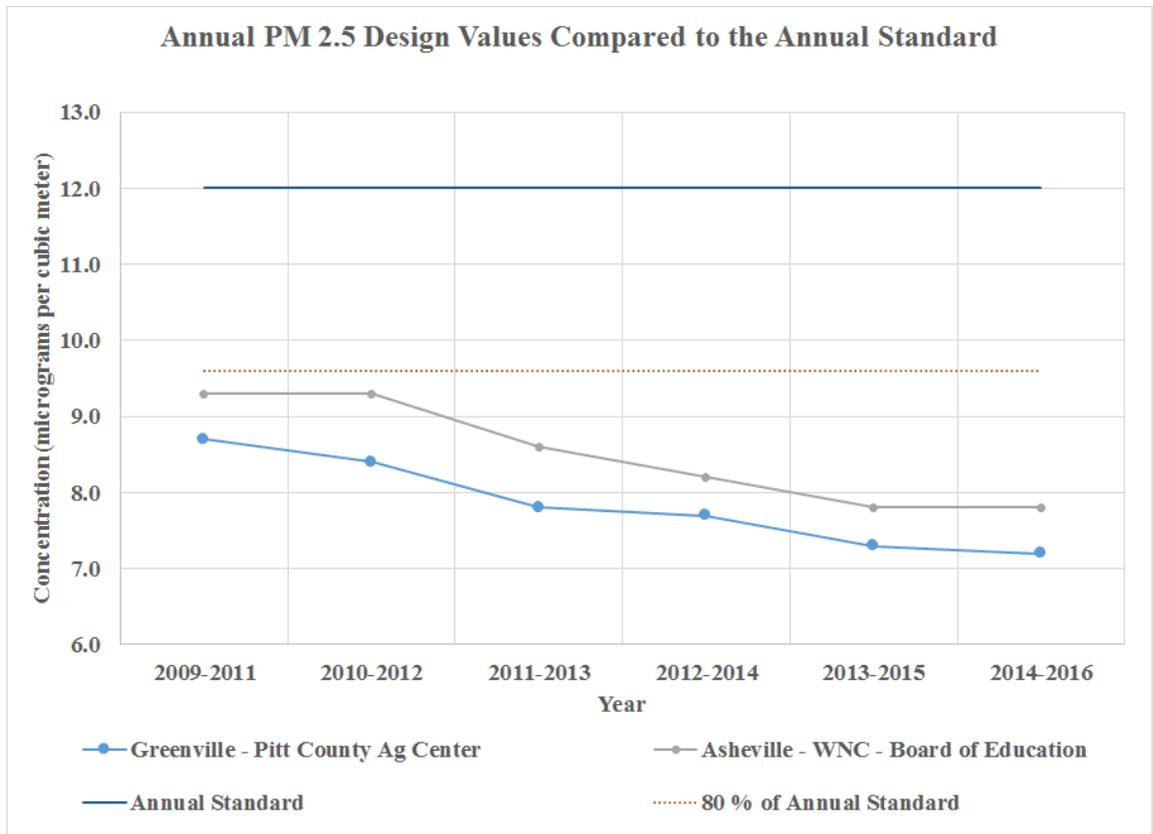
### **Request to operate FRM Monitors on a One-in-Six Day Schedule**

DAQ requests permission to operate the federal reference monitor at Pitt Ag Center, 37-147-0006, and WNC requests to operate the federal reference monitor at the Board of Education, 37-021-0034, on a one-in-six-day schedule.

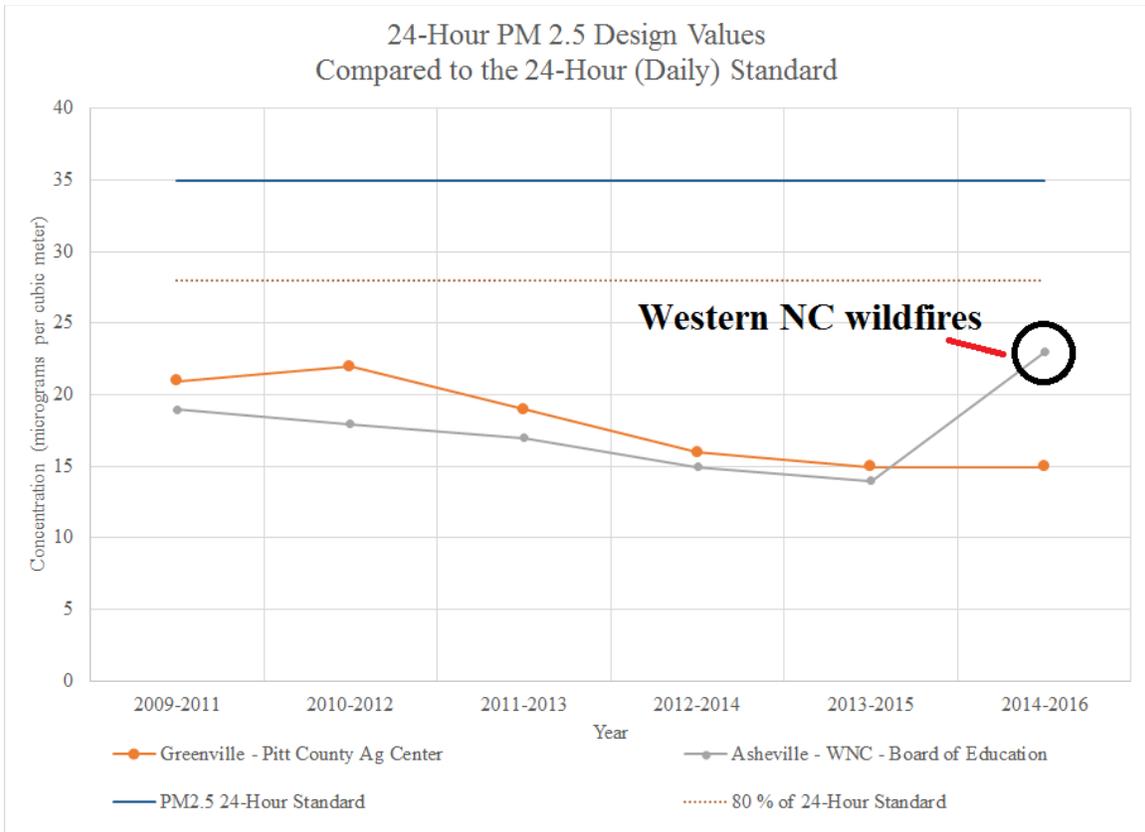
40 Code of Federal Regulations §58.12 Operating schedules in paragraph (d)(1)(ii) states:

For SLAMS PM<sub>2.5</sub> sites with both manual and continuous PM<sub>2.5</sub> monitors operating, the monitoring agency may request approval for a reduction to 1-in-6 day PM<sub>2.5</sub> sampling or for seasonal sampling from the EPA Regional Administrator. Other requests for a reduction to 1-in-6 day PM<sub>2.5</sub> sampling or for seasonal sampling may be approved on a case-by-case basis. The EPA Regional Administrator may grant sampling frequency reductions after consideration of factors (including but not limited to the historical PM<sub>2.5</sub> data quality assessments, the location of current PM<sub>2.5</sub> design value sites and their regulatory data needs) if the Regional Administrator determines that the reduction in sampling frequency will not compromise data needed for implementation of the NAAQS. Required SLAMS stations whose measurements determine the design value for their area and that are within ±10 percent of the annual NAAQS and all required sites where one or more 24-hour values have exceeded the 24-hour NAAQS each year for a consecutive period of at least three years are required to maintain at least a 1-in-3-day sampling frequency until the design value no longer meets these criteria for three consecutive years. A continuously operating FEM or ARM PM<sub>2.5</sub> monitor satisfies this requirement unless it is identified in the monitoring agency's annual monitoring network plan as not appropriate for comparison to the NAAQS and the EPA Regional Administrator has approved that the data from that monitor may be excluded from comparison to the NAAQS.

The DAQ believes both monitors are qualified to operate at a reduced schedule because both monitors are collocated with a continuous PM<sub>2.5</sub> monitor, neither monitor is required and as shown in Figure 14 and Figure 15 both monitors have been measuring concentrations below 80 percent of the standard for six years or more. The DAQ is requesting permission to operate the continuous PM<sub>2.5</sub> monitor in Greenville as an AQI only monitor. See Appendix G. Request for Exclusion of PM<sub>2.5</sub> Continuous FEM data from Comparison to the NAAQS. The BAM 1022 at the site currently does not match the FRM at the site. The DAQ would like to maintain the collocated FRM at a reduced sampling frequency for another year to continue to get comparison data for the two monitors to continue to study why the monitors fail to compare.



**Figure 14. Annual fine particle design values for Asheville and Greenville**



**Figure 15. 24-Hour fine particle design values for Asheville and Greenville**

### **Request for a waiver for the trees at Triple Oak Road**

The DAQ requests a waiver for the trees that are on the northeast side of the building because they are an obstruction to air flow. The waiver is necessary because the trees are on private property belonging to an out-of-state trust and the owner has not provided permission to DAQ to remove the trees.

Figure 16 is an aerial photograph of the site showing the location of the monitor with regards to the surrounding trees. The photograph does not show the second building placed at the site to the southeast of the building in the photograph. However, the presence/or lack of presence of the other building does not affect the location of the trees. They are still 20 meters from the proposed monitoring location to the southeast and northwest and there are no trees between the monitor and the roadway.

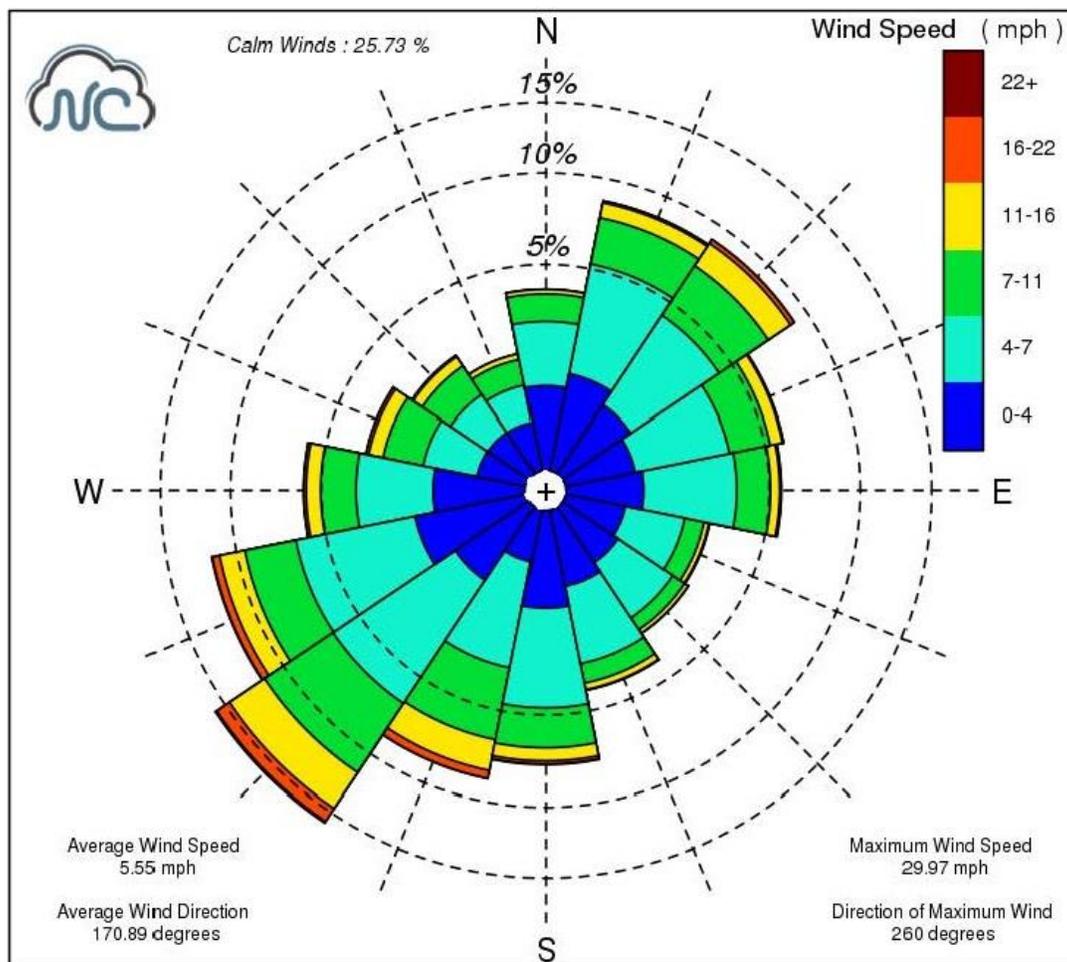


**Figure 16. Site diagram showing locations of trees relative to the fine particle monitoring location.**

The monitor will be 10 meters from the trees to the northeast. The trees further back from the trees that are 10 meters away are taller and will act as an obstruction to air flow coming from the northeast. Those trees are 12 to 13 meters away from the proposed location of the PM<sub>2.5</sub> inlet and about 18 meters tall. The inlet of the PM<sub>2.5</sub> monitor will be approximately 5 meters from the ground. Thus, the trees would need to be 26 meters away to not act as an obstruction.

Predominant winds at the site are from the southwest most of the year. Figure 17 provides a wind rose using the 2011 to 2015 wind data from the Raleigh Durham Airport, which is about 2.5 Kilometers northeast of the site. Based on the wind rose, the winds come from the south, southwest and west over 50 percent of the time and from the north, northeast and east less than a third of the time.

## Wind Rose for Raleigh-Durham Airport (KRDU) Jan. 1, 2011 to Dec. 31, 2015



**Figure 17. Wind Rose for the Raleigh-Durham Airport for 2011-2015.**

Figure 18 show the trees to the north of the site. These trees are 12 to 15 meters in height and located about 12 meters from the proposed location. There is a berm that starts to rise about approximately 7 meters from where the site would be. The trees are growing on top of this berm. They will be an obstruction because they are less than twice the distance, 23.2 meters, from the proposed probe location than the difference between the height of the probe, 3.6 meters, and the height of the trees, 15.2 meters.

Because the site is a source-oriented site and the trees do not create an obstruction between the source, that is the roadway and the inlet, the trees should not impact the ability of the site to monitor fine particle emissions from the interstate highway. Thus, the DAQ requests a waiver of siting criteria regarding the trees to the northeast of the site. The other trees meet siting criteria and do not require a waiver. They are shown in Figure 19 through Figure 21.



**Figure 18. Trees to the north of the site.**



**Figure 19. Taken from the fine particle monitor towards the east, showing trees and the monitoring shelter.**



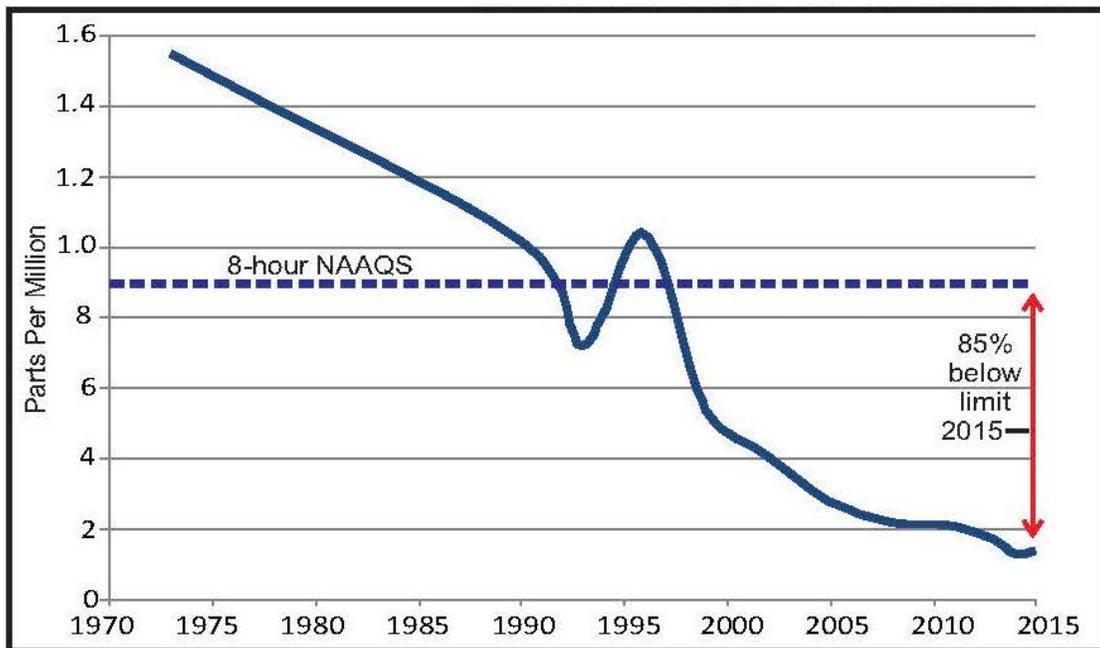
**Figure 20. Taken from fine particle monitor. Shows the trees to the south and the interstate highway.**



**Figure 21. – Taken from the fine particle monitor towards the west.**

### III. Carbon Monoxide, CO, Monitoring Network

Carbon monoxide monitoring is conducted in two of the major urban areas of the state, the Raleigh and Charlotte-Concord-Gastonia metropolitan statistical areas, also known as MSAs. The 2017-2018 state-operated network consists of two monitors in Raleigh operated by the Division of Air Quality, DAQ, and two monitors in Charlotte operated by Mecklenburg County Air Quality, MCAQ. All four monitors collect data using a federal reference method for comparison to the national ambient air quality standards, also known as NAAQS. Until the end of 2015, the local program agency in Forsyth County also operated a carbon monoxide monitor in Winston-Salem. However, because statewide carbon monoxide levels have fallen so far below the standard, as shown in Figure 22, and the state has maintained the standard for more than 20 years, the Peters Creek Winston-Salem micro-scale site is no longer required and was shut down at the end of 2015. One monitor in Raleigh and one monitor in Charlotte are located near the instate highway. The other sites in Raleigh and Charlotte are middle and neighborhood scale sites that are part of the national core, also known as NCore, network. Neither of the two sites operating in 2016 reported exceedances of the 1- or 8-hour ambient air quality standard from 2012 to 2016.



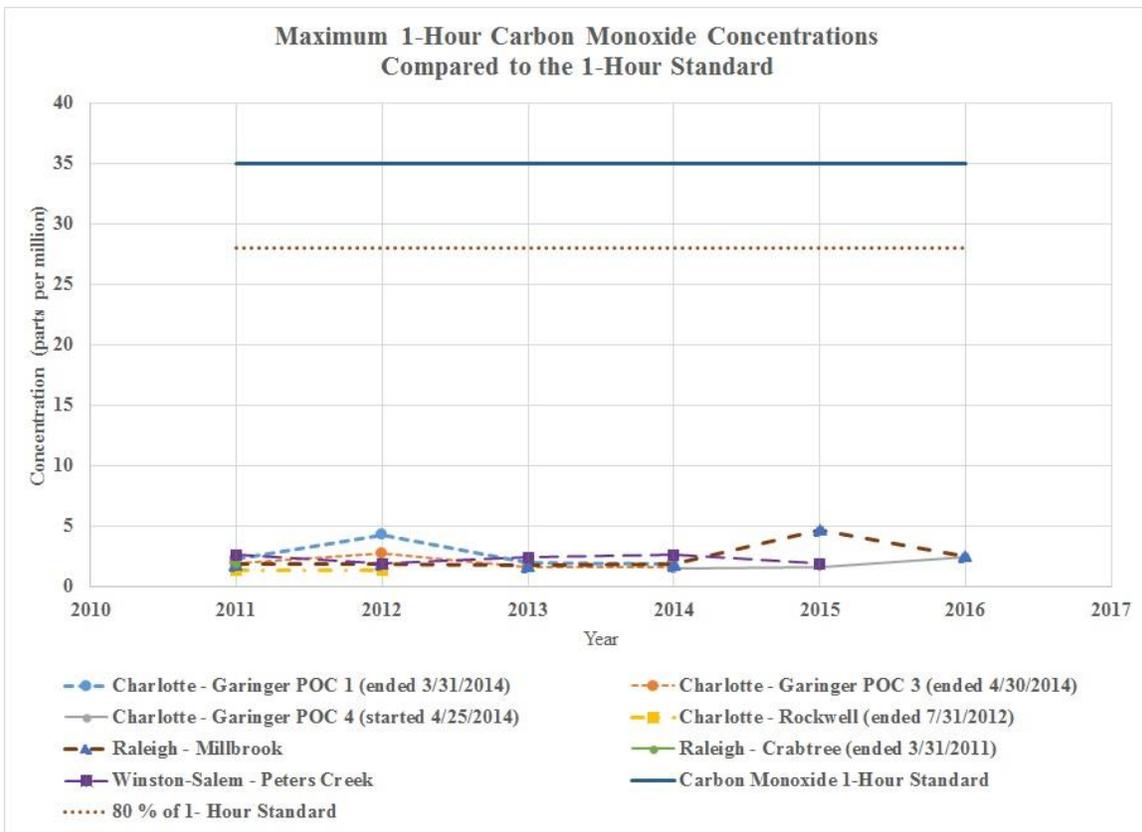
**Figure 22. Statewide 8-hour carbon monoxide levels through 2015**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air\\_Quality\\_Trends\\_in\\_North\\_Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air_Quality_Trends_in_North_Carolina.pdf) )

As of the end of 2015 the state has met all of the monitoring requirements in the DAQ carbon monoxide maintenance state implementation plans, also known as SIPs, for Mecklenburg, Forsyth, Durham and Wake counties. The SIP required the state to operate at least one carbon monoxide monitor in Mecklenburg, Forsyth and either Durham or

Wake counties through the end of 2015 so that the data from the monitor could be used to trigger contingency requirements.<sup>25</sup>

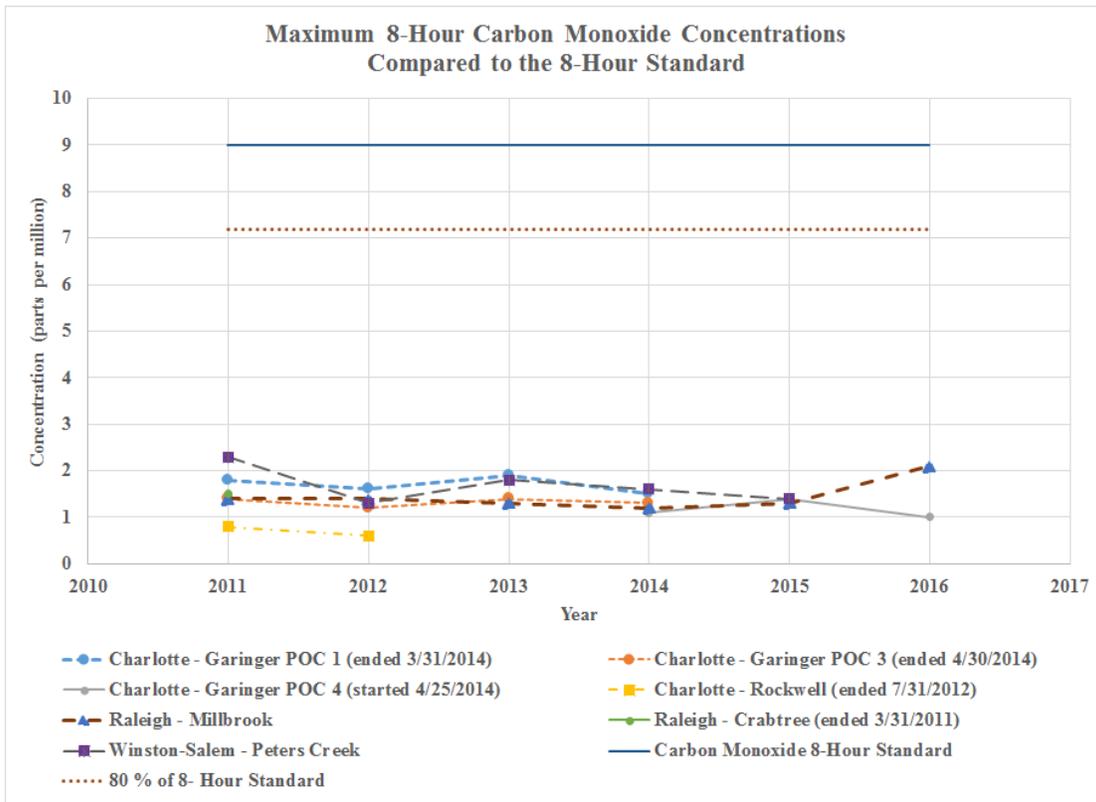
Figure 23 provides the maximum 1-hour and Figure 24 provides the maximum 8-hour concentrations for all operating sites for 2011 through 2016. All measured carbon monoxide concentrations during the past five years have been well below 80 percent of the standards. The maximum 1-hour concentration during the past five years was 13 percent of the standard and occurred at the Millbrook site in 2015. The maximum 8-hour concentration during the past five years was 23 percent of the standard and occurred at Millbrook in 2016, due to smoke from November forest fires in the western North Carolina mountains. Currently the state and local programs are operating the minimum required carbon monoxide network, that is, one carbon monoxide monitor at each NCore and each near-road site. The state and the MCAQ local program started operating a carbon monoxide monitor at the near road stations in Raleigh and Charlotte in late 2016 to meet the Jan. 1, 2017, start date.<sup>26</sup>



**Figure 23. Maximum 1-hour carbon monoxide concentrations measured in North Carolina from 2011 to 2016**

<sup>25</sup> “Carbon Monoxide (CO) Limited Maintenance Plan for the Charlotte, Raleigh/Durham & Winston-Salem CO Maintenance Areas”, Aug. 2, 2012, available at <http://deq.nc.gov/about/divisions/air-quality/air-quality-planning/state-implementation-plans/carbon-monoxide-limited-maintenance-plans>.

<sup>26</sup> “Appendix D to Part 58—Network Design Criteria for Ambient Air Quality Monitoring,” 4.2 Carbon Monoxide (CO) Design Criteria, 4.2.1 General Requirements, available at [https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&r=PART&n=40y6.0.1.1.6#ap40.6.58\\_161.d](https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&r=PART&n=40y6.0.1.1.6#ap40.6.58_161.d), accessed on April 22, 2017.



**Figure 24. Maximum 8-hour carbon monoxide concentrations measured in North Carolina from 2011 to 2016**

Table 6 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the carbon monoxide monitoring network in the Charlotte-Concord-Gastonia MSA. Table 7 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the carbon monoxide monitoring network in the Raleigh MSA.

**Table 6 The 2017-2018 Carbon Monoxide Monitoring Network for the Charlotte-Concord-Gastonia MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041	37-119-0045
<b>Site Name:</b>	Garinger	Remount Road
<b>Street Address:</b>	1130 Eastway Drive	902 Remount Road
<b>City:</b>	Charlotte	Charlotte
<b>Latitude:</b>	35.2401	35.212657
<b>Longitude:</b>	-80.7857	-80.874401
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly
<b>Statement of Purpose:</b>	Compliance with NAAQS; ozone and fine particle precursor monitoring;	Near road monitoring site. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Source oriented
<b>Scale:</b>	Neighborhood	Micro-scale
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: RFCA-0981-054	Yes: RFCA-0981-054
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes - NCore	Yes –near road
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an Instrumental nondispersive infrared Thermo Electron 48 i method, Air Quality System, AQS, method code 554. Both monitors are operated by Mecklenburg County Air Quality, AQS primary quality assurance and reporting agency 0669

**Table 7 The 2017-2018 Carbon Monoxide Monitoring Network for the Raleigh MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-183-0014	37-183-0021
<b>Site Name:</b>	Millbrook	Triple Oak Road
<b>Street Address:</b>	3801 Spring Forest Road	2826 Triple Oak Road
<b>City:</b>	Raleigh	Cary
<b>Latitude:</b>	35.8561	35.8654
<b>Longitude:</b>	-78.5742	-78.8195
<b>MSA, CSA or CBSA represented:</b>	Raleigh	Raleigh
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly
<b>Statement of Purpose:</b>	Compliance with NAAQS; ozone and fine particle precursor monitoring;	Near road monitoring site. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure; general/ background	Source oriented
<b>Scale:</b>	Middle	Micro-scale
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: RFCA-0981-054	Yes: RFCA-0981-054

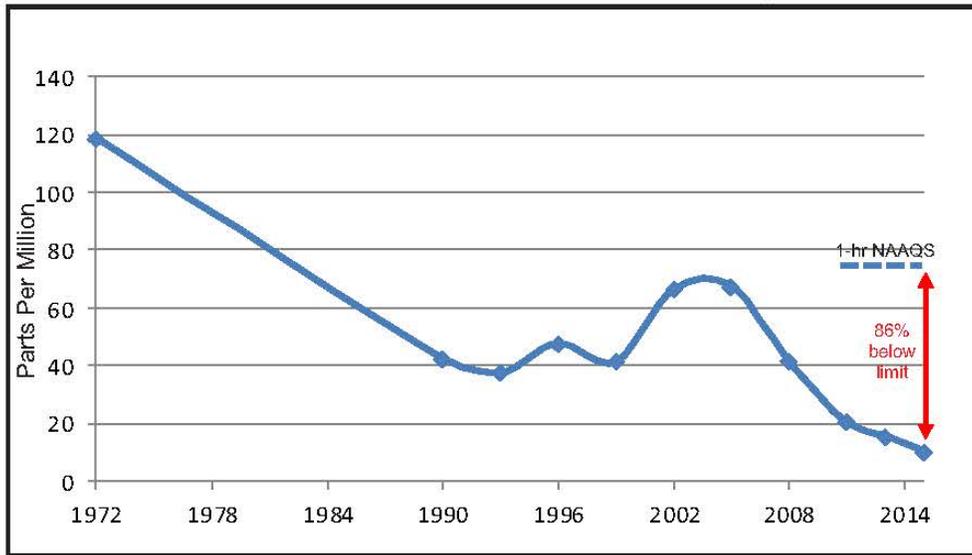
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes - NCore	Yes –near road
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an Instrumental nondispersive infrared Thermo Electron 48 i method, Air Quality System, AQS, method code 554

#### IV. Sulfur Dioxide Monitoring Network

Sulfur dioxide, SO<sub>2</sub>, monitoring is currently conducted in North Carolina at 12 sites operated by the North Carolina Division of Air Quality, DAQ, and at two sites operated by local programs. From Jan. 1, 2012 through April 15, 2015, the South Carolina Department of Health and Environmental Control also operated an upwind background special purpose SO<sub>2</sub> monitor in York County, South Carolina, part of the Charlotte- Concord-Gastonia Metropolitan Statistical Area, MSA.

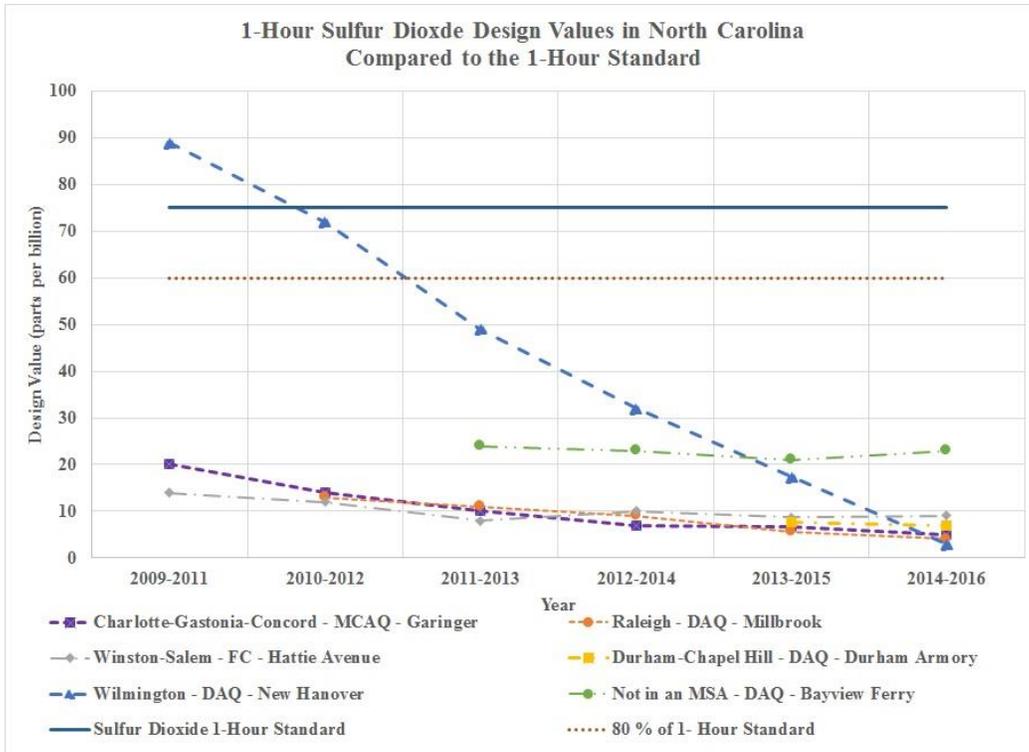
The data collected are used to determine human health effect exposures in MSAs with more than one million people, to collect background levels for prevention of significant deterioration, also known as PSD, permit modeling and to determine the impact on SO<sub>2</sub> levels due to facilities that burn large quantities of fossil fuels or manufacture sulfuric acid. Currently five major cities are being monitored for sulfur dioxide. Data from previous years, as shown in Figure 25, indicate statewide levels of sulfur dioxide in most areas are well below the 1-hour standard established by the United States Environmental Protection Agency, EPA.



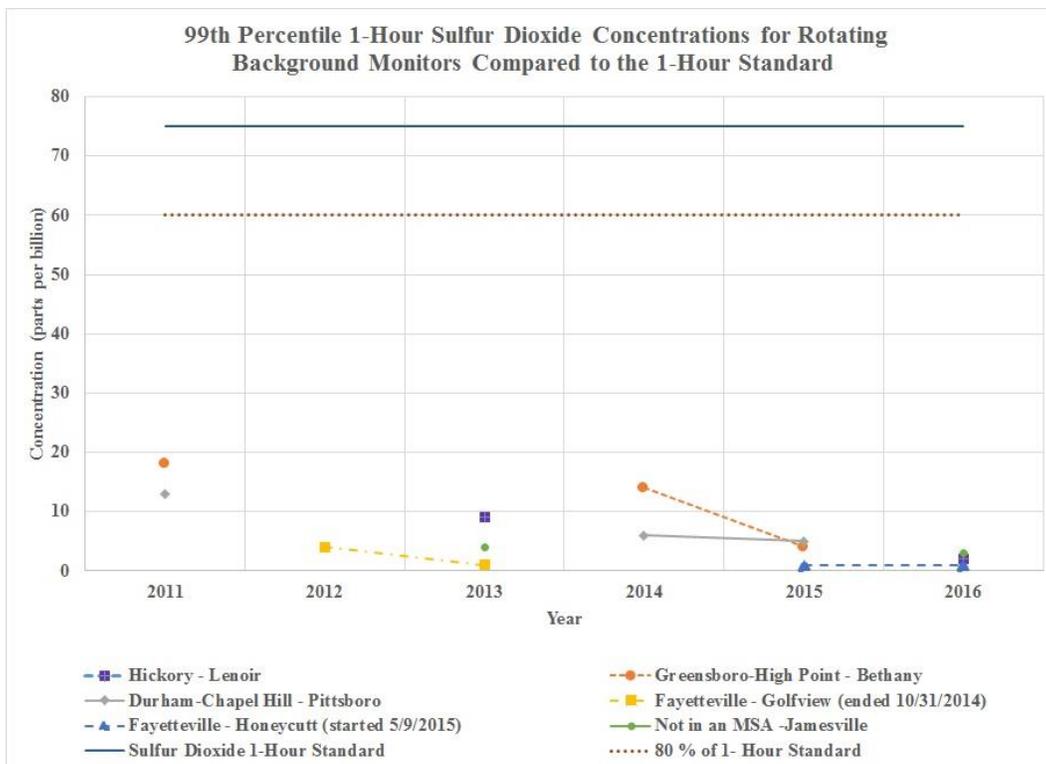
**Figure 25. Statewide trends for sulfur dioxide**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air\\_Quality\\_Trends\\_in\\_North\\_Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air_Quality_Trends_in_North_Carolina.pdf) )

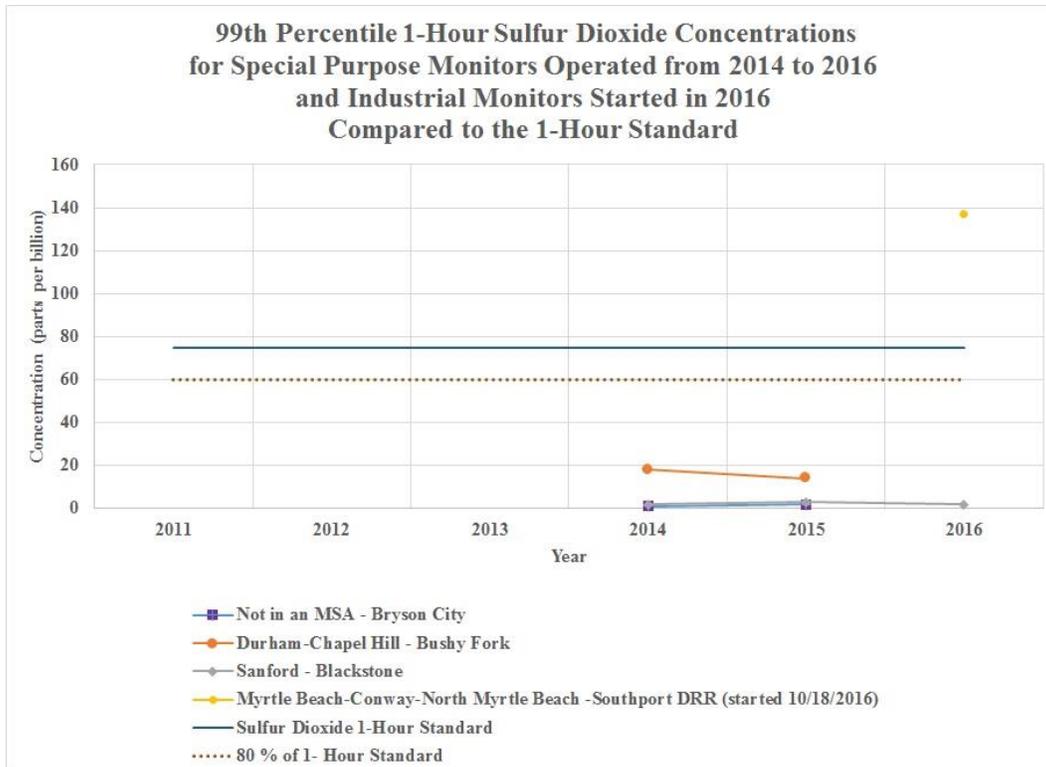
Figure 26 through Figure 28 show the design value or concentrations of sulfur dioxide measured in North Carolina between 2011 and 2016 as compared to the national ambient air quality standards, NAAQS. Although the design value exceeded the standard in Wilmington in 2011, in 2015 all design values in the state were less than 28 percent of the standard. For the rotating and special purpose monitors the maximum 99 percentile 1-hour concentration during the past five years was 24 percent of the standard and occurred at the Bushy Fork site in 2014. The only industrial monitor operating in 2016 was at Southport. It started operating on Oct. 18, 2016, and reported a 99 percentile 1-hour concentration that was 183 percent of the standard. The DAQ is working with the facility to reduce its sulfur dioxide emissions.



**Figure 26. Sulfur dioxide 1-hour design value trends**



**Figure 27. Background Sulfur Dioxide Concentrations**



**Figure 28. Sulfur Dioxide Concentrations at Special Purpose and Industrial Sites**

The DAQ operates one trace-level SO<sub>2</sub> monitor on a 100-ppb scale because low levels of SO<sub>2</sub> are a precursor for fine particle formation. The current network consists of one site in Wake County. The Wake County site is a national core, also known as NCore, monitoring site. The DAQ monitors for these trace-level-particle precursor pollutants year-round because monitoring for fine particles is required on a year-round basis. Mecklenburg County Air Quality also operates a trace-level SO<sub>2</sub> monitor at the Garinger NCore site in Mecklenburg County.

The federal government requires industries that want to expand or begin operations in an area to conduct 12 consecutive months of background monitoring to use in modeling to demonstrate the addition or expansion of their facility will not contribute to the significant deterioration of air quality in that area. In 2010, the DAQ modified the rotating PSD network by shutting down the Bryson City SO<sub>2</sub> monitor in Swain County and adding rotating PSD SO<sub>2</sub> monitors at Lenoir in Caldwell County and Bethany in Rockingham County. Assessment of the SO<sub>2</sub> monitoring network indicated that the ability of DAQ to meet its obligation to provide relevant background SO<sub>2</sub> data for PSD modeling could be improved by these changes. In 2015 the DAQ decided to shut down the rotating PSD SO<sub>2</sub> monitor at Pittsboro. The monitor was no longer needed because of the monitor at the Durham Armory. In 2020, the DAQ will add a rotating SO<sub>2</sub> monitor at Castle Hayne in New Hanover County.

In 2011, the DAQ moved the Aurora monitor across the Pamlico River to the Bayview Ferry station because more people live over there and the new site is downwind of the PCS facility.

Figure 29 shows the relative locations of the two sites. The Bayview Ferry site began operating January 2011.

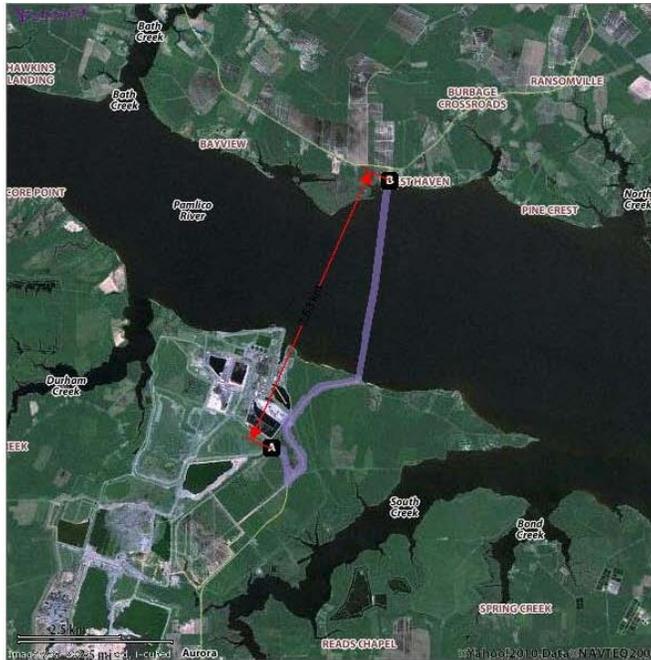


Figure 29. Location of the Bayview Ferry Site, B, Relative to the Aurora Site, A

### *Population Weighted Emissions Index Sulfur Dioxide Monitoring*

In 2010, the EPA changed the monitoring regulations for sulfur dioxide to support the lower sulfur dioxide NAAQS.<sup>27</sup> For the SO<sub>2</sub> monitoring network the EPA developed the population weighted emissions index, PWEI. The PWEI is calculated for each core-based statistical area, CBSA, by multiplying the population of each CBSA, using the most current census data or estimates, by the total amount of SO<sub>2</sub> in tons per year emitted within the CBSA, using an aggregate of the most recent county level emissions data available in the national emissions inventory, NEI, for each county in each CBSA. The resulting product is divided by 1,000,000, providing a PWEI value, the units of which are million person-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO<sub>2</sub> monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO<sub>2</sub> monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO<sub>2</sub> monitor is required within that CBSA.

The SO<sub>2</sub> monitoring site required because of the calculated PWEI in each CBSA satisfies minimum monitoring requirements if the monitor is sited within the boundaries of the parent CBSA and is one of the following site types as defined in section 1.1.1 of 40 CFR 58 Appendix D: population exposure, highest concentration, source impacts, general background or regional transport. The SO<sub>2</sub> monitors at NCore stations may satisfy minimum monitoring requirements if that monitor is located within a CBSA that is required to have one or more PWEI monitors.

In 2013, the 2010 sulfur dioxide monitoring requirements required North Carolina to add three PWEI sulfur dioxide monitors to three MSAs in North Carolina: Charlotte-Concord-Gastonia, Durham-Chapel Hill and Wilmington.

In December 2016, the EPA released version 1 of the 2014 NEI.<sup>28</sup> The DAQ calculated new PWEI values for each MSA using the 2014 NEI and 2016 population estimates.<sup>29</sup> Table 8 presents the newest PWEI values using the 2014 NEI and 2016 population estimates. Due to drastically lower emissions in the Wilmington area, the Wilmington PWEI monitor is no longer required and will be shut down at the end of the year. However, the Winston-Salem MSA is now required to have a PWEI monitor. Figure 30 shows the locations of the three required PWEI sulfur dioxide monitoring sites based on the 2014 NEI and 2016 population estimates.

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<sup>27</sup> Primary National Ambient Air Quality Standard for Sulfur Dioxide, Final Rule, Federal Register, Vol. 75, No. 119, Jun. 22, 2010, available on the worldwide web at <https://www3.epa.gov/ttn/naaqs/standards/so2/fr/20100622.pdf>, accessed on May 13, 2017.

<sup>28</sup> 2014 National Emission Inventory, Version 1, All Sectors: National-County/Tribe aggregated, Released December 2016, available on the world wide web at <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>. Accessed Jan. 4, 2017.

<sup>29</sup> Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016, U.S. Census Bureau, Population Division, Released March 23, 2017, available on the world wide web at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.

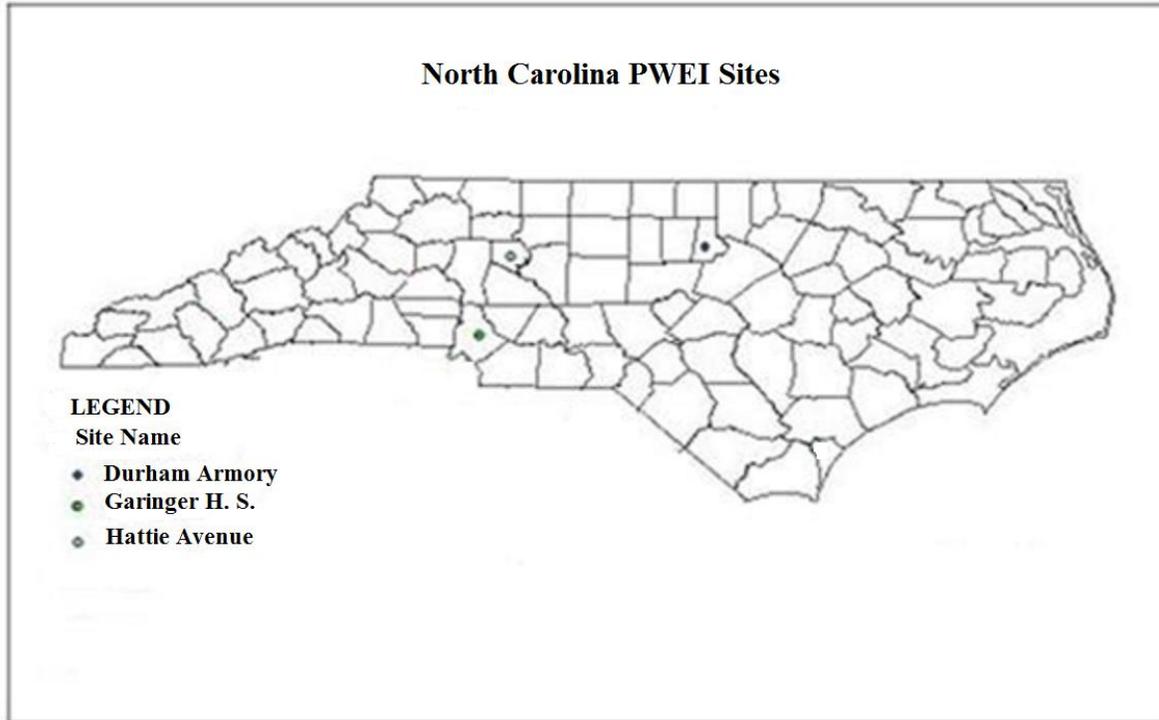
**Table 8. Population-Weighted Emission Indices Using the 2014 National Emissions Inventory and 2016 Population Estimates for North Carolina Metropolitan Statistical Areas**

<b>Metropolitan Statistical Area <sup>a</sup></b>	<b>SO<sub>2</sub> Emissions, tons <sup>b</sup></b>	<b>Estimated Population, July 1, 2016</b>	<b>Population Weighted Emission Index</b>	<b>Number of SO<sub>2</sub> Monitors Required</b>
Asheville	9,260.05	452,319	4,188.497	0
Burlington	98.64	159,688	15.75	0
Charlotte-Gastonia-Concord	7,624.02	2,474,314	18,864.23	1
Durham Chapel Hill	21,473.57	559,535	12,015.21	1
Fayetteville	377.73	380,389	143.69	0
Goldsboro	136.72	124,150	16.97	0
Greensboro-High Point	914.49	756,139	691.48	0
Greenville	134.05	177,220	23.76	0
Hickory	6,515.13	364,187	2,372.73	0
Jacksonville	1,120.84	187,136	209.75	0
Myrtle Beach-Conway-North Myrtle Beach	4,836.85	449,295	2,173.17	0
New Bern	1,383.04	126,111	174.42	0
Raleigh	797.44	1,302,946	1,039.03	0
Rocky Mount	164.93	147,323	24.30	0
Virginia Beach-Norfolk-Newport News	25,045.32	1,726,907	43,250.94	1
Wilmington	732.89	282,573	207.09	0
Winston-Salem	8,101.27	662,079	5,363.68	1

<sup>a</sup> Office of Management and Budget, OMB BULLETIN NO. 13-01: Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas and Combined Statistical Areas and Guidance on Uses of the Delineations of These Areas, Feb. 28, 2013, available on the worldwide web at <https://obamawhitehouse.archives.gov/sites/default/files/omb/bulletins/2013/b13-01.pdf>, accessed May 18, 2017.

<sup>b</sup> Source: 2014 National Emission Inventory, Version 1, All Sectors: National-County/Tribe aggregated, Released December 2016, available on the world wide web at <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>. Accessed Jan. 4, 2017.

<sup>c</sup> Source: Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016, U.S. Census Bureau, Population Division, Released March 23, 2017, available on the world wide web at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.



**Figure 30. Location of North Carolina PWEI monitors**

In 2011 the DAQ and the MCAQ proposed the following monitoring sites to meet the PWEI requirements:

- Garinger as a population exposure monitor in the Charlotte-Concord-Gastonia MSA;
- Durham Armory as a population exposure monitor in the Durham MSA; and
- New Hanover as a population exposure/highest concentration monitor in the Wilmington MSA.

These locations were approved by EPA Region 4 in 2011. The approval letter is provided in Appendix H. 2011 Network Plan EPA Approval Letter.

In the 2011 network plan the DAQ proposed doing PWEI monitoring at five additional sites, located in the Asheville, Charlotte-Concord-Gastonia, Greensboro-High Point, Hickory and Winston-Salem MSAs. After the network plan was written the EPA developed revised PWEI lists, which no longer included required PWEI monitors for those three areas. Thus, the DAQ did not add PWEI monitors to the Waynesville Elementary School, Mendenhall School and Hickory sites and the revised 2013 network plan, reflecting a smaller PWEI network, was approved by the EPA. The approval letter is provided in Appendix I. 2013 Network Plan EPA Approval Letter.

#### *A. Temporary Special Purpose Background Monitors*

In 2014 the EPA came out with guidance for modeling and monitoring around specific facilities emitting over certain quantities of sulfur dioxide. The modeling and/or monitoring is required to demonstrate compliance with the NAAQS. The modeling

guidance requires background levels of sulfur dioxide to be considered. The DAQ anticipated that the Roxboro coal-fired electric generating facility in Person County would be one of the facilities in North Carolina for which the DAQ would need to do modeling. Background sulfur dioxide data had not been collected in Person County within the last three years. Thus, the DAQ collected background sulfur dioxide data at the Bushy Fork site from May 21, 2014, through late May 2015 to meet the federally-required modeling protocols. For similar reasons the DAQ operated a sulfur dioxide monitor at Bryson City in Swain County from August 2014 through August 2015. The DAQ anticipated that the Asheville coal-fired electric generating facility in Buncombe County would also be a facility for which the DAQ would need to do modeling.

*B. Facilities Subject to the SO<sub>2</sub> Data Requirements Rule, DRR*

On Jan. 15, 2016, the DAQ submitted to the EPA a list identifying all facilities within North Carolina with SO<sub>2</sub> emissions that exceeded the 2,000 tons per year threshold based on the most recent emissions data. The DAQ's list also includes facilities for which the DAQ received third-party SO<sub>2</sub> modeling information even though the emissions for the facilities were below the 2,000 tons per year threshold. By July 15, 2016, the DAQ submitted to the EPA documentation specifying the compliance path, modeling or monitoring, for each of the affected facilities.

Ambient monitoring is being used to characterize air quality for the following facilities:

- Duke Energy Progress, Roxboro Plant, Facility ID 7300029;
- Duke Energy Progress, Asheville Plant, Facility ID 37-021-00628;
- Blue Ridge Paper Products, Canton Mill, also known as Evergreen, Facility ID 4400159;
- PCS Phosphate Company, Inc. – Aurora, Facility ID 0700071; and
- CPI USA North Carolina – Southport Plant, Facility ID 1000067.

DAQ established a single SO<sub>2</sub> monitor at each of these facilities. Specific details for each facility are included in Volume 2, Site Descriptions by Division of Air Quality Regional Office and Metropolitan Statistical Area:

- D. The Raleigh Monitoring Region, Appendix D-3. Duke Energy Roxboro Siting Analysis and Additional Site Information;
- A. The Asheville Monitoring Region, Appendix A-3. Duke Progress Energy Skyland Siting Analysis and Additional Site Information;
- A. The Asheville Monitoring Region, Appendix A-4. Evergreen Packaging Canton Siting Analysis and Additional Site Information;
- F. The Washington Monitoring Region, Appendix F-3. PCS Phosphate, Inc. – Aurora Siting Analysis and Additional Site Information; and
- G. The Wilmington Monitoring Region, Appendix G-3. CPI Southport Siting Analysis and Additional Site Information.

Note that:

- Duke Energy operates the monitor at Roxboro and Asheville as part of DAQ's primary quality assurance organization, PQAQ. Duke provides full access to all data on an hourly basis for reporting to AIRNow and DAQ's real-time website; Duke quality assures, QAs, the data on a daily and monthly basis. DAQ performs additional QA activities, including annual performance evaluations, technical system audits and annual certification of the data.
- DAQ operates the monitors at Evergreen's Canton mill, PCS Phosphate and CPI Southport.
- DAQ reports the data to AIRNow and EPA's Air Quality System and certifies data for all five monitors.

The rationale for the selection of the monitor location at three of the facilities follows. Full details are included in the Appendices listed above. Modeling input and output files for siting the monitors were provided to the EPA in 2016 outside of the network plan. A Region 4 representative visited each monitoring site except the existing site at Bayview.

#### Evergreen's Canton mill, Canton DRR

- Modeling is questionable in complex terrain
- Evergreen has already announced emissions controls that will be complete in 2019
  - Modeling suggests the facility will attain the standard with the new controls
- Modeling shows three clusters of impacted receptors
  - The Canton DRR site is located among a cluster containing seven of the top 10 ranked receptors and meets monitor siting criteria. This site has a clear view of the facility, has power nearby and is located on unoccupied state property where DAQ is assured of a long-term uninterrupted presence.
  - The second cluster contains two of the top 10 receptors, but will be disrupted by a major construction project in early 2017. This cluster will not support a three-year design value for 2017 to 2019.
  - The final cluster contains one top 10 receptor, but is in an employee parking lot and may also be impacted by adjacent rail line and idling heavy-duty trucks.
- The main difference between the Canton DRR site and the alternatives is wind direction on a particular day. All three are very close to the mill. The Canton DRR site is within the highest rated cluster.

#### Duke's Roxboro plant, Semora DRR

- The top 50 receptors for this facility are all within a single cluster to the northeast of the facility.
- The top 20 receptors are all located within a deep depression, in heavily-wooded areas, or on privately-owned property.
- The Semora DRR site (receptor #64 of +8,000) is immediately adjacent to the top 20 and within 300 meters of the #1 receptor.

- The Semora DRR site meets siting criteria, has an unobstructed view of the facility and the property owner agreed to a long-term presence (at least three years).

PCS Phosphate Company, Inc. – Aurora, Bayview Ferry

- This facility is surrounded by heavily forested areas, a major river and privately-owned waterfront property. The facility is located on the southern banks of the Pamlico River. The prevailing winds blow from the facility and across the river. The river is at least 2 miles wide at this location, so siting options are limited for a “downwind” monitor.
- The highest ranked feasible receptor, #15, already has an operational SO<sub>2</sub> monitor; it is located on the opposite side of the river on public land with an unobstructed view of the facility.

When reviewing potential monitoring sites, it is important to note that there is a significant difference between the SO<sub>2</sub> data requirements rule and other rules in regards to monitoring. Usually, if there is no three-year design value, then the area is designated unclassifiable until a design value is available. However, the DRR states that in the absence of a three-year design value, the area will be designated based on a modeling analysis. This becomes a major factor in selecting a monitoring site – if DAQ cannot be assured that a monitoring site is continuously available through 2019 then we are setting the state up for a possible nonattainment designation.

As discussed in Section 2.A.3. Monitoring Changes in the Myrtle Beach-Conway-North Myrtle Beach MSA, in 2017, the CPI - Southport facility proposed changes at the facility to include raising the physical stack heights of Units 1 and 2 by approximately 9.14 meters. Based on modeling done using the higher stack heights, the Southport DRR monitor will still be appropriately sited to record maximum sulfur dioxide concentrations near the CPI-Southport facility. See the memorandum provided in Figure 5 for more details.

Table 9 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the sulfur dioxide monitoring network in the Charlotte-Concord-Gastonia and Raleigh MSAs. Table 10 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the sulfur dioxide monitoring network in the Greensboro, Winston-Salem and Fayetteville MSAs. Table 11 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the sulfur dioxide monitoring network in the Durham MSA.

Table 12 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets

the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the sulfur dioxide monitoring network in the Asheville and Hickory MSAs. Table 13 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the sulfur dioxide monitoring network in the Myrtle Beach-Conway-North Myrtle Beach and Wilmington MSAs. Table 14 provides the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the sulfur dioxide monitoring network in areas outside of MSAs.

**Table 9 The 2017-2018 Sulfur Dioxide Monitoring Network for the  
Charlotte-Concord-Gastonia and Raleigh MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041	37-183-0014
<b>Site Name:</b>	Garinger	Millbrook
<b>Street Address:</b>	1130 Eastway Drive	3801 Spring Forest Road
<b>City:</b>	Charlotte	Raleigh
<b>Latitude:</b>	35.2401	35.8561
<b>Longitude:</b>	-80.7857	-78.5742
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Raleigh
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly – every year	Hourly – every year
<b>Statement of Purpose:</b>	Compliance with the NAAQS; required monitor for NCore & PWEI.	Required monitor for NCore. SO <sub>2</sub> fine particle precursor monitoring. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	General/ background
<b>Scale:</b>	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes – NCore & PWEI	Yes - NCore
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> Both monitors use an instrumental pulsed fluorescence method using a Thermo Electron 43i TLE, Air Quality System, AQS, method code 560.

<sup>b</sup> Operated by Mecklenburg County Air Quality, AQS reporting agency 0669

**Table 10 The 2017-2018 Sulfur Dioxide Monitoring Network for the Greensboro, Winston-Salem and Fayetteville MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-157-0099	37-067-0022 <sup>b</sup>	37-051-0010 <sup>b</sup>
<b>Site Name:</b>	Bethany	Hattie Avenue	Honeycutt E.S.
<b>Street Address:</b>	6371 NC 65	1300 block of Hattie Avenue	4665 Lakewood Drive
<b>City:</b>	Bethany	Winston-Salem	Fayetteville
<b>Latitude:</b>	36.308889	36.110556	35.00
<b>Longitude:</b>	-79.859167	-80.226667	-78.99
<b>MSA, CSA or CBSA represented:</b>	Greensboro-High Point	Winston-Salem	Fayetteville
<b>Monitor Type:</b>	Special purpose	Other	Special purpose
<b>Operating Schedule:</b>	Hourly- every third year	Hourly- every year	Hourly- every third year
<b>Statement of Purpose:</b>	Industrial expansion monitoring for PSD modeling.	Compliance with the NAAQS; PWEI Monitor	Industrial expansion monitoring for PSD modeling.
<b>Monitoring Objective:</b>	General/ background	Population exposure	Population exposure
<b>Scale:</b>	Urban	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	No	Yes - PWEI	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Operating 4/1/2017 to 3/31/2018	None	Monitor will operate June 2018 to May 2019

<sup>a</sup> All monitors use an instrumental pulsed fluorescence method using a Thermo Electron 43i, Air Quality System, AQS, method code 060.

<sup>b</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS primary quality assurance organization and reporting agency 0403

**Table 11 The 2017-2018 Sulfur Dioxide Monitoring Network for the Durham-Chapel Hill MSA**

<b>AQS Site Id Number:</b>	37-063-0015 <sup>a</sup>	37-145-0004 <sup>b</sup>
<b>Site Name:</b>	Durham Armory	Semora DRR
<b>Street Address:</b>	801 Stadium Drive	Shore Drive Air Monitor, Roxboro Plant
<b>City:</b>	Durham	Semora
<b>Latitude:</b>	36.032944	36.489943
<b>Longitude:</b>	-78.905417	-79.058523
<b>MSA, CSA or CBSA represented:</b>	Durham-Chapel Hill	Durham-Chapel Hill
<b>Monitor Type:</b>	SLAMS	Industrial
<b>Operating Schedule:</b>	Hourly – every year	Hourly – every year
<b>Statement of Purpose:</b>	PWEI monitor for Durham-Chapel Hill MSA	Maximum concentration site in the vicinity of the Roxboro Plant. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Source oriented
<b>Scale:</b>	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes - PWEI	Yes – Data Requirements Rule
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	Monitoring started Jan. 1, 2017

<sup>a</sup> Monitor uses an instrumental pulsed fluorescence method using a Thermo Electron 43i, Air Quality System, AQS, method code 060.

<sup>b</sup> Operated by Duke Progress Energy. Monitor uses an instrumental pulsed fluorescence method using a Thermo Electron 43i TLE, Air Quality System, AQS, method code 560.

**Table 12 The 2017-2018 Sulfur Dioxide Monitoring Network for the Asheville and Hickory MSAs**

<b>AQS Site Id Number:</b>	37-087-0013 <sup>a</sup>	37-021-0036 <sup>b</sup>	37-027-0003 <sup>c</sup>
<b>Site Name:</b>	Canton DRR	Skyland DRR	Lenoir
<b>Street Address:</b>	Pace Street, Evergreen Plant	Crestwood Drive Air Monitor, Asheville Plant	291 Nuway Circle
<b>City:</b>	Canton	Arden	Lenoir
<b>Latitude:</b>	35.534	35.481861	35.935833
<b>Longitude:</b>	-82.853	-82.509861	-81.530278
<b>MSA, CSA or CBSA represented:</b>	Asheville	Asheville	Hickory
<b>Monitor Type:</b>	Industrial	Industrial	Special purpose
<b>Operating Schedule:</b>	Hourly	Hourly – every year	Hourly – every third year
<b>Statement of Purpose:</b>	Maximum concentration site near the Evergreen Plant. Compliance w/NAAQS.	Maximum concentration site near the Duke Progress Energy Asheville Plant. Compliance w/NAAQS.	Industrial expansion monitoring for PSD modeling.
<b>Monitoring Objective:</b>	Source-oriented	Source-oriented	General/ background
<b>Scale:</b>	Middle	Neighborhood	Regional
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	No – Data Requirements Rule	No – Data Requirements Rule	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Started Jan. 1, 2017	Started Jan. 6, 2017	None

<sup>a</sup> Monitor uses an instrumental pulsed fluorescence method using a Thermo Electron 43i TLE, Air Quality System, AQS, method code 560.

<sup>b</sup> Operated by Duke Progress Energy. Monitor uses an instrumental pulsed fluorescence method using a Thermo Electron 43i TLE, Air Quality System, AQS, method code 560.

<sup>c</sup> Monitors use an instrumental pulsed fluorescence method using a Thermo Electron 43i, Air Quality System, AQS, method code 060.

**Table 13 The 2017-2018 Sulfur Dioxide Monitoring Network for the Myrtle Beach-Concord-North Myrtle Beach and Wilmington MSAs**

<b>AQS Site Id Number:</b>	371290006	37-129-0002	37-019-0005
<b>Site Name:</b>	New Hanover	Castle Hayne	Southport DRR
<b>Street Address:</b>	2400 US Highway 421 N	6028 Holly Shelter Road	5538 Rob Gandy Blvd SE
<b>City:</b>	Wilmington	Castle Hayne	Southport
<b>Latitude:</b>	34.268403	34.364167	33.942222
<b>Longitude:</b>	-77.956529	-77.838611	-78.019167
<b>MSA, CSA or CBSA represented:</b>	Wilmington	Wilmington	Myrtle Beach-Concord-North Myrtle Beach
<b>Monitor Type:</b>	SLAMS	Special purpose	Industrial
<b>Operating Schedule:</b>	Hourly – every year	Hourly – every third year	Hourly – every year
<b>Statement of Purpose:</b>	Maximum concentration site to ensure compliance w/NAAQS; required PWEI monitor	Industrial expansion monitoring for PSD modeling.	Maximum concentration site in the vicinity of the CPI-Southport Plant. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure/highest concentration	General/background	Source-oriented
<b>Scale:</b>	Urban	Regional	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes –PWEI	No	Yes – Data Requirements Rule
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Will shut down on 12/31/2017	Will operate in 2020	Started Oct. 18, 2016

<sup>a</sup> Monitor uses an instrumental pulsed fluorescence method using a Thermo Electron 43i, Air Quality System, AQS, method code 060.

<sup>b</sup> Monitor uses an instrumental pulsed fluorescence method using a Thermo Electron 43i TLE, Air Quality System, AQS, method code 560.

**Table 14 The 2017-2018 Sulfur Dioxide Monitoring Network  
for areas outside MSAs <sup>a</sup>**

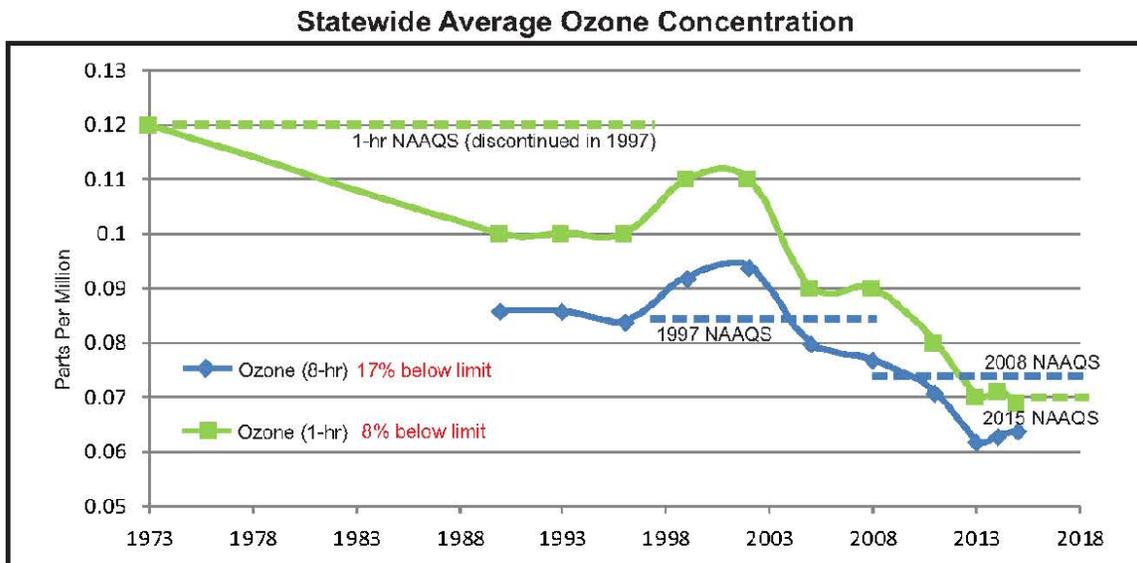
<b>AQS Site Id Number:</b>	370130151 <sup>b</sup>	37-105-0002	37-117-0001
<b>Site Name:</b>	Bayview	Blackstone	Jamesville
<b>Street Address:</b>	229 NC Highway 306N	4110 Blackstone Drive	1210 Hayes Street
<b>City:</b>	Bath	Sanford	Jamesville
<b>Latitude:</b>	35.428	35.432500	35.810690
<b>Longitude:</b>	-76.74	-79.288700	-76.897820
<b>MSA, CSA or CBSA represented:</b>	None	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	SLAMS	Special purpose	Special purpose
<b>Operating Schedule:</b>	Hourly – every year	Hourly Year-round	Hourly – every third year
<b>Statement of Purpose:</b>	Fence-line monitoring at PCS Phosphate facility to ensure compliance with the NAAQS	General/ background site for shale gas development study.	Industrial expansion monitoring for PSD modeling.
<b>Monitoring Objective:</b>	Source oriented	General/ background	Upwind/ background general/ background
<b>Scale:</b>	Neighborhood	Urban	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQSA-0486-060	Yes: EQSA-0486-060	Yes: EQSA-0486-060
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes – DRR monitor	No – not required	No – rotating PSD background monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	Monitor operated 4/1/2016 to 3/31/2017

<sup>a</sup> All monitors use an instrumental pulsed fluorescence method using a Thermo Electron 43i, Air Quality System, AQS, method code 060.

<sup>b</sup> This monitor is in Beaufort County on the fence line of the PCS Phosphate facility. It replaced the New Aurora Site, 370130007, that was dislocated by nearby current land clearing and future mining activities.

## V. Ozone Monitoring Network

The North Carolina Division of Air Quality, DAQ, operates an extensive ozone network covering the state from large urban areas to smaller rural areas and from valley communities to mountain top recreation and wilderness areas. This strong network has greatly benefited the state by enabling the DAQ to learn how ozone is transported to and within the state, to identify the parts of the state where the formation of ozone results in peak concentrations and to know where ozone concentrations do and do not exceed the national ambient air quality standards, NAAQS. By having sufficient monitors to provide understanding of ozone formation in an area, DAQ could make strong arguments with the United States Environmental Protection Agency, EPA, to prevent certain areas of the state from being designated as nonattainment and could develop effective state implementation plans. Data from previous years, as shown in Figure 31, indicate statewide levels of ozone are below the 8-hour standard established by the EPA in 2015.



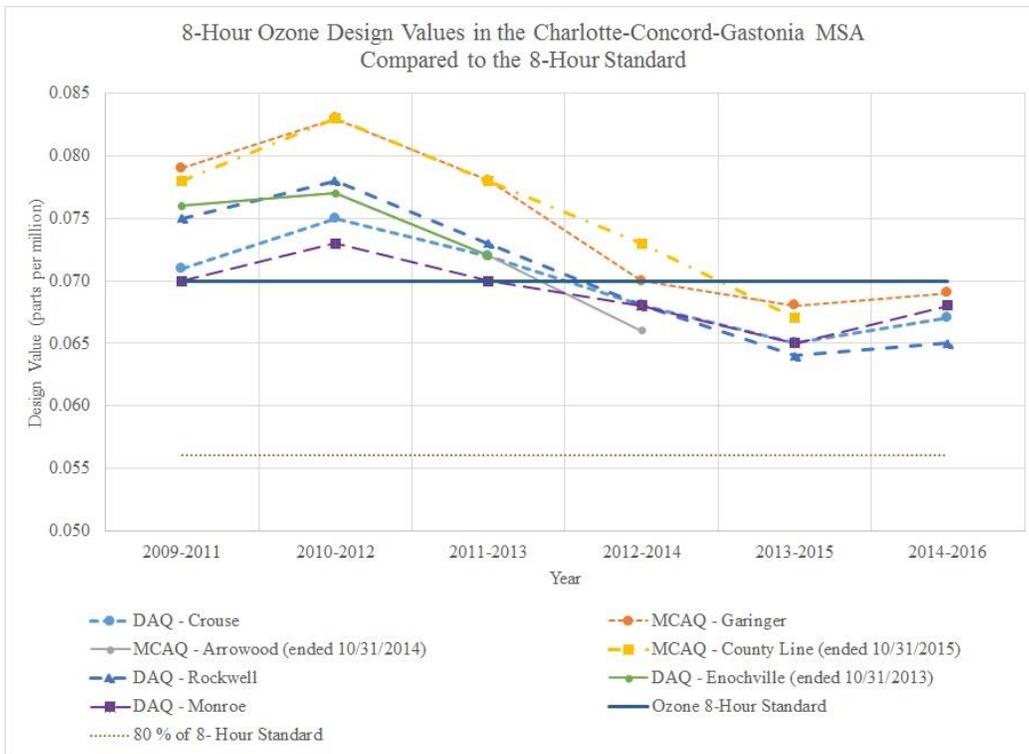
**Figure 31. Statewide trends for ozone**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air\\_Quality\\_Trends\\_in\\_North\\_Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air_Quality_Trends_in_North_Carolina.pdf) )

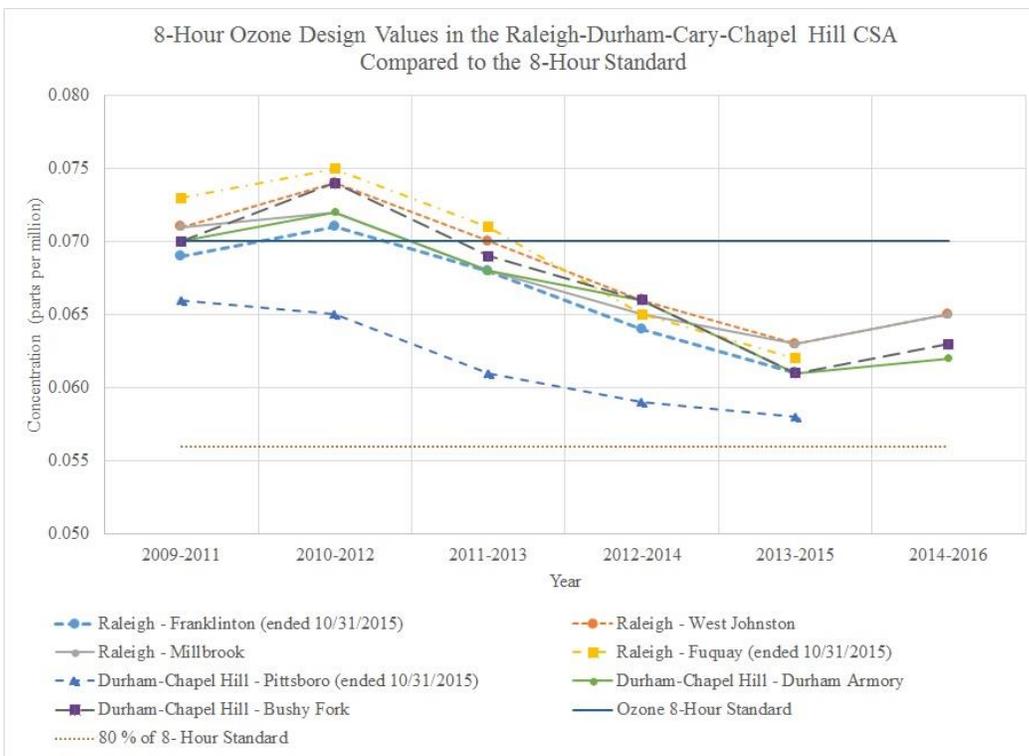
### A. Analysis of Existing Monitors

#### 1. Analysis of Measured Concentrations Compared to NAAQS

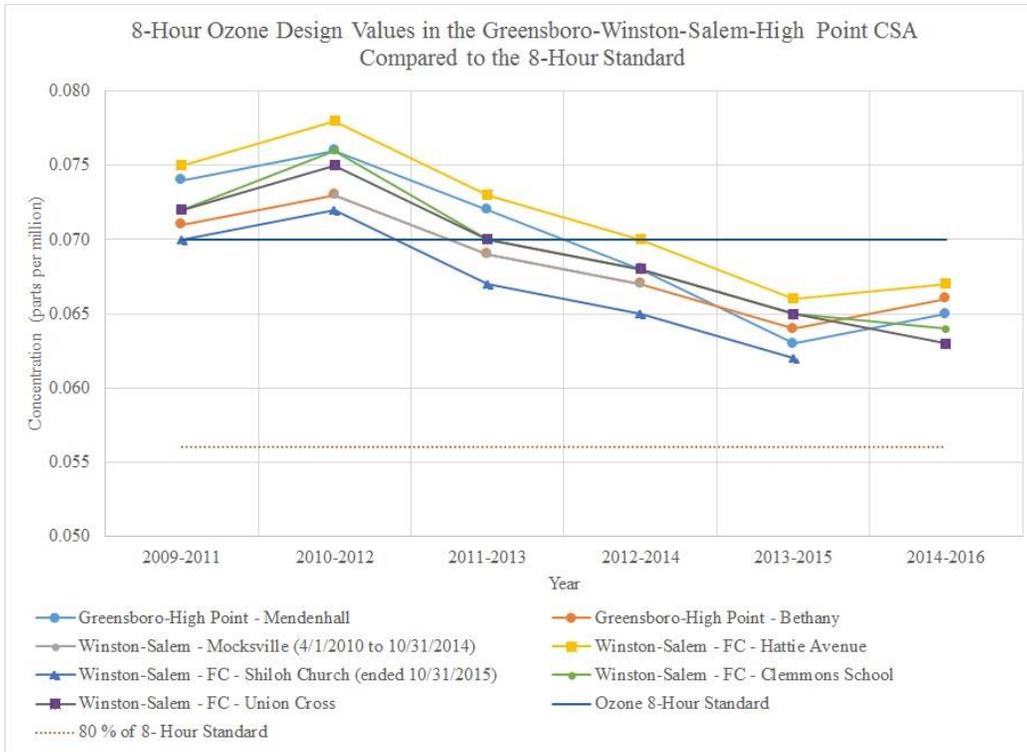
Figure 32 through Figure 37 graphically display the ozone design values for the monitors in the North Carolina state-operated network for the past five years. This information is important because 40 CFR 58.14(c)(1) requires a monitor to be attaining the NAAQS for the past five years before the monitor can be shut down. On Oct. 1, 2015, the EPA lowered the 8-hour ozone standard to 0.070 parts per million. Only 13 of the 34 monitors operated by the state and local programs in 2016 have met an 8-hour ozone design value of 0.070 parts per million for the past five years. These monitors are located in:



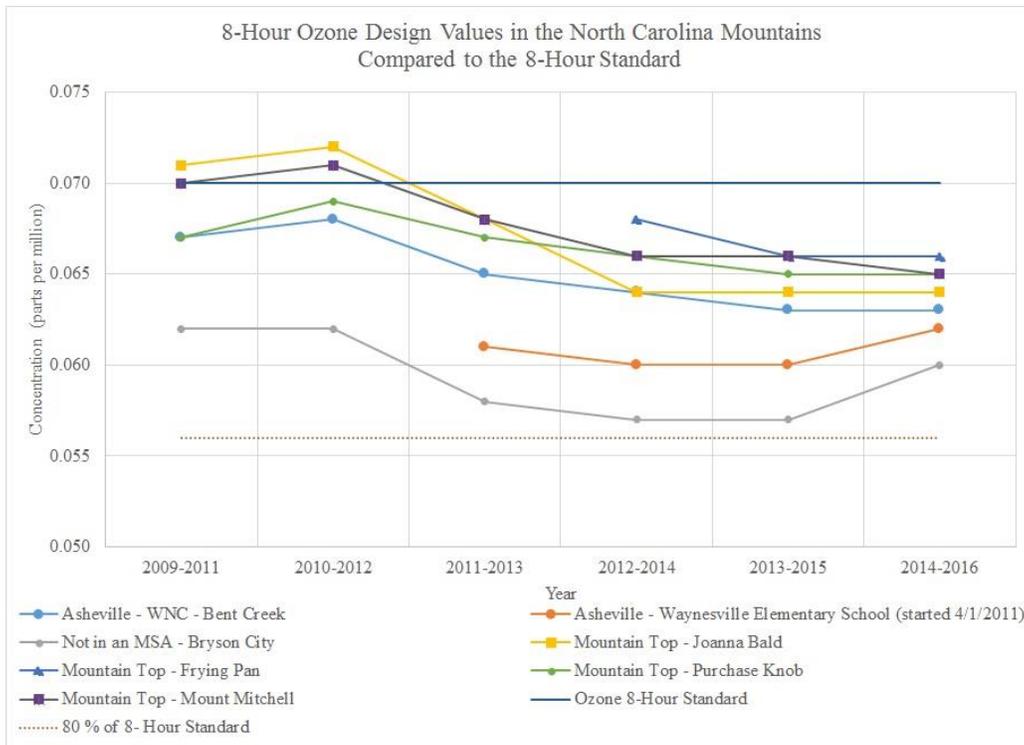
**Figure 32. Ozone design values in the Charlotte-Concord-Gastonia MSA**



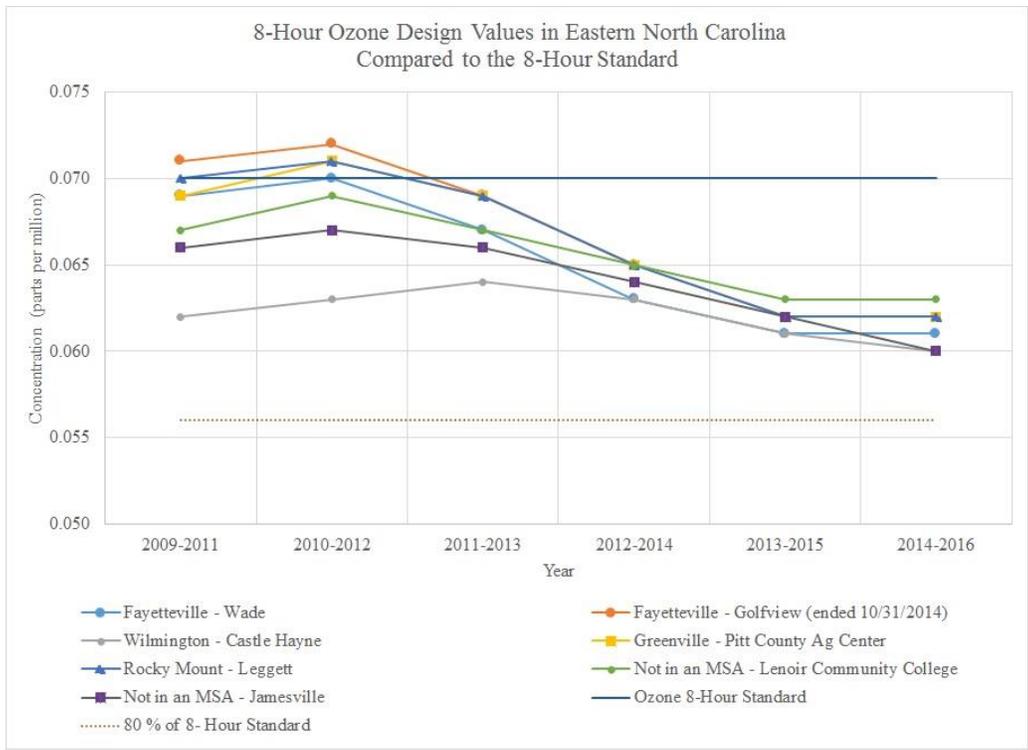
**Figure 33. Ozone design values in the Raleigh and Durham-Chapel Hill MSAs**



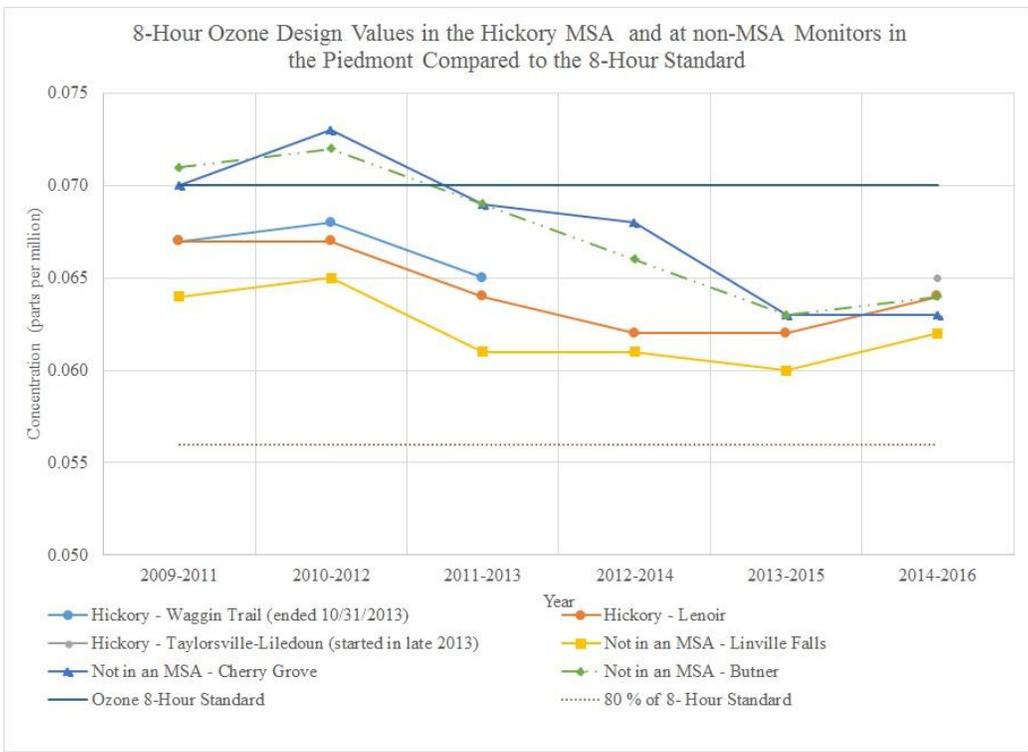
**Figure 34. Ozone design values for the Greensboro-High Point and Winston-Salem MSAs**



**Figure 35. Ozone design values for the Asheville MSA and North Carolina mountains**



**Figure 36. Ozone design values in the Fayetteville, Greenville, Rocky Mount and Wilmington MSAs and at other coastal sites**



**Figure 37. Ozone design values in the Hickory MSA and at other monitors in the piedmont area**

- The Asheville MSA – Waynesville, 37-087-0004/8, in Haywood County and Bent Creek, 37-021-0030, in Buncombe County;
- The Hickory-Lenoir-Morganton MSA – Lenoir, 37-027-0003, in Caldwell County and Waggin Trail, 37-003-0004, replaced by Taylorsville-Liledoun, 37-003-0005, in Alexander County;
- The Fayetteville MSA – Wade, 37-051-008 and Golfview 37-051-1003, replaced by Honeycutt, 37-051-0010, in Cumberland County;
- The Wilmington MSA - Castle Hayne, 37-129-0002, in New Hanover County;
- Mountain Top Sites - Purchase Knob, 37-087-0036, and Frying Pan, 37-087-0035, in Haywood County; and
- Valley, Piedmont and Coastal Sites not in MSAs: Bryson City, 37-173-0002, in Swain County; Lenoir Community College, 37-107-0004, in Lenoir County; Jamesville, 37-117-0001, in Martin County; and Linville Falls, 37-011-0002, in Avery County.

None of these 13 monitors have design values less than 80 percent of the NAAQS so they will not meet the additional requirement of having less than 10 percent probability of exceeding 80 percent of the NAAQS during the next three years. Thus, DAQ does not propose to shut down any ozone monitors based on design values alone.

2. Analysis of Operating Monitors Compared to Appendix D Requirements

Other ozone monitors that could be considered for shut down are those monitors that exceed the minimum number of monitors required in 40 CFR 58 Appendix D Table D-2 provided in Figure 38. The latest estimated population of the MSA and the most recent ozone 8-hour design value for the area determines the number of required monitors for an area.

TABLE D-2 OF APPENDIX D TO PART 58.—  
SLAMS MINIMUM O<sub>3</sub> MONITORING REQUIREMENTS

MSA population <sup>1,2</sup>	Most recent 3-year design value concentrations ≥85% of any O <sub>3</sub> NAAQS <sup>3</sup>	Most recent 3-year design value concentrations <85% of any O <sub>3</sub> NAAQS <sup>3,4</sup>
>10 million .....	4	2
4–10 million .....	3	1
350,000–<4 million .....	2	1
50,000–<350,000 <sup>5</sup>	1	0

<sup>1</sup>Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

<sup>2</sup>Population based on latest available census figures.

<sup>3</sup>The ozone (O<sub>3</sub>) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

<sup>4</sup>These minimum monitoring requirements apply in the absence of a design value.

<sup>5</sup>Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

**Figure 38. 40 CFR 58 Appendix D Table D-2**

Table 15 provides the 2016 estimated population for the MSAs in North Carolina, the design values for 2014-2016, the number of required monitors based on Appendix D and the number of current monitors operated by the DAQ and the local programs. Currently,

**Table 15 Design Values and Required Ozone Monitors for North Carolina  
Metropolitan Statistical Areas, MSA**

MSA	Population Estimate, 2016 <sup>a</sup>	2014-2016 Ozone 8-Hour Design Value (As percent of NAAQS) <sup>b</sup>	Number of Monitors operated in North Carolina	
			Required	Current
Charlotte-Concord- Gastonia	2,474,314	99	2	5 <sup>c</sup>
Virginia Beach-Norfolk-Newport News, VA-NC	1,726,907	93	2	0 <sup>d</sup>
Raleigh	1,302,946	93	2	2
Greensboro-High Point	756,139	94	2	2
Winston-Salem	662,079	96	2	3
Durham-Chapel Hill	559,535	90	2	2
Asheville	452,319	90	2	2
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	449,295	Estimated at 59	1	0 <sup>e</sup>
Fayetteville	380,389	91	2	2
Hickory-Lenoir-Morganton	364,187	93	2	2
Wilmington	282,573	86	1	1
Jacksonville	187,136	Not Available	0	0
Greenville	177,220	89	1	1
Burlington	159,688	Not Available	0	0
Rocky Mount	147,323	89	1	1
New Bern	126,111	Not Available	0	0
Goldsboro	124,150	Not Available	0	0

<sup>a</sup> Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016; Source: U.S. Census Bureau, Population Division; Release Date: March, 23, 2017, available on the world wide web at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.

<sup>b</sup> The national ambient air quality standard for an 8-hour period is 0.070 parts per million. Attainment is based on the average of the 4th highest value over three consecutive ozone seasons. Values of 0.070, which is equivalent to 100 percent, and below are attaining the national ambient air quality standard.

<sup>c</sup> South Carolina Department of Health and Environment operates an additional monitor in York County, South Carolina.

<sup>d</sup> Virginia Department of Environmental Quality, VDEQ, Office of Air Quality Monitoring operates three monitors in this MSA.

<sup>e</sup> South Carolina Department of Health and Environment operates a monitor in Horry County, South Carolina, starting in July 2016.

Myrtle Beach-Conway-North Myrtle Beach MSAs. The DAQ has a written agreement with the Virginia Department of Environmental Quality, VDEQ, Office of Air Quality Monitoring, that VDEQ will maintain the minimum required number of monitors for the

Virginia Beach-Norfolk-New Port News MSA.<sup>30</sup> The Office of Management and Budget the DAQ and the local programs operate at least the minimum number of required monitors in every MSA except for the Virginia Beach-Norfolk-New Port News and the changed the Myrtle Beach-Conway-North Myrtle Beach MSA definition in February 2013 to include Brunswick County in North Carolina. Adding Brunswick County to the MSA resulted in the MSA exceeding the 350,000 population-threshold for a required ozone monitor. In May 2015, the South Carolina Department of Health and Environmental Control, DHEC, proposed operating a monitor in Horry County. The DHEC started operating this monitor on July 27, 2016. The DAQ worked with DHEC to develop an appropriate monitoring agreement. This monitoring agreement is provided in Appendix K. Monitoring Agreement for the Myrtle Beach-Conway-North Myrtle Beach Metropolitan Statistical Area. Brunswick County was formerly part of the Wilmington, NC, MSA and for many years was characterized by the Castle Hayne ozone monitor. As shown in Figure 36, Castle Hayne's highest design value during the past five years was 64 ppb. The Castle Hayne monitor has never violated the ozone standard.

The DAQ evaluated each MSA with more than the required monitors to determine if all the current monitors in the MSA are still needed and providing valuable information. The local program monitors were not included in this analysis. The local program monitors were excluded because the decision on whether to continue to operate them or shut them down is up to the local program and not the DAQ. Thus, three monitors were considered in this evaluation.

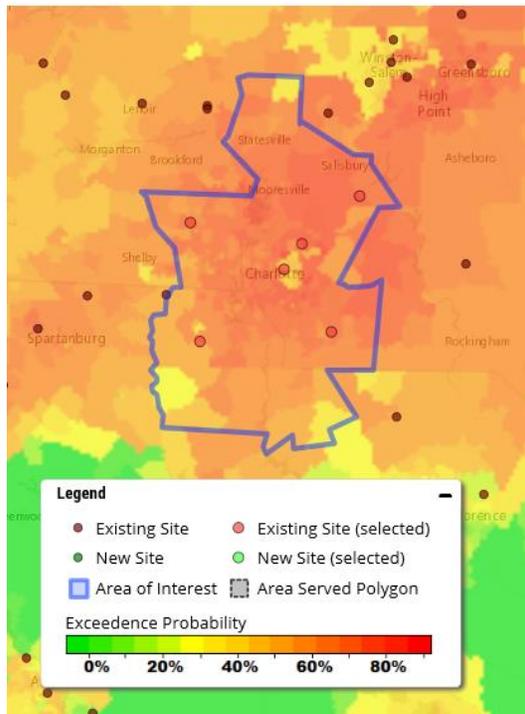
### **Monroe Middle School, 37-179-0003**

#### **Monroe Middle School, shown in**

Figure 39, is in the Charlotte-Concord-Gastonia MSA, also known as the Metrolina area. This monitor provides valuable information for ozone forecasting in the Metrolina area. Because it is attaining the standard, these data can also be used to justify excluding part of Union County from the Metrolina nonattainment area should the area fail to attain the 2015 ozone standard at any time in the future. Union County is one of the fastest growing counties in North Carolina and is one of the fastest growing counties in the nation. It is also located in the state's largest MSA. The DAQ views this monitor as being significant for attainment and maintenance plan development for the Metrolina area and will therefore be retaining this site.

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<sup>30</sup> See Appendix J. Monitoring Agreement between Virginia and North Carolina for the Virginia Beach-Norfolk-New Port News Metropolitan Statistical Area.



The Rockwell site is furthest to the northeast; the Monroe site is furthest to the southeast; and the Crouse site is furthest to the northwest. The color of the map indicates the probability of having at least one exceedance of the 2015 ozone standard of 0.070 parts per million.

**Figure 39. Charlotte-Concord-Gastonia MSA ozone monitors.**

**Crouse, 37-109-0004**

**As shown in**

Figure 39, Crouse is in the Charlotte-Concord-Gastonia MSA. This monitor provides valuable spatial information for ozone forecasting in the Charlotte area. Elimination of the Crouse monitor would leave a hole in the ozone network in the area to the west of Charlotte. The data from this monitor are also valuable in helping to determine nonattainment boundaries and keeping Lincoln County or parts of Lincoln County from being designated as nonattainment should the Metrolina area in the future ever fail to attain the 2015 ozone standard. The DAQ views this monitor as being a significant monitor for attainment and maintenance plan development for the Metrolina area and will therefore be retaining this site.

**Rockwell, 37-159-0021**

**As shown in**

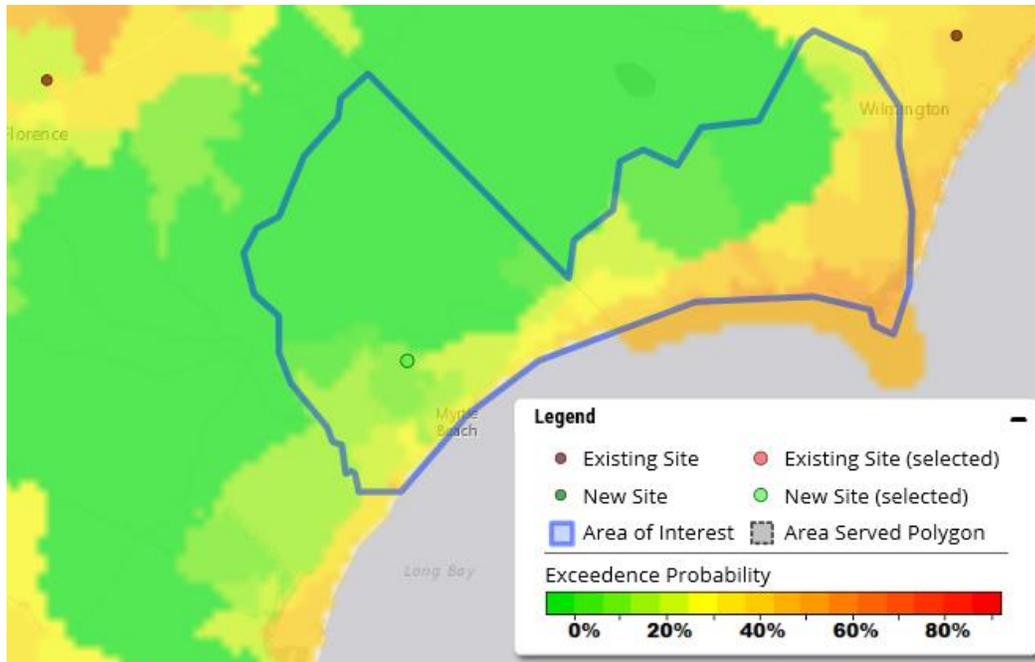
Figure 39, Rockwell is in the Charlotte-Concord-Gastonia MSA. The ozone concentrations measured at Rockwell are sometimes some of the highest ozone concentrations measured in the MSA. DAQ believes the information collected at Rockwell is important in adding to our understanding of pollution formation and transport in the Piedmont area. Rockwell is downwind of Charlotte and provides information on the pollution being transferred out of Charlotte into the Winston-Salem area. The DAQ views this monitor as being a significant monitor for attainment and maintenance plan development. Thus, the DAQ plans to retain the Rockwell monitor.

#### *B. Analysis of Unmonitored Areas with Rapid Population Growth*

The DAQ also evaluated the fastest growing areas in the state. Of the 12 fastest growing counties in North Carolina listed in Table 1, seven of those counties do not have an ozone monitor.

##### 1. Brunswick County

Brunswick County grew by 18.2 percent between April 1, 2010, and July 1, 2016. It is the 39<sup>th</sup> fastest growing county in the nation so far during this decade and it is the 37<sup>th</sup> fastest growing county in the nation during the past year. Brunswick County is impacted by growth in the Wilmington, North Carolina and North Myrtle Beach, South Carolina, areas. As of February 2013, Brunswick County is one of two counties making up the Myrtle Beach-Conway-North Myrtle Beach MSA. Before February 2013 Brunswick County was part of the Wilmington MSA. The Myrtle Beach-Conway-North Myrtle Beach MSA now has a population exceeding 350,000 so an ozone monitor is required. Based on ozone monitoring at Castle Hayne in the Wilmington MSA, the design value for the Myrtle Beach-Conway-North Myrtle Beach MSA is expected to be around 85 percent of the standard. As shown in Figure 40, the probability that there would be one exceedance of the 70-ppb ozone standard in Brunswick County is less than 50 percent. The DAQ has an agreement with the SCDHEC, which in July 2016 established the Coastal Carolina monitoring site in the Myrtle Beach-Conway-North Myrtle Beach MSA.



**Figure 40. Probability of having one exceedance of the 70-ppb ozone standard in the Myrtle Beach-Conway-North Myrtle Beach MSA**

2. Cabarrus County

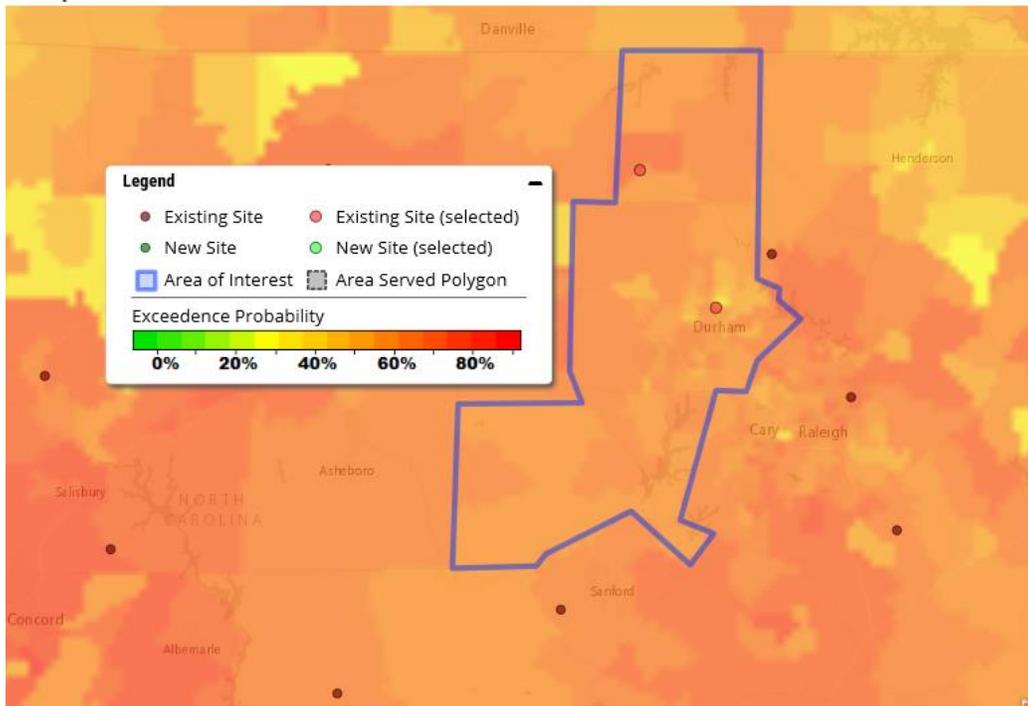
Cabarrus County is estimated to have grown by 5,082 people or 2.5 percent between July 1, 2015, and July 1, 2016. It is the 103<sup>rd</sup> fastest growing county in the nation during the past year, percentagewise. Cabarrus County is in the Charlotte-Concord-Gastonia MSA. Currently, the DAQ is required to operate two monitors in the MSA. As shown in

Figure 39, this MSA currently has six ozone monitors, with one monitor to the south and one to the north of the county. The ozone exceedance probability for Cabarrus County indicates that the probability of having one exceedance of the 70-ppb ozone standard in Cabarrus County is as likely as the probability of having one exceedance at either of these two monitors. Thus, the existing monitors should adequately characterize the air quality in Cabarrus County. Currently, DAQ has no plans to monitor for ozone there.

3. Chatham County

Chatham County is estimated to have grown by 1,473 people or 2.0 percent between July 1, 2015, and July 1, 2016. It is the 88<sup>th</sup> fastest growing county in the nation during the current decade percentagewise. Chatham County is in the Durham-Chapel

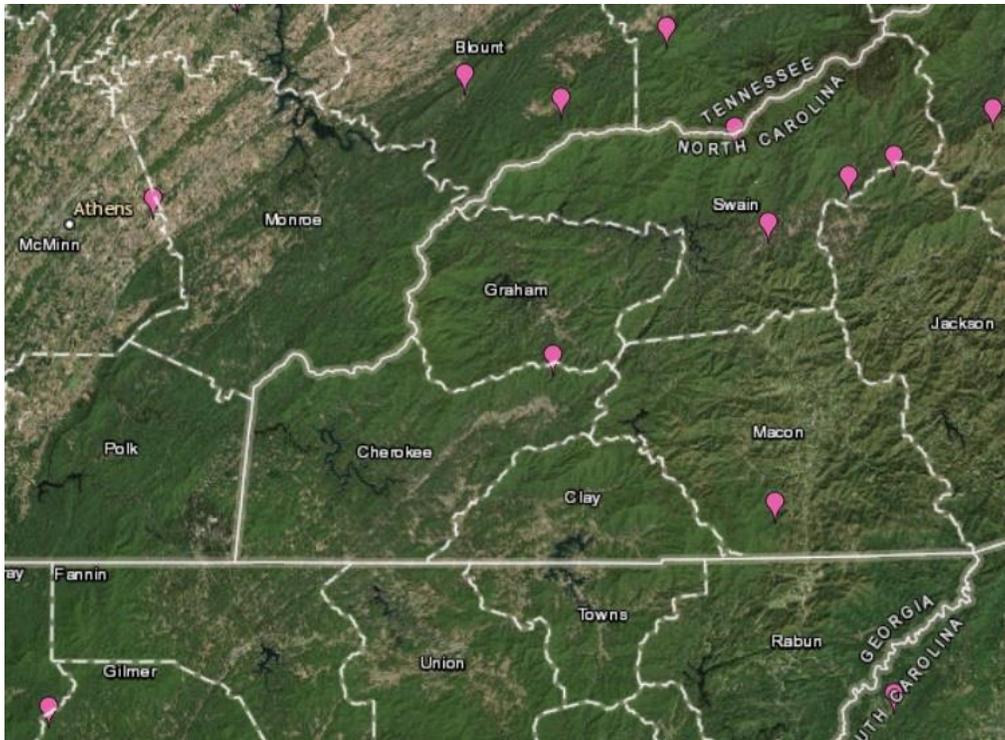
Hill MSA. Currently, the DAQ is required to operate two monitors in this MSA. As shown in Figure 41, the ozone exceedance probability for Chatham County indicates that the probability of having one exceedance of the 70-ppb ozone standard in Chatham County is as likely as the probability of having one exceedance at either of these two monitors. Thus, the existing monitors should adequately characterize the air quality in Chatham County. Currently, DAQ has no plans to resume monitoring for ozone there.



**Figure 41. Probability of having one exceedance of the 70-ppb ozone standard in the Durham-Chapel Hill MSA.**

#### 4. Cherokee County

Cherokee County is estimated to have grown by 768 people or 2.8 percent between July 1, 2015, and July 1, 2016. It is the 87<sup>th</sup> fastest growing county in the nation during the past year percentagewise. As shown in Figure 41, Cherokee County is the furthest west county in the state and adjoins Georgia to the south and Tennessee to the west. Currently, the closest monitor to Cherokee County operated by DAQ is at Joanna Bald, 37-075-0001, which is located just over the county line. The 2014-2016 ozone design value for the Joanna Bald monitor is at 91 percent of the standard. The DAQ expects the ozone concentrations in Cherokee County to be as likely as or lower than the ozone concentrations measured at the Joanna Bald monitor. Thus, the existing Joanna Bald monitor should adequately characterize the air quality in Cherokee County. Thus, DAQ has no plans to monitor for ozone there.

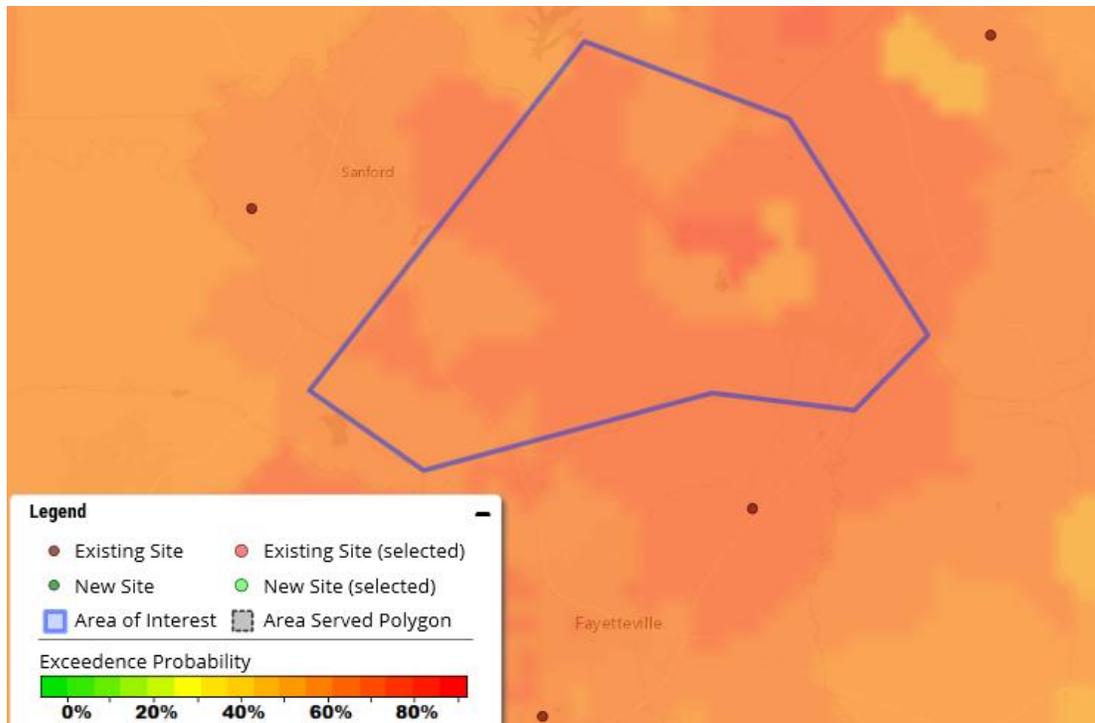


**Figure 42. Ozone monitors near Cherokee County**

(map is from <https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=5f239fd3e72f424f98ef3d5def547eb5&extent=-146.2334,13.1913,-46.3896,56.5319>.)

### 5. Harnett County

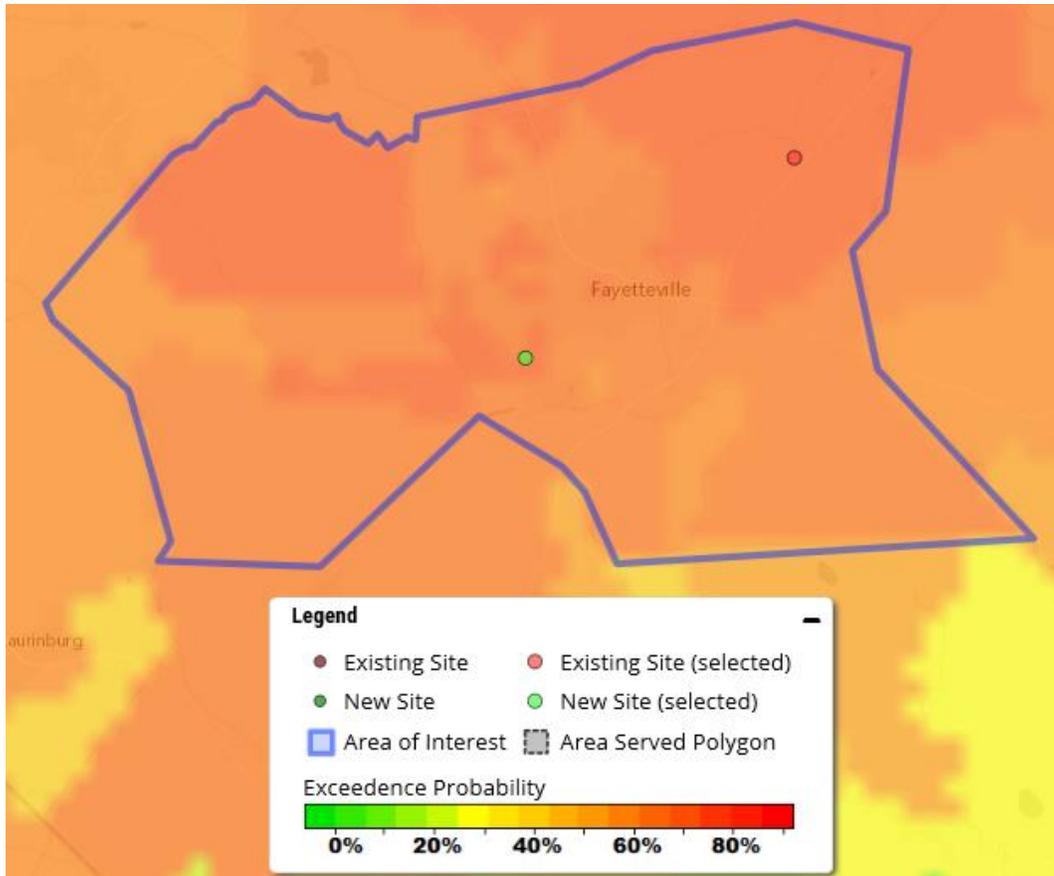
Harnett County grew by 14.1 percent between April 1, 2010, and July 1, 2016. It is the 83<sup>rd</sup> fastest growing county in the nation during this decade. Harnett County is located between Raleigh to the north and Fort Bragg and the Fayetteville MSA to the south, two rapidly growing areas. As shown in Figure 43 there are three ozone monitors surrounding Harnett County: West Johnston to the northeast, Wade to the south and Blackstone to the west. Also, Figure 43 indicates the probability for any area within the county to have one exceedance of the 70-ppb ozone standard is as likely as the probability of any of the neighboring monitors exceeding the standard. Thus, the DAQ currently does not plan to monitor for ozone in Harnett County.



**Figure 43. Ozone monitors surrounding Harnett County**

### 6. Hoke County

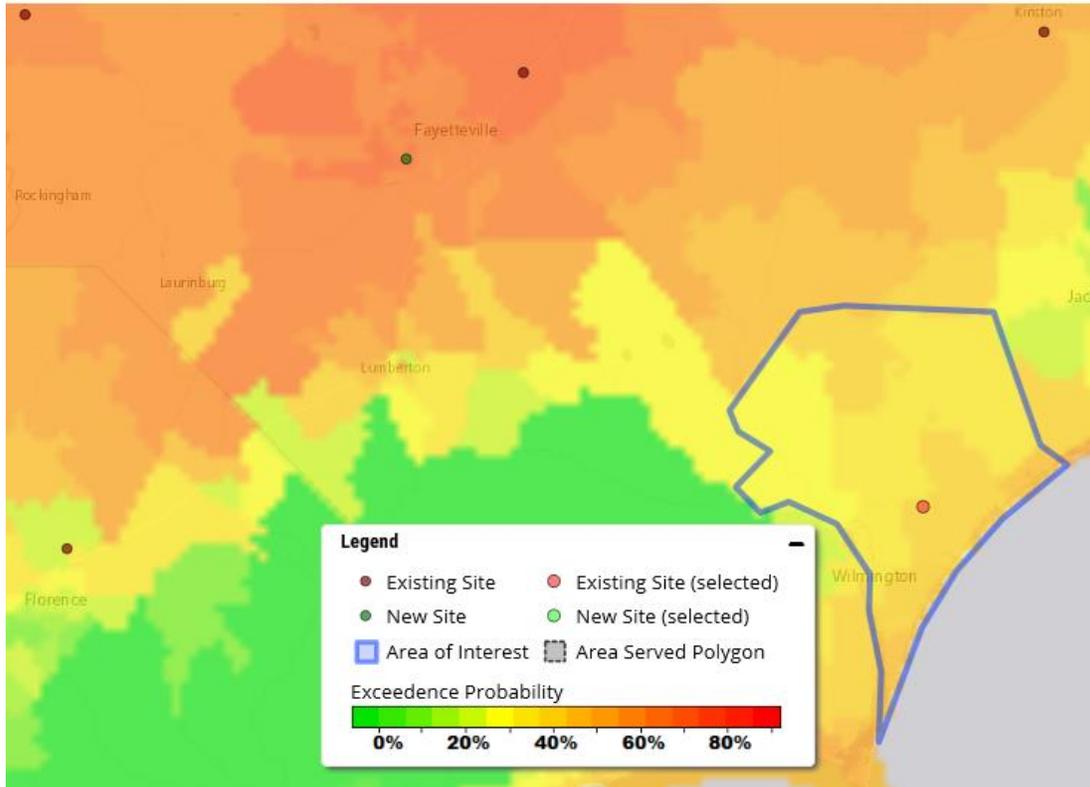
Hoke County grew by 13.4 percent between April 1, 2010, and July 1, 2016. It is the 97<sup>th</sup> fastest growing county in the nation during this decade. Hoke County is part of the Fayetteville MSA. The DAQ currently operates two ozone monitors in the Fayetteville MSA as required by 40 CFR 58 Appendix D. Both monitors are in Cumberland County. The ozone exceedance probability for Hoke County, as shown in Figure 44, indicates the probability of having one exceedance of the 70-ppb ozone standard in Hoke County is similar to the probability of having an exceedance at the Wade monitor in Cumberland County. Currently this monitor has a design value of 0.061 parts per million. Thus, the DAQ currently has no plans to monitor for ozone in Hoke County.



**Figure 44. Probability of having one exceedance of the 70-ppb ozone standard in the Fayetteville MSA.**

7. Pender County

Pender County grew by 1,410 people, or 2.4 percent, between July 1, 2015, and July 1, 2016, and is the 108<sup>th</sup> fastest growing county in the nation during this decade. Pender County is in the Wilmington MSA. Currently, the DAQ is required to operate one monitor in the MSA. This monitor is located at Castle Hayne in New Hanover County. The Castle Hayne monitor indicates that the ozone concentrations on the coast are currently at 86 percent of the NAAQS. The ozone exceedance probability for Pender County shown in Figure 45 indicates the probability of having one exceedance of the 70 ppb ozone standard in Pender County is similar to the probability of having an exceedance at Castle Hayne. As a result, the DAQ has no plans to monitor for ozone in Pender County at this time.



**Figure 45. Probability of having one exceedance of the 70-ppb ozone standard in the Wilmington MSA**

*C. Changes to Existing Monitors*

At this time, the DAQ is not aware of any changes that need to be made to any existing monitors.

*D. DAQ Recommendations*

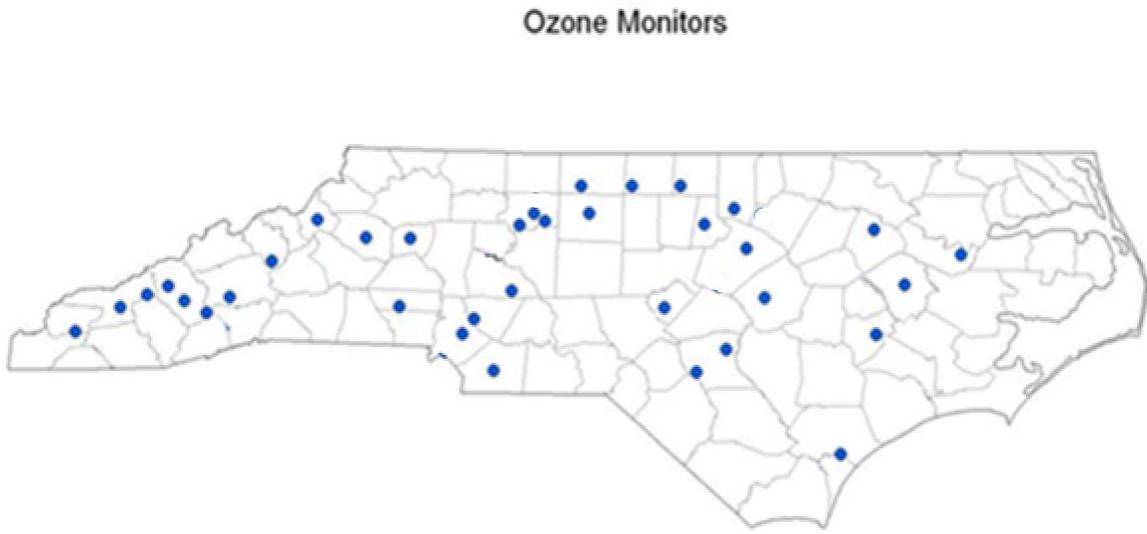
The DAQ recommends:

- Maintaining the current size of the network and all the currently operating sites;
- Not establishing any new ozone sites in 2017 or 2018; and
- Evaluating the data collected at the special purpose monitoring site in Lee County for baseline shale gas development monitoring to determine whether it met the objectives of the study. Based on the results of the evaluation, DAQ will submit a recommendation on whether to continue operating the site. Until that time, DAQ recommends maintaining the site as a special purpose monitoring site.

*E. Network Description*

Figure 46 shows the locations of the ozone monitors operating in 2017. The locations, monitor type, operating schedules, monitoring objectives, scales, statement of purpose and any proposed change to the monitor or site are listed in Table 16 through

Table 27. All monitors listed in these tables are suitable for comparison to the national ambient air quality standards and meet the requirements of Appendices A, C, D and E of Part 58. All these monitors use the EPA equivalent method designation EQOA-0880-047. All seasonal monitors operate on an hourly schedule from March 1 through Oct. 31 each year, except for the mountain top monitors, which will operate as soon after March 1 as the weather will allow through Oct. 31. The DAQ requested and received a waiver for the start of the monitoring season for the mountain top sites because the roads going to the sites are often closed during February. Several of the monitors operate year-round.



**Figure 46. Location of 2017 ozone monitoring stations**

**Table 16 The 2017-2018 Ozone Monitoring Network for the Charlotte-Concord-Gastonia MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-109-0004	37-119-0041 <sup>b</sup>	37-119-0046 <sup>b</sup>	37-159-0021	37-179-0003
<b>Site Name:</b>	Crouse	Garinger	University Meadows	Rockwell	Monroe Middle School
<b>Street Address:</b>	1487 Riverview Road	1130 Eastway Drive	1660 Pavilion Blvd	301 West Street	701 Charles Street
<b>City:</b>	Lincolnton	Charlotte	Charlotte	Rockwell	Monroe
<b>Latitude:</b>	35.438556	35.2401	35.314158	35.551868	34.973889
<b>Longitude:</b>	-81.276750	-80.7857	-80.713469	-80.395039	-80.540833
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia
<b>Monitor Type:</b>	SLAMS	SLAMS / NCore	SLAMS	SLAMS	Special purpose
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly Year round	Hourly 4/1 to 10/31	Hourly Year round	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Compliance w/NAAQS; SIP development.	Compliance with NAAQS; AQI reporting; ozone precursor monitoring	AQI reporting. Compliance w/NAAQS.	Modeling; compliance w/NAAQS.	Forecasting. Compliance w/NAAQS. SIP Development
<b>Monitoring Objective:</b>	General/background	Highest concentration	Highest concentration	Highest concentration	Population exposure
<b>Scale:</b>	Urban	Neighborhood	Urban	Urban	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	No	Yes - NCore	Yes	No	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	None	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

<sup>b</sup> Operated by Mecklenburg County Air Quality, AQS primary quality assurance organization and reporting agency 0669

**Table 17 The 2017-2018 Ozone Monitoring Network for the Raleigh MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-101-0002	37-183-0014
<b>Site Name:</b>	West Johnston	Millbrook
<b>Street Address:</b>	1338 Jack Road <sup>c</sup>	3801 Spring Forest Road
<b>City:</b>	Clayton	Raleigh
<b>Latitude:</b>	35.590833	35.8561
<b>Longitude:</b>	-78.461944	-78.5742
<b>MSA, CSA or CBSA represented:</b>	Raleigh	Raleigh
<b>Monitor Type:</b>	SLAMS	SLAMS / NCore
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly Year round
<b>Statement of Purpose:</b>	Real-time AQI reporting for the Raleigh MSA. Compliance w/NAAQS. SIP development	Maximum Concentration Site for Raleigh MSA. Ozone precursor monitoring Site. Real-time AQI reporting for the Raleigh MSA. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	General/background	Maximum ozone concentration/ population exposure
<b>Scale:</b>	Urban	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes - NCore
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

**Table 18 The 2017-2018 Ozone Monitoring Network for the Greensboro-High Point MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-081-0013	37-157-0099
<b>Site Name:</b>	Mendenhall	Bethany
<b>Street Address:</b>	205 Willoughby Blvd.	6371 NC 65
<b>City:</b>	Greensboro	Bethany
<b>Latitude:</b>	36.109167	36.308889
<b>Longitude:</b>	-79.801111	-79.859167
<b>MSA, CSA or CBSA represented:</b>	Greensboro-High Point	Greensboro-High Point
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Maximum concentration site downwind of the Greensboro-High Point MSA. Compliance w/NAAQS. Real-time AQI	Maximum ozone concentration site downwind of the Winston-Salem MSA. Real-time AQI reporting for the Greensboro-Winston-Salem-

**Table 18 The 2017-2018 Ozone Monitoring Network for the Greensboro-High Point MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-081-0013	37-157-0099
<b>Site Name:</b>	Mendenhall	Bethany
	reporting for the Greensboro-Winston-Salem-High-Point CSA	High-Point CSA. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Highest concentration
<b>Scale:</b>	Urban	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

**Table 19 The 2017-2018 Ozone Monitoring Network for the Winston-Salem MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-067-0022 <sup>b</sup>	37-067-0030 <sup>b</sup>	37-067-1008 <sup>b</sup>
<b>Site Name:</b>	Hattie Avenue	Clemmons School	Union Cross
<b>Street Address:</b>	1300 block of Hattie Avenue	Fraternity Church Road	3656 Piedmont Memorial Drive
<b>City:</b>	Winston-Salem	Clemmons	Union Cross
<b>Latitude:</b>	36.110556	36.026000	36.050833
<b>Longitude:</b>	-80.226667	-80.342000	-80.143889
<b>MSA, CSA or CBSA represented:</b>	Winston-Salem	Winston-Salem	Winston-Salem
<b>Monitor Type:</b>	Other	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Urban center city site for modeling. Real-time AQI reporting for the Greensboro-Winston-Salem-High Point CSA. Compliance w/NAAQS.	. Real-time AQI reporting for the Greensboro-Winston-Salem-High Point CSA. Compliance w/NAAQS.	Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047

**Table 19 The 2017-2018 Ozone Monitoring Network for the Winston-Salem MSA**

<sup>a</sup>

<b>AQS Site Id Number:</b>	37-067-0022 <sup>b</sup>	37-067-0030 <sup>b</sup>	37-067-1008 <sup>b</sup>
<b>Site Name:</b>	Hattie Avenue	Clemmons School	Union Cross
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	No	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

<sup>b</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS primary quality assurance organization and reporting agency 0403

**Table 20 The 2017-2018 Ozone Monitoring Network for the Durham-Chapel Hill MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-063-0015	37-145-0003
<b>Site Name:</b>	Durham Armory	Bushy Fork
<b>Street Address:</b>	801 Stadium Drive	7901 Burlington Road
<b>City:</b>	Durham	Hurdle Mills
<b>Latitude:</b>	36.032944	36.306965
<b>Longitude:</b>	-78.905417	-79.091970
<b>MSA, CSA or CBSA represented:</b>	Durham-Chapel Hill	Durham-Chapel Hill
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Maximum concentration site in the Durham-Chapel Hill MSA. Real-time AQI reporting for the Durham-Chapel Hill MSA. Compliance w/NAAQS.	Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	General/background
<b>Scale:</b>	Neighborhood	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

**Table 21 The 2017-2018 Ozone Monitoring Network for the Asheville MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-021-0030 <sup>b</sup>	37-087-0008
<b>Site Name:</b>	Bent Creek	Waynesville E.S.
<b>Street Address:</b>	Route 191 South	2236 Asheville Road
<b>City:</b>	Asheville	Waynesville
<b>Latitude:</b>	35.500102	35.507160
<b>Longitude:</b>	-82.599860	-82.963370
<b>MSA, CSA or CBSA represented:</b>	Asheville	Asheville
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Industrial expansion monitoring for PSD modeling. Real-time AQI reporting. Compliance with the NAAQS.	Low elevation, i.e., valley, site for Haywood County. Real-time AQI reporting. Modeling. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Maximum ozone concentration/ Highest concentration	Population exposure
<b>Scale:</b>	Urban	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

<sup>b</sup> Operated by Western North Carolina Regional Air Quality Agency, AQS reporting agency 0779.

**Table 22 The 2017-2018 Ozone Monitoring Network for the Fayetteville MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-051-0008	37-051-0010
<b>Site Name:</b>	Wade	Honeycutt E.S.
<b>Street Address:</b>	7112 Covington Lane	4665 Lakewood Drive
<b>City:</b>	Wade	Fayetteville
<b>Latitude:</b>	35.158686	35.00
<b>Longitude:</b>	-78.728035	-78.99
<b>MSA, CSA or CBSA represented:</b>	Fayetteville	Fayetteville
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Maximum concentration site in the Fayetteville MSA. Real-time AQI	Upwind site in the Fayetteville MSA. Real-time AQI reporting for

**Table 22 The 2017-2018 Ozone Monitoring Network for the Fayetteville MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-051-0008	37-051-0010
<b>Site Name:</b>	Wade	Honeycutt E.S.
	reporting for the Fayetteville MSA. Compliance w/NAAQS.	the Fayetteville MSA. Compliance with the NAAQS
<b>Monitoring Objective:</b>	Highest concentration	Population exposure
<b>Scale:</b>	Urban	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

**Table 23 The 2017-2018 Ozone Monitoring Network for the Hickory MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-003-0005	37-027-0003
<b>Site Name:</b>	Taylorsville-Liledoun	Lenoir
<b>Street Address:</b>	700 Liledoun Road	291 Nuway Circle
<b>City:</b>	Taylorsville	Lenoir
<b>Latitude:</b>	35.9139	35.935833
<b>Longitude:</b>	-81.191	-81.530278
<b>MSA, CSA or CBSA represented:</b>	Hickory	Hickory
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Compliance w/NAAQS..	Highest ozone precursor concentration site for Hickory MSA. Real-time AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	General/ background	General/ background
<b>Scale:</b>	Urban	Regional
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

**Table 23 The 2017-2018 Ozone Monitoring Network for the Hickory MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-003-0005	37-027-0003
<b>Site Name:</b>	Taylorsville-Liledoun	Lenoir

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

**Table 24 The 2017-2018 Ozone Monitoring Network for the  
Wilmington, Greenville and Rocky Mount MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-129-0002	37-147-0006	37-065-0099
<b>Site Name:</b>	Castle Hayne	Pitt County Ag Center	Leggett
<b>Street Address:</b>	6028 Holly Shelter Road	403 Government Circle	7589 NC Hwy 33-NW
<b>City:</b>	Castle Hayne	Greenville	Leggett
<b>Latitude:</b>	34.364167	35.638610	35.988333
<b>Longitude:</b>	-77.838611	-77.358050	-77.582778
<b>MSA, CSA or CBSA represented:</b>	Wilmington	Greenville	Rocky Mount
<b>Monitor Type:</b>	SLAMS	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Real-time AQI reporting. Compliance w/NAAQS.	Real-time AQI reporting. Compliance w/NAAQS.	Real-time AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	General/ background	General/ background
<b>Scale:</b>	Neighborhood	Regional	Regional
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

**Table 25 The 2017-2018 Ozone Monitoring Network for the Mountain Tops <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-075-0001 <sup>b</sup>	37-087-0035	37-087-0036	37-199-0004
<b>Site Name:</b>	Joanna Bald	Frying Pan	Purchase Knob	Mount Mitchell
<b>Street Address:</b>	Forest Road 423 Spur	State Rd 450, Blue Ridge Pkwy Mile 409	6905 Purchase Road	2388 State Hwy 128
<b>City:</b>	Robbinsville	Pisgah Forest	Waynesville, in the GSMNP	Burnsville
<b>Latitude:</b>	35.257930	35.379167	35.590000	35.765413
<b>Longitude:</b>	-83.795620	-82.792500	-83.077500	-82.264944
<b>MSA, CSA or CBSA represented:</b>	Not in an MSA	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	Other	Other	Other	Special purpose
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Operated in cooperation with the USFS. Located in a Class I area. Provides ozone data for PSD modeling for industrial expansion. Provides AQI data for recreational users. Modeling. Compliance w/NAAQS.	Operated in cooperation with the USFS. Located in a Class I area and collocated at an IMPROVE site. Provides ozone data for PSD modeling for industrial expansion. Provides AQI data for recreational users. Real-time AQI reporting for the Asheville MSA. Modeling. Compliance w/NAAQS.	Operated in cooperation with the USFS. Located in a Class I area. Provides ozone data for PSD modeling for industrial expansion. Provides AQI data for recreational users. Real-time AQI reporting for the Asheville MSA. Modeling. Compliance w/NAAQS.	Provides ozone data for PSD modeling for industrial expansion. Provides AQI data for recreational users. Modeling. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Welfare related impacts/ general/ background	Welfare related impacts/ general/ background	Welfare related impacts/ general/ background	Welfare related impacts/ general/ background/ regional transport
<b>Scale:</b>	Regional	Regional	Regional	Regional
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	No	No	No	No

**Table 25 The 2017-2018 Ozone Monitoring Network for the Mountain Tops <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-075-0001 <sup>b</sup>	37-087-0035	37-087-0036	37-199-0004
<b>Site Name:</b>	Joanna Bald	Frying Pan	Purchase Knob	Mount Mitchell
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	2018 ozone season will start when weather allows	2018 ozone season will start when weather allows	2018 ozone season will start when weather allows	2018 ozone season will start when weather allows

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

<sup>b</sup> This monitor is owned by the United States Forest Service and operated by the North Carolina Division of Air Quality.

**Table 26 The 2017-2018 Ozone Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA (Part 1) <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-011-0002	37-033-0001	37-077-0001	37-105-0002
<b>Site Name:</b>	Linville Falls	Cherry Grove	Butner	Blackstone
<b>Street Address:</b>	100 Linville Falls Road	7074 Cherry Grove Road	800 Central Ave	4110 Blackstone Drive
<b>City:</b>	Linville Falls	Reidsville	Butner	Sanford
<b>Latitude:</b>	35.972222	36.307033	36.141111	35.432500
<b>Longitude:</b>	-81.933056	-79.467417	-78.768056	-79.288700
<b>MSA, CSA or CBSA represented:</b>	Not in an MSA	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	Other	Other	SLAMS	Special purpose
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly Year round
<b>Statement of Purpose:</b>	Operated in cooperation with the USFS. Located in a Class I area and collocated at an IMPROVE site. Provides ozone data for PSD modeling for industrial expansion. Provides AQI data for recreational users. Modeling. Compliance w/NAAQS.	Extreme downwind site for the Greensboro-High Point MSA. Modeling. Real-time AQI reporting for the Greensboro-Winston-Salem-High Point CSA. Compliance with the NAAQS	Maximum concentration site downwind for the Durham-Chapel Hill MSA. Modeling. Real-time AQI reporting for the Raleigh-Durham-Chapel Hill CSA. Compliance w/NAAQS.	General/background site for shale gas development study.
<b>Monitoring Objective:</b>	Welfare related impacts/ general/ background	General/ background	Highest concentration	General/ background
<b>Scale:</b>	Urban	Urban	Urban	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes	Yes

**Table 26 The 2017-2018 Ozone Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA (Part 1) <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-011-0002	37-033-0001	37-077-0001	37-105-0002
<b>Site Name:</b>	Linville Falls	Cherry Grove	Butner	Blackstone
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	No	No	No	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

<sup>b</sup> This monitor is owned by the United States Forest Service and operated by the North Carolina Division of Air Quality.

**Table 27 The 2017-2018 Ozone Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA, Part 2 <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-107-0004	37-117-0001	37-173-0002
<b>Site Name:</b>	Lenoir Community College	Jamesville	Bryson City
<b>Street Address:</b>	231 Highway 58 S	1210 Hayes Street	Parks & Rec Bldg, Center Street
<b>City:</b>	Kinston	Jamesville	Bryson City
<b>Latitude:</b>	35.231459	35.810690	35.434767
<b>Longitude:</b>	-77.568792	-76.897820	-83.442133
<b>MSA, CSA or CBSA represented:</b>	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	Other	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31	Hourly 4/1 to 10/31
<b>Statement of Purpose:</b>	Compliance w/NAAQS.	Compliance w/NAAQS.	Regional transport and general background site. Low elevation, i.e. valley, mountain site on the NC side of the GSMNP. Modeling. Forecasting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	General/ background	General/ background	General/ background

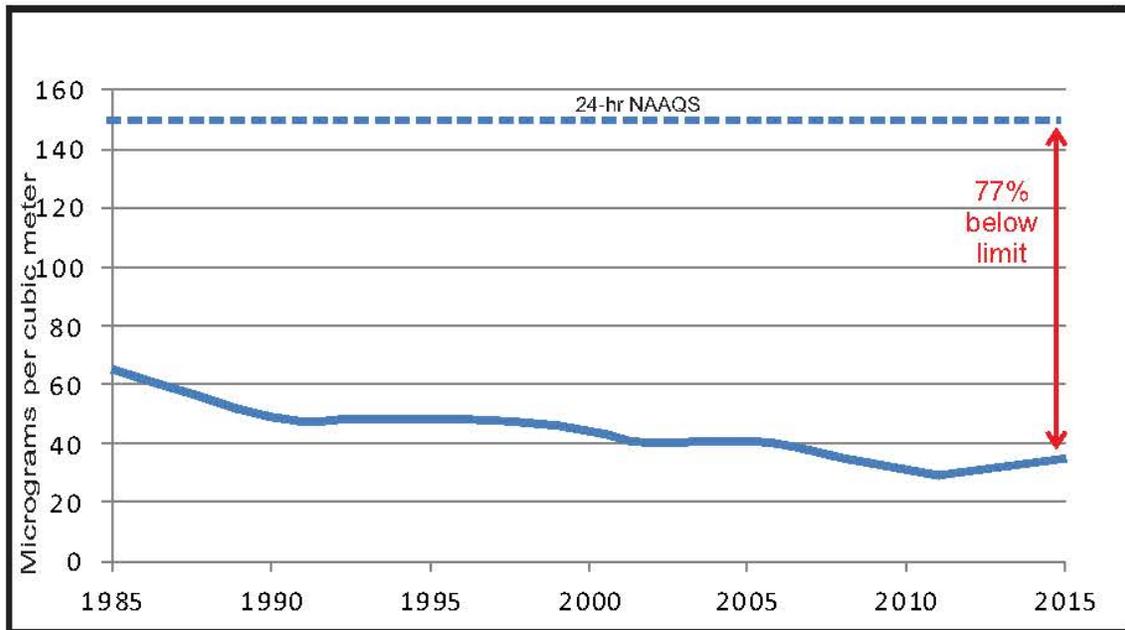
**Table 27 The 2017-2018 Ozone Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA, Part 2 <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-107-0004	37-117-0001	37-173-0002
<b>Scale:</b>	Neighborhood	Regional	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQOA-0880-047	Yes: EQOA-0880-047	Yes: EQOA-0880-047
<b>Meets Requirements of Part 58 Appendix D:</b>	No	No	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	None

<sup>a</sup> All monitors use an instrumental ultra violet method, Air Quality System, AQS, method code 047. All monitors use the EPA equivalent method designation EQOA-0880-047.

## VI. Particle Monitoring Network for Particles with Aerodynamic Diameters of 10 Micrometers or Less, PM<sub>10</sub>

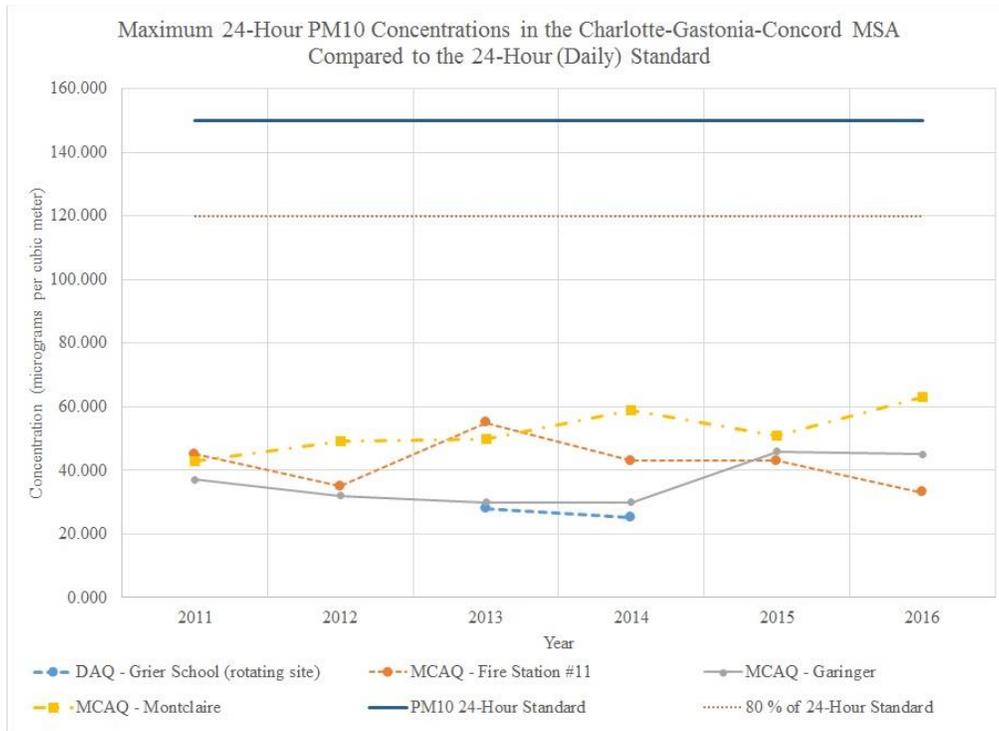
Monitoring for particles of 10 micrometers or less aerodynamic diameter, PM<sub>10</sub>, is currently conducted in North Carolina at six sites operated by the North Carolina Division of Air Quality, DAQ, and at four sites operated by local programs. The data collected are used to determine human health effect exposures in metropolitan statistical areas, also known as MSAs, with over 500,000 people and to collect background levels for prevention of significant deterioration, also known as PSD. The DAQ also uses PM<sub>10</sub> as a surrogate for PSD modeling for the state standard for total suspended particulates, also known as TSP. Data from previous years, as shown in Figure 47, indicate statewide levels of PM<sub>10</sub> are well below the 24-hour standard.



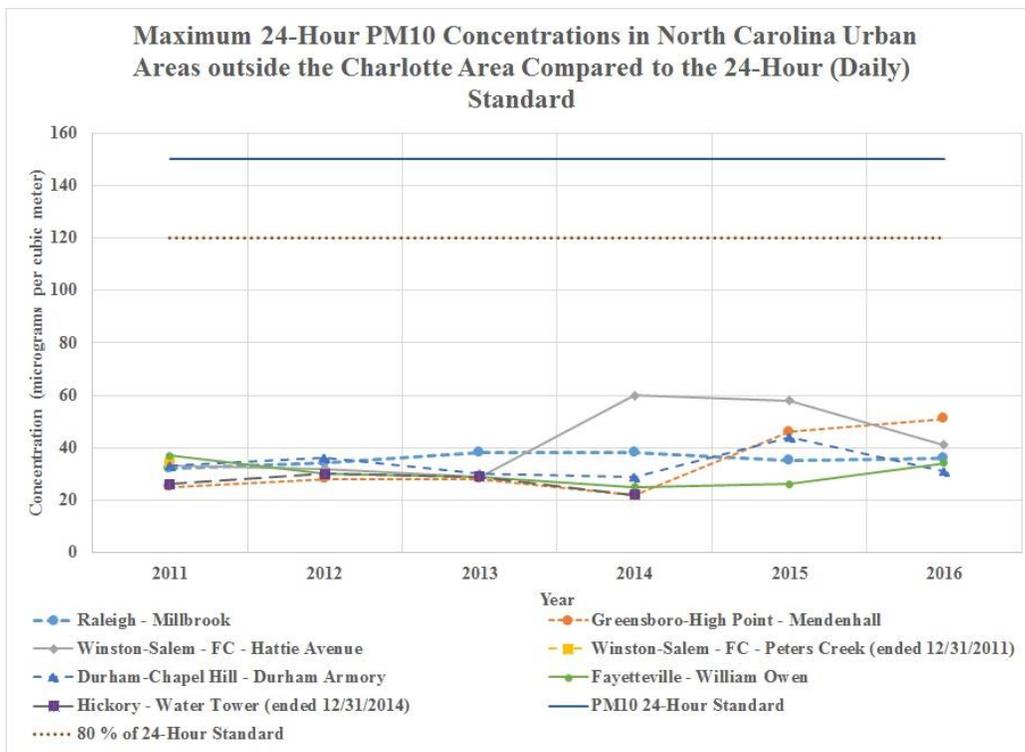
**Figure 47. Statewide trends for PM<sub>10</sub>**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air\\_Quality\\_Trends\\_in\\_North\\_Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air_Quality_Trends_in_North_Carolina.pdf) )

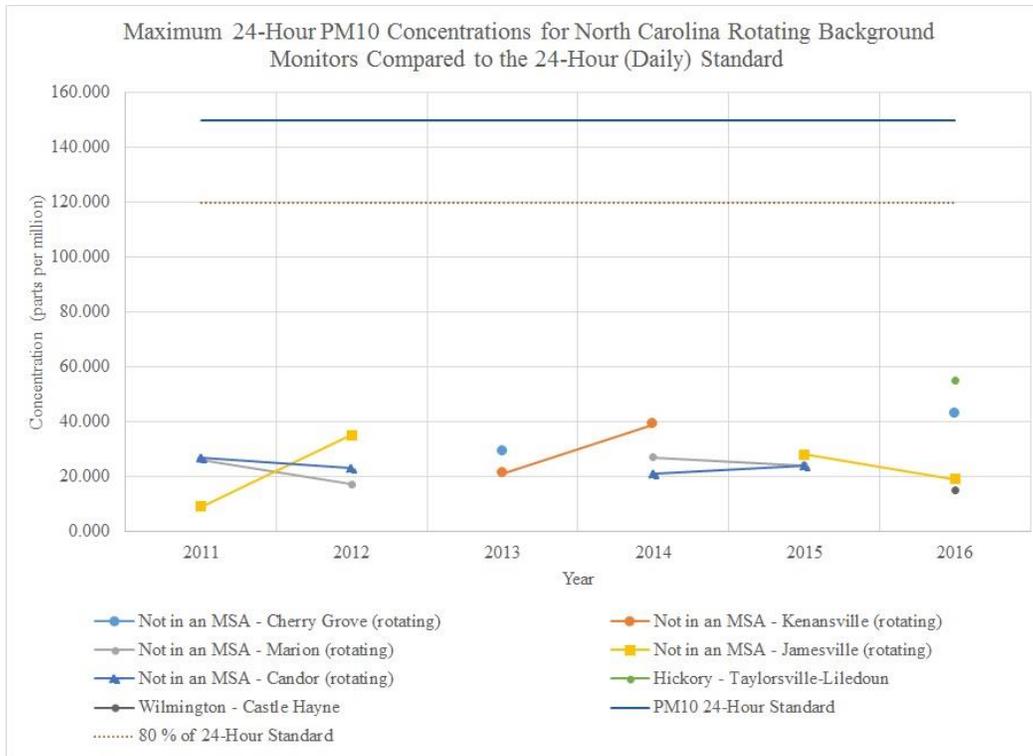
Figure 48 through Figure 50 provide the highest PM<sub>10</sub> concentrations measured in North Carolina for the past five years. The monitoring regulations currently require a monitor to be attaining the national ambient air quality standards, NAAQS, for the past five years before the monitor can be shut down. All PM<sub>10</sub> monitors operated in North Carolina in the last five years have attained the NAAQS and have reported values less than 80 percent of the standard. Thus, the only monitors that the EPA requires the state to operate are the ones required to meet the minimum monitoring requirements in 40 CFR 58 Appendix D Table D-4 provided in Figure 51 and those used to provide background data for PSD modeling.



**Figure 48. Maximum 24-hour PM10 concentration in the Charlotte -Concord-Gastonia MSA from 2011-2016**



**Figure 49. Maximum 24-hour concentration in North Carolina urban areas from 2011 to 2016**



**Figure 50. Maximum PM10 concentrations for rotating background monitors in North Carolina from 2011 to 2016**

**TABLE D-4 OF APPENDIX D TO PART 58. PM<sub>10</sub> MINIMUM MONITORING REQUIREMENTS (NUMBER OF STATIONS PER MSA)<sup>1</sup>**

Population category	High concentration <sup>2</sup>	Medium concentration <sup>3</sup>	Low concentration <sup>4,5</sup>
>1,000,000	6-10	4-8	2-4
500,000-1,000,000	4-8	2-4	1-2
250,000-500,000	3-4	1-2	0-1
100,000-250,000	1-2	0-1	0

<sup>1</sup> Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.

<sup>2</sup> High concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations exceeding the PM<sub>10</sub> NAAQS by 20 percent or more.

<sup>3</sup> Medium concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations exceeding 80 percent of the PM<sub>10</sub> NAAQS.

<sup>4</sup> Low concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations less than 80 percent of the PM<sub>10</sub> NAAQS.

<sup>5</sup> These minimum monitoring requirements apply in the absence of a design value.

**Figure 51. Table D-4 from 40 CFR 58 Appendix D**

The 2016 estimated population of the MSA and the most recent PM<sub>10</sub> ambient concentration values for the area determines the number of required monitors for an area. Table 28 provides the 2016 estimated total population for the MSAs in North Carolina, the maximum ambient daily concentration values as percentage of the NAAQS for 2016, the number of required monitors based on 40 CFR 58 Appendix D Table D-4 and the number of current monitors operated by the DAQ and the local programs. Currently, the DAQ and the local programs are operating the minimum number of required monitors in every MSA except for the Virginia Beach-Norfolk-New Port News and the Raleigh

MSA. The DAQ has a written agreement with the Virginia Department of Environmental Quality, VDEQ, Office of Air Quality Monitoring, that VDEQ will maintain the minimum required number of monitors for the Virginia Beach-Norfolk-New Port News MSA.<sup>31</sup>

**Table 28 Ambient Concentrations and Required Number of PM<sub>10</sub> Monitors for North Carolina Metropolitan Statistical Areas, MSA**

MSA	Population Estimate, 2016 <sup>a</sup>	2016 PM <sub>10</sub> 24-Hour Maximum Ambient Concentration, as percent of NAAQS	Number of Monitors operated in North Carolina	
			Required <sup>b</sup>	Current
Charlotte-Concord-Gastonia	2,474,314	42	2-4	2
Virginia Beach-Norfolk-New Port News, VA-NC	1,726,907	17	2-4	0 <sup>c</sup>
Raleigh	1,302,946	24	2-4	1 <sup>d</sup>
Greensboro-High Point	756,139	34	1-2	1
Winston-Salem	662,079	27	1-2	1
Durham-Chapel Hill	559,535	21	1-2	1
Asheville	452,319	20 <sup>e</sup>	0-1	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	449,295	Not Available	0-1	0
Fayetteville	380,389	21	0-1	1
Hickory	364,187	37	0-1	rotating
Wilmington	282,573	10	0-1	rotating
Jacksonville	187,136	25 <sup>f</sup>	0	0
Greenville	177,220	Not Available	0	0
Burlington	159,688	Not Available	0	0
Rocky Mount	147,323	30 <sup>g</sup>	0	0
New Bern	126,111	Not Available	0	0
Goldsboro	124,150	21 <sup>f</sup>	0	0

<sup>a</sup> Source: Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016, U.S. Census Bureau, Population Division, Released March 23, 2017, available on the world wide web at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkml>.

<sup>b</sup> 40 CFR 58 Appendix D Table D-4

<sup>c</sup> The Virginia Department of Environment operates two PM<sub>10</sub> monitors

<sup>d</sup> The DAQ received a waiver in 2008 for the second required PM<sub>10</sub> monitor

<sup>e</sup> PM<sub>10</sub> 24-hour maximum ambient concentration is from 2009

<sup>f</sup> PM<sub>10</sub> 24-hour maximum ambient concentration is from 2007

<sup>g</sup> PM<sub>10</sub> 24-hour maximum ambient concentration is from 2006

<sup>31</sup> See Appendix J. Monitoring Agreement between Virginia and North Carolina for the Virginia Beach-Norfolk-New Port News Metropolitan Statistical Area.

The DAQ received a waiver from the EPA for the second required monitor in the Raleigh MSA. The EPA granted the waiver because PM<sub>10</sub> values recorded in the Raleigh MSA have been less than 50 percent of the NAAQS except for when the existing monitor was impacted by an exceptional event on June 12, 2008.

Currently the DAQ operates one PM<sub>10</sub> monitor that may not be required by 40 CFR 58 Appendix D. This monitor is located at William Owen School in Fayetteville. The monitor may not be required because Appendix D requires zero to one monitor for areas with populations less than 500,000 and measured concentrations less than 80 percent of the NAAQS. The DAQ evaluated the purpose for this monitor and the use of the data from the monitor. The data from the William Owen monitor are used for PSD modeling so the DAQ will continue operating this monitor. A PM<sub>10</sub> monitor at Hickory was shut down at the end of 2014 because the data were not used for PSD modeling, the measured concentrations were less than 40 percent of the standard and trending downward and the population in Hickory is less than 500,000.

In 2011, the DAQ modified its PM<sub>10</sub> PSD monitoring network by establishing a network of rotating background PM<sub>10</sub> sites. One to three PM<sub>10</sub> monitors operate each year and each site operates once every 39 months. Because the DAQ decided to shut down the Grier School particle monitoring site in Gastonia at the end of 2014, the rotating PM<sub>10</sub> monitor at Grier School was replaced with a rotating PM<sub>10</sub> monitor at the Taylorsville Liledoun site. Likewise, when DAQ shut down the Marion and Kenansville particle monitoring sites, the rotating PM<sub>10</sub> monitors at those sites were moved to the Lenoir Community College, LCC, site in Kinston and the Castle Hayne site in Wilmington. Thus, the six PM<sub>10</sub> background sites are:

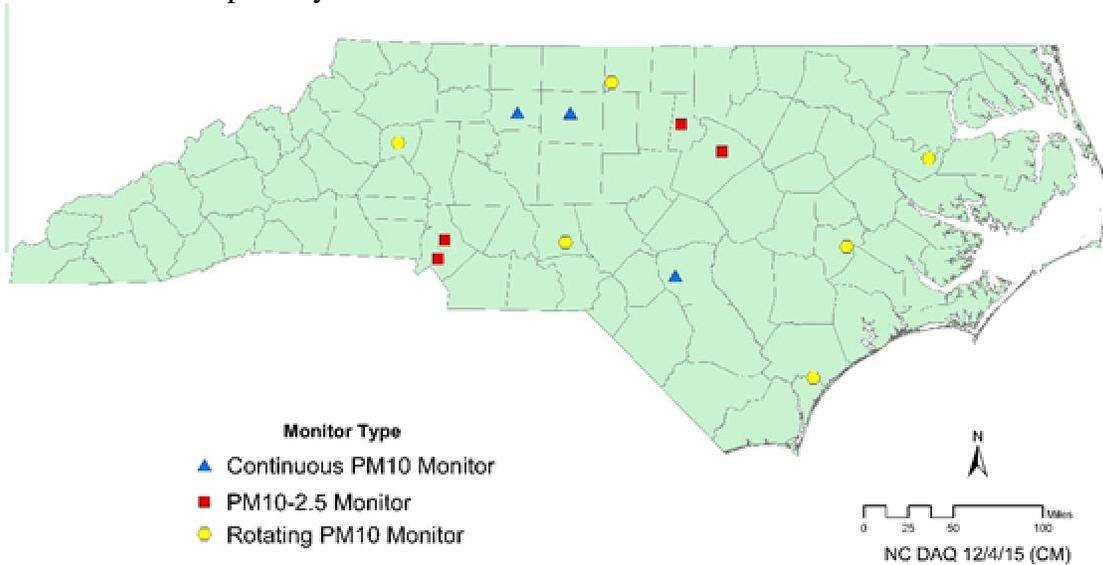
- Candor and LCC, operating from May 2017 through April 2018;
- Jamesville operating from June 2018 through May 2019;
- Cherry Grove and Taylorsville Liledoun, which operated from April 2016 through March 2017 and will operate again July 2020 through June 2021 and
- Castle Hayne, operating from November 2016 until the end of October 2017.

Two of these six sites, Candor and Castle Hayne, are also fine particle monitoring sites. The other four sites are ozone monitoring sites.

The monitoring regulations promulgated in 2006 include a method for measuring coarse particles. The coarse particle monitoring method measures coarse particles by the difference between the measured PM<sub>10</sub> concentration and the fine particle concentration measured using the same sampling and analytical method. The DAQ purchased two coarse particle BAM monitors and one coarse particle optical monitor. By mid-January 2016, the DAQ had converted all manual PM<sub>10</sub> high volume samplers to continuous PM<sub>10</sub> low volume samplers.

Also, Mecklenburg County Air Quality, MCAQ, and DAQ became separate primary quality assurance organizations, PQAOs, in March 2015. The MCAQ operated the collocated low-volume PM<sub>10</sub> monitor for the PQAQO. Since MCAQ and the DAQ are separate PQAQOs, the DAQ added a collocated low volume PM<sub>10</sub> monitor at Millbrook starting Jan. 1, 2015.

The locations of the current and rotating PM<sub>10</sub>-monitoring sites are provided in Figure 52. Table 29 through Table 33 list the locations, monitor type, operating schedules, monitoring objectives, scales, statement of purpose, status for each current and proposed monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and any proposed changes to the network. All monitors listed in these tables are suitable for comparison to the NAAQS. All monitors meet the requirements of Appendices A, C and E of 40 CFR 58. All monitors operate year-round.



**Figure 52. 2017-2018 PM 10 Monitor Locations**

**Table 29 The 2017-2018 PM10 Monitoring Network for the Charlotte-Concord-Gastonia MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041 <sup>d</sup>	371190042 <sup>c, d</sup>
<b>Site Name:</b>	Garinger	Montclair
<b>Street Address:</b>	1130 Eastway Drive	1935 Emerywood Drive
<b>City:</b>	Charlotte	Charlotte
<b>Latitude:</b>	35.2401	35.151283
<b>Longitude:</b>	-80.7857	-80.866983
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia
<b>Monitor Type:</b>	SLAMS / NCore	SLAMS
<b>Operating Schedule:</b>	24-hour, midnight to midnight, 1-in-3 day	24-hour, midnight to midnight, 1-in-3 day
<b>Statement of Purpose:</b>	Required by Appendix D for NCore sites. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling	Required by Appendix D. Collocated low volume PM10 site required by Appendix A. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling.
<b>Monitoring Objective:</b>	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood

<b>AQS Site Id Number:</b>	37-119-0041 <sup>d</sup>	371190042 <sup>c,d</sup>
<b>Site Name:</b>	Garinger	Montclair
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: RFPS-1298-127	Yes: RFPS-1298-127
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes - NCore	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	Monitoring method will change	Monitoring method will change

**Table 30 The 2017-2018 PM<sub>10</sub> Monitoring Network for the Raleigh-Durham-Cary CSA**

<b>AQS Site Id Number:</b>	37-063-0015 <sup>a</sup>	37-183-0014 <sup>b</sup>
<b>Site Name:</b>	Durham Armory	Millbrook
<b>Street Address:</b>	801 Stadium Drive	3801 Spring Forest Road
<b>City:</b>	Durham	Raleigh
<b>Latitude:</b>	36.032944	35.8561
<b>Longitude:</b>	-78.905417	-78.5742
<b>MSA, CSA or CBSA represented:</b>	Durham-Chapel Hill	Raleigh
<b>Monitor Type:</b>	SLAMS	SLAMS / NCore
<b>Operating Schedule:</b>	Hourly	24-hour, midnight to midnight, 1-in-3 day
<b>Statement of Purpose:</b>	Required by Appendix D. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling.	Required by Appendix D. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling.
<b>Monitoring Objective:</b>	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	EQPM-0798-122	Yes: RFPS-1298-127
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes - NCore

<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	Monitoring method will change

<sup>a</sup> This monitor is a Met One 1020 beta attenuation monitor, Air Quality System, AQS, method code 122. It uses the EPA equivalent method designation EQPM-0798-122. The DAQ is also evaluating a Teledyne D640X monitor at Millbrook

<sup>b</sup> Monitor uses a low-volume Thermo R&P 2025, AQS Method Code 127, U.S. EPA reference method designation RFPS-1298-127. This site has a collocated PM<sub>10</sub> monitor to meet Appendix A requirements.

**Table 31 The 2017-2018 PM<sub>10</sub> Monitoring Network for the Greensboro-Winston-Salem-High Point CSA**

<b>AQS Site Id Number:</b>	37-067-0022 <sup>a</sup>	37-081-0013 <sup>b</sup>
<b>Site Name:</b>	Hattie Avenue	Mendenhall
<b>Street Address:</b>	1300 block of Hattie Avenue	205 Willoughby Blvd.
<b>City:</b>	Winston-Salem	Greensboro
<b>Latitude:</b>	36.110556	36.109167
<b>Longitude:</b>	-80.226667	-79.801111
<b>MSA, CSA or CBSA represented:</b>	Winston-Salem	Greensboro-High Point
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly
<b>Statement of Purpose:</b>	Required by Appendix D. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling.	Required by Appendix D. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling.
<b>Monitoring Objective:</b>	Population exposure	Population exposure/ general/ background
<b>Scale:</b>	Neighborhood	Neighborhood/urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes: EQPM-1090-079	EQPM-0798-122
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS primary quality assurance organization and reporting agency 0403. Monitor uses a Ruprecht & Patshneck TEOM Series 1400, AQS Method Code 079, U.S. EPA equivalent method designation EQPM-1090-079.

<sup>b</sup> This monitor uses a Met One 1020 beta attenuation monitor, Air Quality System, AQS, method code 122. This monitor uses the EPA equivalent method designation EQPM-0798-122.

**Table 32 The 2017-2018 PM10 Monitoring Network for the Fayetteville, Hickory and Wilmington MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	370510009	37-003-0005	37-129-0002
<b>Site Name:</b>	William Owen	Taylorsville-Liledoun	Castle Hayne
<b>Street Address:</b>	4533 Raeford Road	700 Liledoun Road	6028 Holly Shelter Road
<b>City:</b>	Fayetteville	Taylorsville	Castle Hayne
<b>Latitude:</b>	35.041416	35.9139	34.364167
<b>Longitude:</b>	-78.953112	-81.191	-77.838611
<b>MSA, CSA or CBSA represented:</b>	Fayetteville	Hickory	Wilmington
<b>Monitor Type:</b>	SLAMS	Special purpose	Special purpose
<b>Operating Schedule:</b>	Hourly	Hourly 3-year rotation	Hourly 3-year rotation
<b>Statement of Purpose:</b>	Required by Appendix D. Compliance w/NAAQS. Industrial expansion monitoring for PSD modeling.	Industrial expansion monitoring for PSD modeling	Industrial expansion monitoring for PSD modeling
<b>Monitoring Objective:</b>	Population exposure	General/ background	General/ background
<b>Scale:</b>	Urban	Urban	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	EQPM-0798-122	EQPM-0798-122	RFPS-1298-127
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	No	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	Monitoring ended 3/31/2017 and will resume July 1, 2019	Will operate 11/1/2016 to 10/31/2017

<sup>a</sup> All monitors except the Castle Hayne monitor use a Met One 1020 beta attenuation monitor, Air Quality System, AQS, method code 122. The EPA equivalent method designation is EQPM-0798-122. The Castle Hayne monitor uses a 2025 sequential monitor, AQS method code 127.

**Table 33 The 2017-2018 PM10 Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-033-0001	37-107-0004	37-117-0001	371230001
<b>Site Name:</b>	Cherry Grove	Lenoir Community College	Jamesville	Candor
<b>Street Address:</b>	7074 Cherry Grove Road	231 Highway 58 S	1210 Hayes Street	112 Perry Drive
<b>City:</b>	Reidsville	Kinston	Jamesville	Candor
<b>Latitude:</b>	36.307033	35.231459	35.810690	35.262490
<b>Longitude:</b>	-79.467417	-77.568792	-76.897820	-79.836613
<b>MSA, CSA or CBSA represented:</b>	Not in an MSA	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	Special purpose	Special purpose	Non-regulatory	SLAMS
<b>Operating Schedule:</b>	Hourly 3-year rotation	Hourly 3-year rotation	Hourly 3-year rotation	Hourly 3-year rotation
<b>Statement of Purpose:</b>	Industrial expansion monitoring for PSD modeling for northern piedmont areas	Industrial expansion monitoring for PSD modeling for coastal areas	Industrial expansion monitoring for PSD modeling for northern coastal areas	Industrial expansion monitoring for PSD modeling for sand hill areas
<b>Monitoring Objective:</b>	Population exposure general/background	Population exposure general/background	General/background	Population exposure general/background
<b>Scale:</b>	Urban	Neighborhood	Regional	Regional
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes	Yes
<b>Meets Part 58 Appendix A Requirements:</b>	Yes	Yes	Yes	Yes
<b>Meets Part 58 Appendix C Requirements:</b>	EQPM-0798-122	EQPM-0798-122	EQPM-0798-122	EQPM-0798-122
<b>Meets Part 58 Appendix D Requirements:</b>	No	No	No	No
<b>Meets Part 58 Appendix E Requirements:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Monitoring ended 3/31/2017 and will resume 7/1/2019	Operates 5/1/2017 to 4/30/2018	Will operate 6/1/2018 to 5/31/2019	Operates 5/1/2017 to 4/30/2018

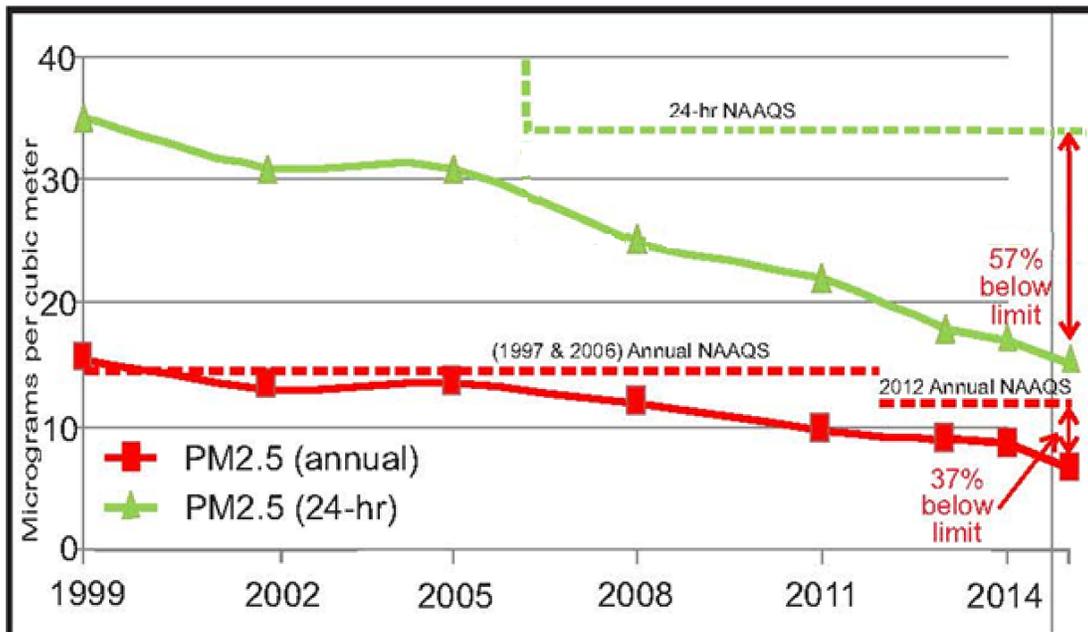
<sup>a</sup> All monitors use a Met One 1020 beta attenuation monitor, Air Quality System, AQS, method code 122. All monitors use the EPA equivalent method designation EQPM-0798-122.

## VII. Fine Particle, PM<sub>2.5</sub>, Monitoring Network

This section is divided into three subsections. The first discusses the network of federal reference method, FRM, and federal equivalent method, FEM, fine particle monitors used to determine compliance with the national ambient air quality standards, NAAQS. The second section discusses the continuous fine particle monitors that are used for air quality forecasting, real-time reporting and air quality index reporting. Five of these monitors are FEMs that are also part of the FRM/FEM network. The third section discusses the fine particle manual speciation monitors.

### A. The Federal Reference Method and Federal Equivalent Method Network

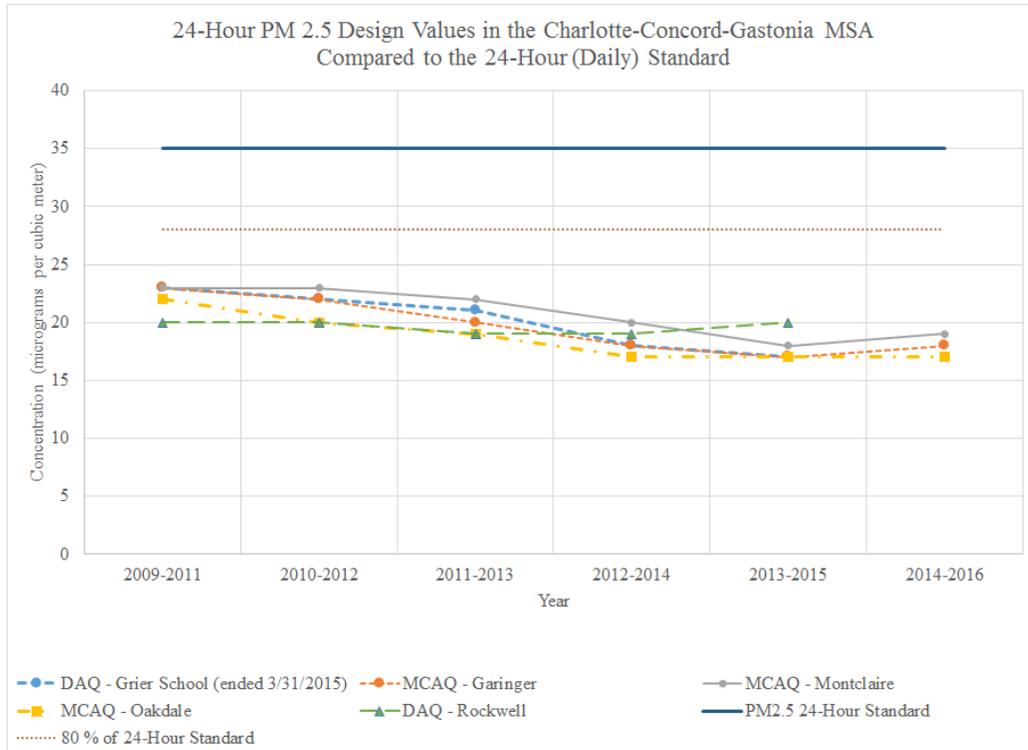
The North Carolina Division of Air Quality, DAQ, currently operates 13 FRM or FEM fine particle monitoring sites and the local programs operate five. The monitors at these sites have been approved by the United States Environmental Protection Agency, EPA, and can be used to determine compliance with the NAAQS. The DAQ believes this network is sufficient to protect the health and welfare of the people and environment in North Carolina as well as to provide information on how fine particles are transported to and within the state, to identify the parts of the state with the highest concentrations of fine particles and to know where fine particle concentrations do and do not exceed the NAAQS. Data from previous years, as shown in Figure 53, indicate statewide levels of fine particles are below the 24-hour and annual standards established by the EPA.



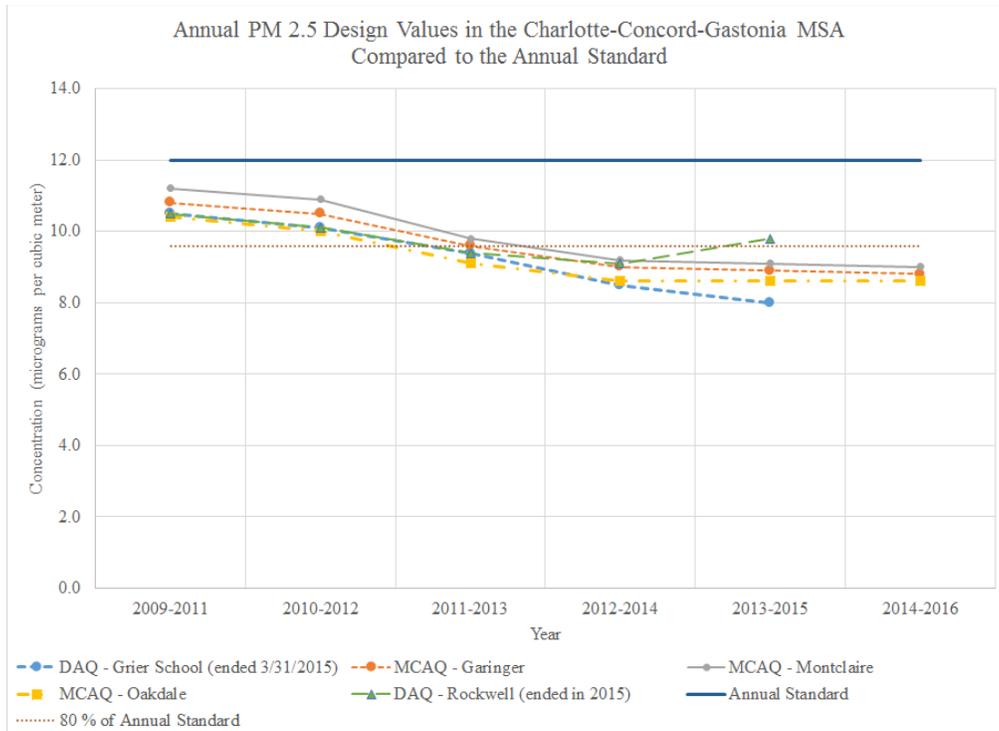
**Figure 53. Statewide trends for fine particles**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air\\_Quality\\_Trends\\_in\\_North\\_Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air_Quality_Trends_in_North_Carolina.pdf)), corrected for 24-hr NAAQS

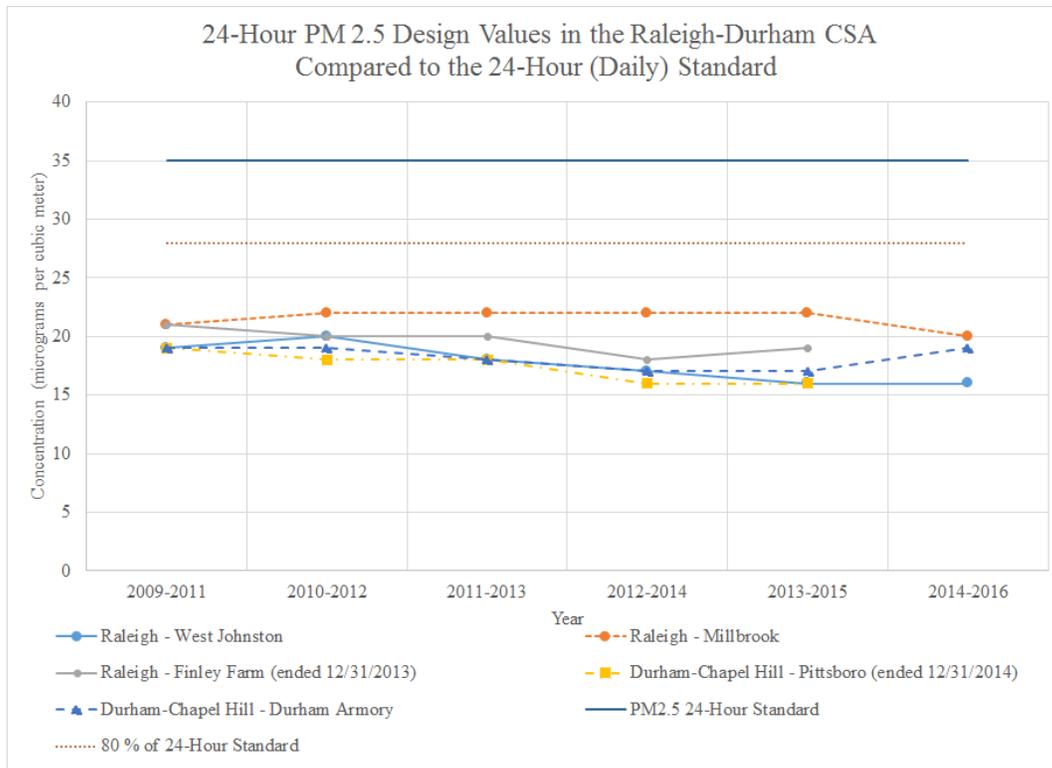
Figure 54 through Figure 65 provides the fine particle design values for the monitors in North Carolina for the past six years. This information is important because the monitoring regulations require a monitor to be attaining the NAAQS for the past five



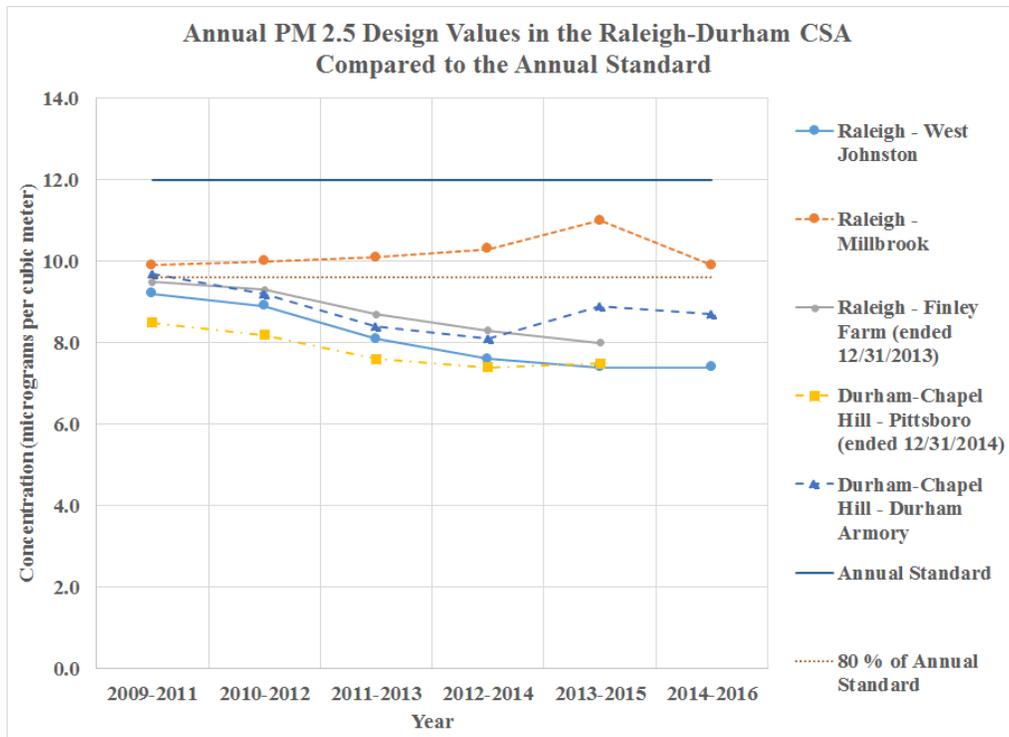
**Figure 54. Measured daily fine particle design values in the Charlotte-Concord-Gastonia MSA**



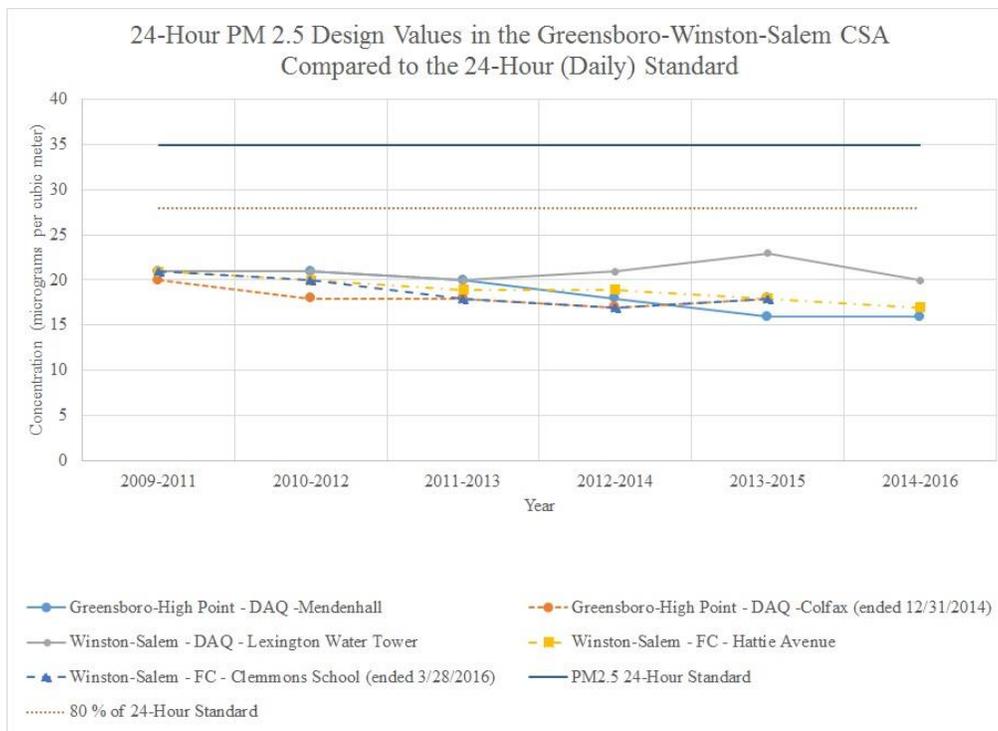
**Figure 55. Annual design values measured in the Charlotte-Concord-Gastonia MSA**



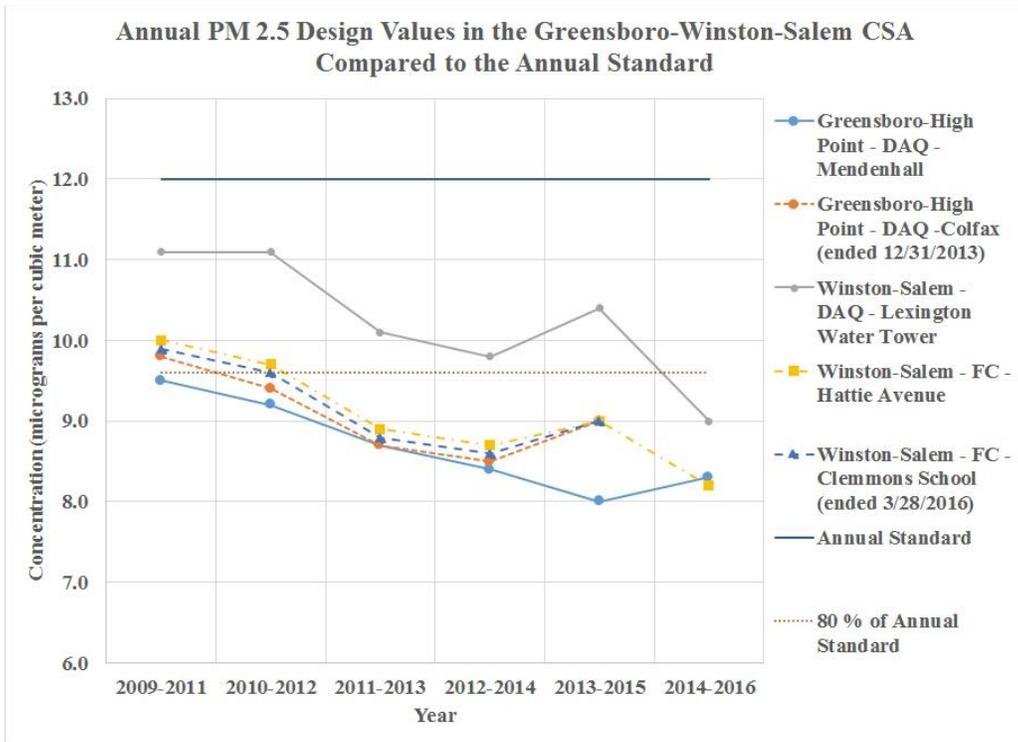
**Figure 56. Daily fine particle design values measured in the Raleigh-Durham CSA**



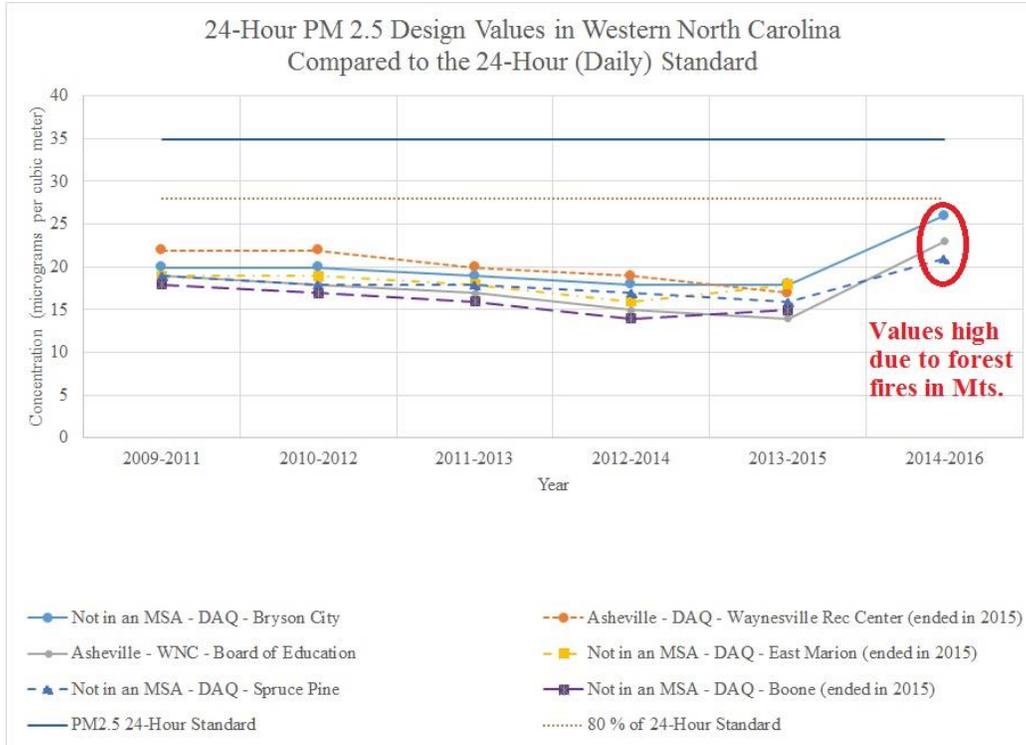
**Figure 57. Annual fine particle design values measured in the Raleigh-Durham CSA**



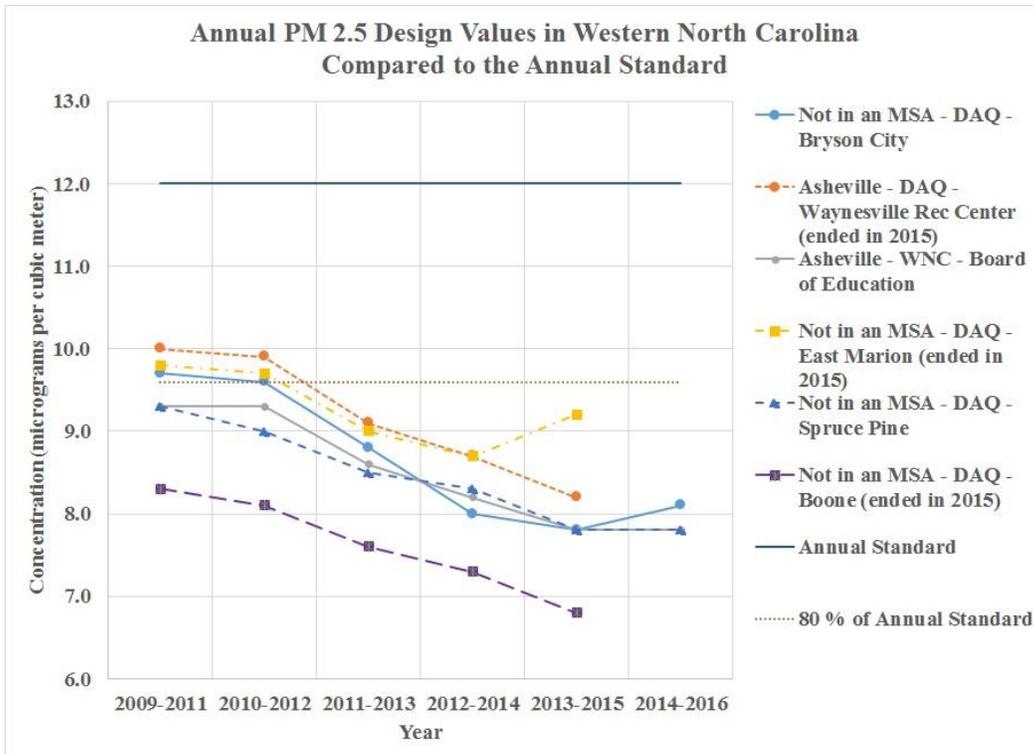
**Figure 58. Daily fine particle design values measured in the Greensboro-Winston-Salem CSA**



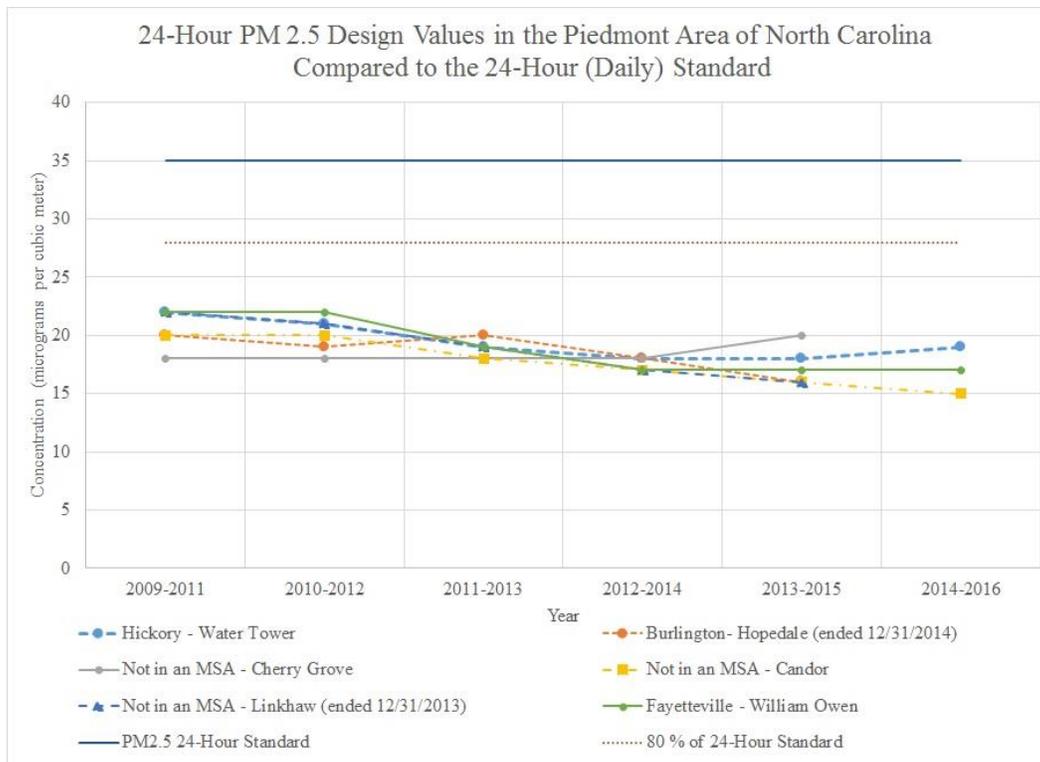
**Figure 59. Annual fine particle design values measured in the Greensboro-Winston-Salem CSA**



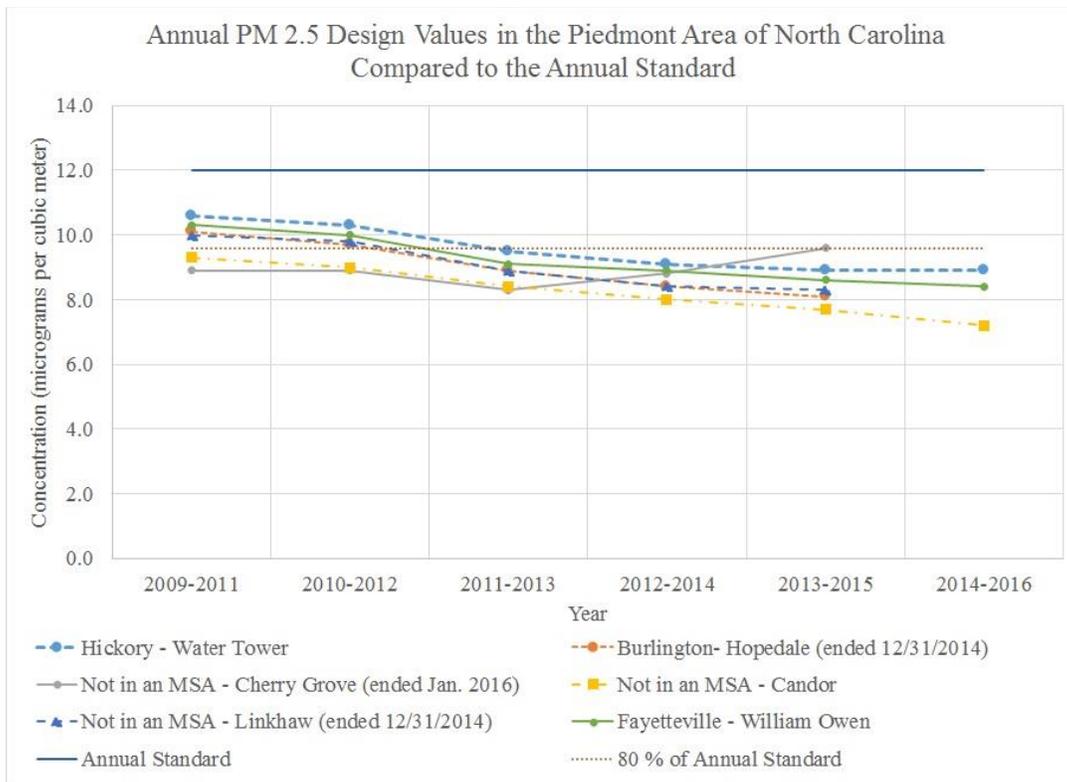
**Figure 60. Daily fine particle design values measured in western North Carolina**



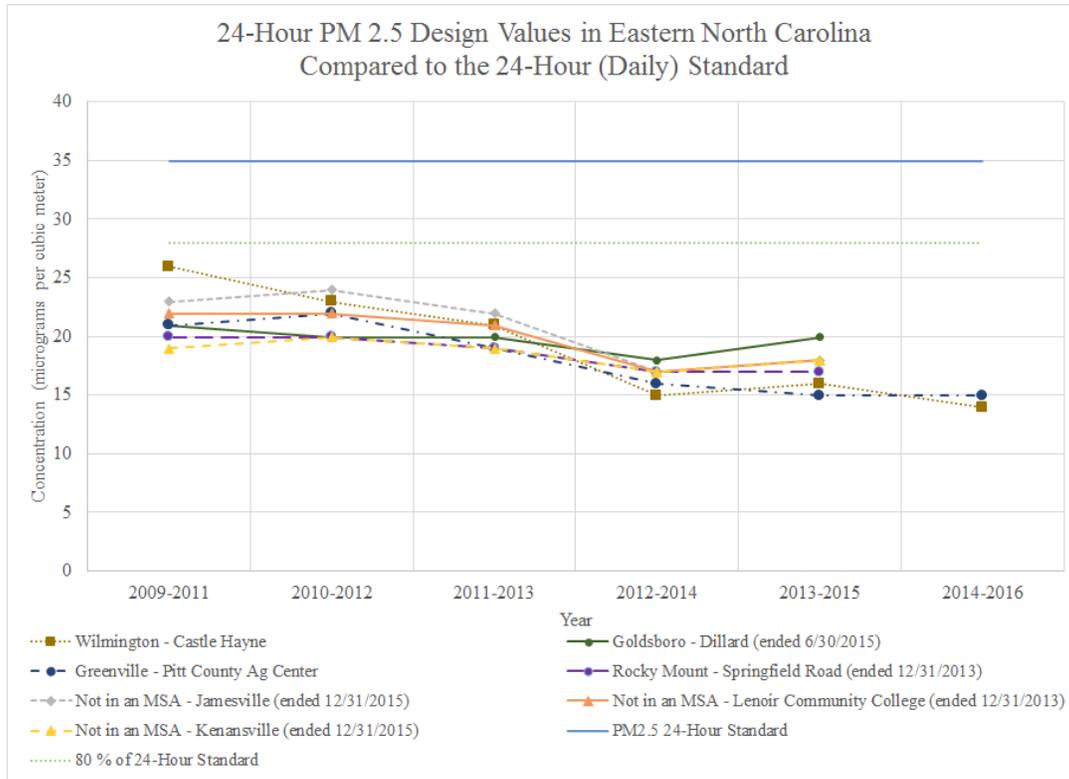
**Figure 61. Annual fine particle design values measured in western North Carolina**



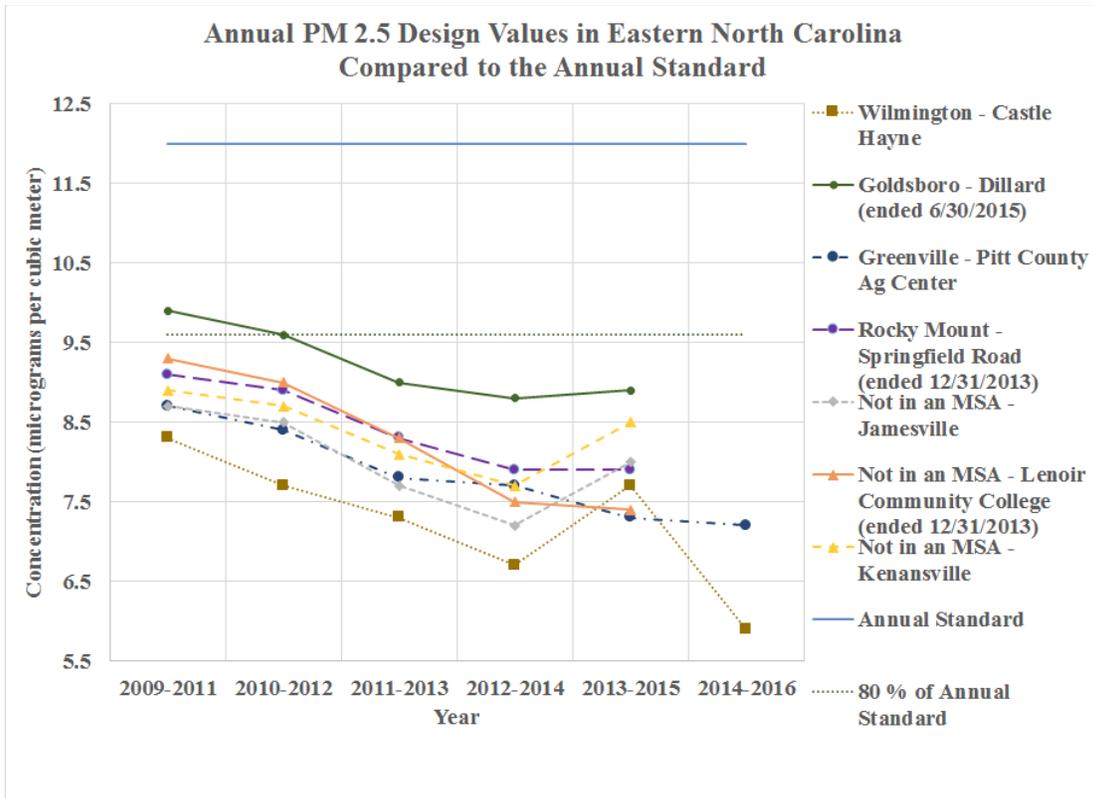
**Figure 62. Daily fine particle design values measured in central North Carolina**



**Figure 63. Annual fine particle design values measured in central North Carolina**



**Figure 64. Daily design values measured in eastern North Carolina**



**Figure 65. Annual fine particle design values measured in eastern North Carolina**

years before the monitor can be shut down. See 40 CFR 58.14(c)(1). All the currently operating FRM/FEM monitors meet this requirement. However, 40 CFR 58 Appendix D 4.7 requires nine of these monitors:

- Garinger and Remount Road in the Charlotte-Concord-Gastonia MSA;
- Millbrook and Triple Oak in the Raleigh MSA;
- Mendenhall in the Greensboro MSA;
- Hattie Avenue in the Winston-Salem MSA;
- Durham Armory in the Durham MSA;
- Bryson City as a transport monitor; and
- Candor as a background monitor.

Two of these monitors, Hickory and Lexington, are required in the December 2009 Redesignation and Maintenance Plan for Fine Particulate Matter.<sup>32</sup>

The remaining seven monitors are less than 80 percent of the standard and may meet the additional requirement of having less than 10 percent probability of exceeding 80 percent of the NAAQS during the next three years, as required in 40 CFR 58.14(c)(1), based on design value trends and model predictions. Thus, there are seven monitors, two operated by local programs and five operated by DAQ, that are not required by Appendix D or by the state implementation plan and that could potentially meet all the requirements of 40 CFR 58.14(c)(1) to be shut down. The DAQ reviewed the five monitors operated by DAQ and their current monitoring objectives and determined these five monitors are still required to meet state objectives and provide an adequate background network for prevention of significant deterioration permitting and modeling. These five monitors are:

- 37-051-0009 at William Owen in the Fayetteville MSA;
- 37-101-0002 at West Johnston in the Raleigh MSA;
- 37-129-0002 at Castle Hayne in the Wilmington MSA;
- 37-147-0006 at the Pitt County Ag Center in the Greenville MSA; and
- 37-121-0004 at Spruce Pine in Mitchell County.

The DAQ decided to continue operating these five monitors for the following reasons:

- The William Owen, 37-051-0009, monitor is needed to maintain an adequate spatial coverage for the fine particle monitoring network. Without it, there would be a hole in coverage for the south-central part of the state. The data from this monitor are also used for PSD modeling. In addition, the Fayetteville MSA is in one of the fastest growing areas of the state. Hoke County, one of two counties in the MSA, is the 97<sup>th</sup> fastest growing county in the nation.
- The West Johnston, 37-101-0002, monitor is in one of the fastest growing areas of the state as well as the nation. Johnston is the nation's 59<sup>th</sup> fastest growing county on an annual basis and 99<sup>th</sup> fastest growing county for this decade.

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<sup>32</sup> "Redesignation Demonstration and Maintenance Plan for the Hickory and Greensboro/Winston-Salem/High Point Fine Particulate Matter Nonattainment Areas" State Implementation Plan (SIP), Dec. 18, 2009, available on the worldwide web at <http://deq.nc.gov/about/divisions/air-quality/air-quality-planning/state-implementation-plans/hickory-area>.

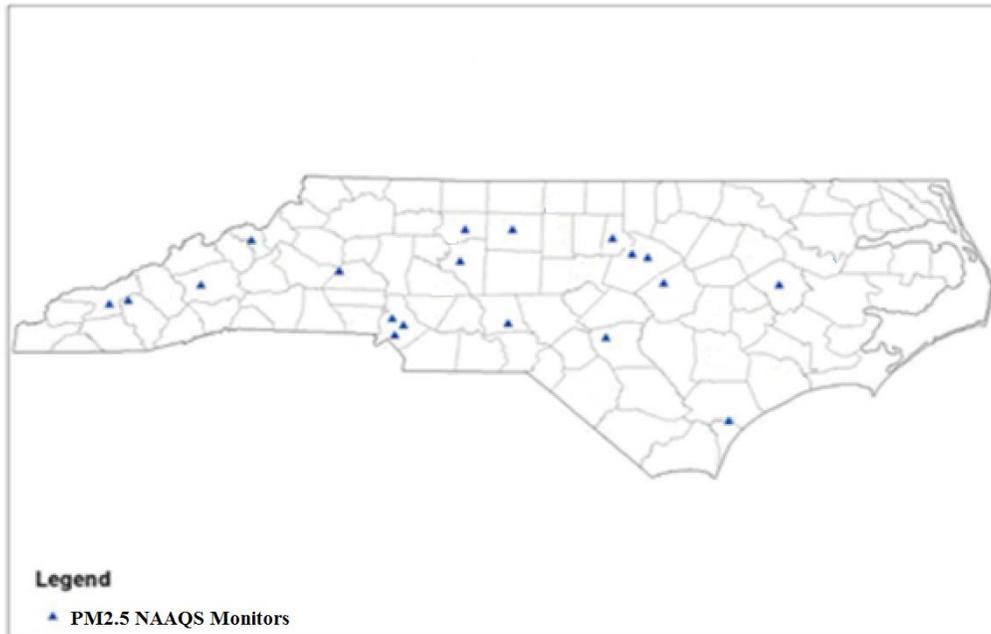
- The Castle Hayne, 37-129-0002, monitor is in an area where there is a great deal of interest in the air quality because there were once plans to build a concrete facility across the road from the monitor. The DAQ believes it is important to maintain a design value monitor at this location.
- The Pitt County Agricultural Center, 37-147-0006, monitor is in Greenville, one of the largest urban areas in northern coastal North Carolina. Having a fine particle monitor here is important when there are wildfires in the area. Eventually, the DAQ may extend air quality forecasting to the area.
- The Spruce Pine, 37-121-0004, monitor is in a mining community and monitors potential mining activity impacts.

The reasons for continued operation of these monitors are consistent with the federal guidelines in 40 CFR 58 Appendix D 1.1.1, which states:

“...a network must be designed with a variety of types of monitoring sites. Monitoring sites must be capable of informing managers about many things including the peak air pollution levels, typical levels in populated areas, air pollution transported into and outside of a city or region and air pollution levels near specific sources.”

These monitors are necessary for the staff of the DAQ to make informed decisions and provide air quality information to the public to inform public health and welfare decisions.

Thus, the current network continues to meet the goals of DAQ to protect the public health and welfare. Thus, DAQ believes the 2017 fine particle network shown in Figure 66 is an adequate network to protect human health and environmental welfare and this network should be continued in 2018.



**Figure 66. Current 2017 and proposed 2018 federal reference and equivalent method monitoring network**

Other fine particle monitors that could be considered for shut down are those monitors that exceed the minimum number of monitors required in 40 CFR 58 Appendix D Table D-5 provided in Figure 67. The latest estimated population of the metropolitan statistical area, MSA, and the most recent fine particle 24-hour and annual design value for the area determines the number of required monitors for an area. Table 34 provides the 2016 population estimates for the MSAs in North Carolina, the design values for 2014-2016, the number of required monitors based on Appendix D and the number of current monitors operated by DAQ and the local programs. Currently, DAQ and the local programs are operating at least the minimum number of required monitors in all but the Virginia Beach-Norfolk-New Port News MSA. The DAQ has a written agreement with the Virginia Department of Environmental Quality, VDEQ, Office of Air Quality Monitoring, that VDEQ will maintain the minimum required number of monitors for the Virginia Beach-Norfolk-New Port News MSA.<sup>33</sup> In 2016 the annual and daily fine particle design values in North Carolina remained constant or continued to decline, maintaining or reducing the number of required monitors in MSAs throughout the state.

**TABLE D-5 OF APPENDIX D TO PART 58. PM<sub>2.5</sub> MINIMUM MONITORING REQUIREMENTS**

MSA population <sup>1,2</sup>	Most recent 3-year design value $\geq 85\%$ of any PM <sub>2.5</sub> NAAQS <sup>3</sup>	Most recent 3-year design value $< 85\%$ of any PM <sub>2.5</sub> NAAQS <sup>3, 4</sup>
>1,000,000 .....	3	2
500,000–1,000,000	2	1
50,000–<500,000 <sup>5</sup>	1	0

<sup>1</sup> Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

<sup>2</sup> Population based on latest available census figures.

<sup>3</sup> The PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

<sup>4</sup> These minimum monitoring requirements apply in the absence of a design value.

<sup>5</sup> Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

**Figure 67. 40 CFR 58 Appendix D Table D-5**

<sup>33</sup> See Appendix J. Monitoring Agreement between Virginia and North Carolina for the Virginia Beach-Norfolk-New Port News Metropolitan Statistical Area.

**Table 34 Design Values and Required Fine Particle Monitors for North Carolina  
Metropolitan Statistical Areas, MSA**

MSA	Population Estimate, 2016 <sup>a</sup>	2016 Fine Particle Design Value, as percent of NAAQS		Number of Monitors operated in North Carolina <sup>b</sup>	
		24-Hour	Annual	Required <sup>c</sup>	Current
Charlotte-Concord-Gastonia, NC-SC	2,474,314	54	75	2	3
Virginia Beach-Norfolk-New Port News, VA-NC	1,726,907	43	56	2	0 <sup>d</sup>
Raleigh, NC	1,302,946	57	83	2	3
Greensboro-High Point	756,139	46	69	1	1
Winston-Salem	662,079	57	75	1	2
Durham- Chapel Hill	559,535	54	73	1	1
Asheville	452,319	66	65	0	1
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	449,295	Not available		0	0
Fayetteville	380,389	49	70	0	1
Hickory	364,187	54	74	0	1
Wilmington	282,573	40	49	0	1
Jacksonville	187,136	Not available		0	0
Greenville	177,220	43	60	0	1
Burlington	159,688	46 <sup>f</sup>	68 <sup>f</sup>	0	0
Rocky Mount	147,323	49 <sup>f</sup>	66 <sup>f</sup>	0	0
New Bern	126,111	Not available		0	0
Goldsboro	124,150	51 <sup>f</sup>	74 <sup>f</sup>	0	0

<sup>a</sup> Source: Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016, U.S. Census Bureau, Population Division, Released March 23, 2017, available on the world wide web at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.

<sup>b</sup> Includes monitors operated by DAQ and the local programs.

<sup>c</sup> Code of Federal Regulations, Title 40 Protection of the Environment, Part 58 Ambient Air Quality Surveillance, Appendix D Network Design Criteria for Ambient Air Quality Monitoring, Table D-5, available on the worldwide web at [http://www.ecfr.gov/cgi-bin/text-idx?SID=f4ac6b967f32490f3a03543735a756fc&mc=true&node=ap40.6.58\\_161.d&rgn=div9](http://www.ecfr.gov/cgi-bin/text-idx?SID=f4ac6b967f32490f3a03543735a756fc&mc=true&node=ap40.6.58_161.d&rgn=div9).

<sup>d</sup> Virginia Department of Environmental Quality, VDEQ, Office of Air Quality Monitoring operates three monitors in this MSA.

<sup>e</sup> Based on measurements taken in 2007, when the monitor was shut down.

<sup>f</sup> Design value for 2013-2015

The information required by 40 CFR 58 to be included in the network plan is provided in the following tables. Table 35 through Table 40 provide the locations of the current FRM/FEM fine particle-monitoring sites, the monitor type, operating schedules, monitoring objectives, scales and statement of purpose for all the current and proposed monitors in the North Carolina fine particle monitoring network. All monitors listed in these tables are suitable for comparison to the NAAQS. All the monitors meet the requirements of Appendices A, C, D and E of 40 CFR 58. All these monitors except the monitors at Bryson, 37-173-0002, Hickory, 37-035-0004,

Lexington, 37-057-0002, Candor, 37-123-0001, Triple Oak Road, 37-183-0021, and Castle Hayne, 37-129-0002, use the EPA reference method designation RFPS-1006-145, AQS method code 145. The monitors at Bryson, Lexington, Candor and Castle Hayne use the EPA automated equivalent method: EQPM-0308-170, AQS method code 170. The monitors at Hickory and Triple Oak Road use the EPA automated equivalent method EQPM-1013-209, AQS method code 209. All monitors, except the Castle Hayne, Triple Oak, Candor, Lexington, Hickory and Bryson monitors, operate on a 24-hour schedule from midnight to midnight on each scheduled sampling day. The Castle Hayne, Triple Oak, Candor, Lexington, Hickory and Bryson monitors collect data each hour. All the monitors operate year-round. Table 35 through Table 40 also summarize the status for each current and proposed monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in 40 CFR58 Appendices A, C, D and E. These tables also provide the proposed changes to the network.

**Table 35 The 2017-2018 NAAQS Fine Particle Monitoring Network for the Charlotte-Concord-Gastonia MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041	37-119-0042	37-119-0045
<b>Site Name:</b>	Garinger	Montclair	Remount Road
<b>Street Address:</b>	1130 Eastway Drive	1935 Emerywood Drive	902 Remount Road
<b>City:</b>	Charlotte	Charlotte	Charlotte
<b>Latitude:</b>	35.2401	35.151283	35.212657
<b>Longitude:</b>	-80.7857	-80.866983	-80.874401
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia
<b>Monitor Type:</b>	SLAMS / NCore	SLAMS	SLAMS
<b>Operating Schedule:</b>	1-in-3 day	1-in-3 day	1-in-3 day
<b>Statement of Purpose:</b>	1 of 2 required monitors in Charlotte-Concord-Gastonia MSA. AQI reporting. Compliance w/NAAQS.	AQI reporting. Compliance w/NAAQS.	Near road monitoring site. AQI reporting. Compliance w/NAAQS. 1 of 2 required monitors in Charlotte-Concord-Gastonia MSA.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Source oriented
<b>Scale:</b>	Neighborhood	Neighborhood	Microscale
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes - RFPS-1006-145	Yes - RFPS-1006-145	Yes - RFPS-1006-145
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes- NCore, 1 of 2 required monitors for the Charlotte-Concord-Gastonia MSA.	No, not required	Yes –near road, 1 of 2 required monitors for the Charlotte-Concord-Gastonia MSA.
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Method may change in 2017	May change to 1-in-6 day in 2017	Started 1/1/2017

<sup>a</sup> All monitors that are not near-road use an R & P Model 2025 PM2.5 Sequential Monitor with a very sharp cut cyclone, Air Quality System, AQS method code 145, The near-road monitor uses a Thermo Model 2025i PM2.5 Sequential Monitor with a very sharp cut cyclone. All monitors operate year-round. All monitors are operated by Mecklenburg County Air Quality, AQS reporting agency 0669.

**Table 36 The 2017-2018 NAAQS Fine Particle Monitoring Network for the Raleigh MSA**

<sup>a</sup>

<b>AQS Site Id Number:</b>	37-101-0002	37-183-0014	37-183-0021
<b>Site Name:</b>	West Johnston	Millbrook	Triple Oak Road
<b>Street Address:</b>	1338 Jack Road <sup>c</sup>	3801 Spring Forest Road	2826 Triple Oak Road
<b>City:</b>	Clayton	Raleigh	Cary
<b>Latitude:</b>	35.590833	35.8561	35.8654
<b>Longitude:</b>	-78.461944	-78.5742	-78.8195
<b>MSA, CSA or CBSA represented:</b>	Raleigh	Raleigh	Raleigh
<b>Monitor Type:</b>	SLAMS	SLAMS / NCore	SLAMS
<b>Operating Schedule:</b>	1-in-3 day	1-in-3 day <sup>f</sup>	Hourly
<b>Statement of Purpose:</b>	AQI reporting. Compliance w/NAAQS.	1 of 2 required monitors in Raleigh MSA. AQI reporting. Compliance w/NAAQS. Air quality forecasting	Near road monitoring site. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Source oriented
<b>Scale:</b>	Neighborhood	Neighborhood	Micro-scale
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes - RFPS-1006-145	Yes - RFPS-1006-145	Yes – EQPM-1013-209
<b>Meets Requirements of Part 58 Appendix D:</b>	No – not required	Yes - 1 of 2 required monitors for the Raleigh MSA. Also required for NCore	Yes – near road; 1 of 2 required monitors for the Raleigh MSA.
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	Method changed on 1/1/2016	None

<sup>a</sup> Monitors at West Johnston, Millbrook use a R & P Model 2025 PM2.5 Sequential Monitor with a very sharp cut cyclone, Air Quality System, AQS method code 145. The monitor at Triple Oak uses a Met One BAM-1022 Monitor, AQS method code 209.

**Table 37 The 2017-2018 NAAQS Fine Particle Monitoring Network for the Winston-Salem and Greensboro-High Point MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	370570002	37-067-0022 <sup>b</sup>	37-081-0013
<b>Site Name:</b>	Lexington Water Tower	Hattie Avenue	Mendenhall
<b>Street Address:</b>	938 South Salisbury Street	1300 block of Hattie Avenue	205 Willoughby Blvd.
<b>City:</b>	Lexington	Winston-Salem	Greensboro
<b>Latitude:</b>	35.814444	36.110556	36.109167
<b>Longitude:</b>	-80.262500	-80.226667	-79.801111
<b>MSA, CSA or CBSA represented:</b>	Winston-Salem	Winston-Salem	Greensboro-High Point
<b>Monitor Type:</b>	SLAMS	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly Collocated w/1-in-6 day	1-in-3 day	1-in-6 day
<b>Statement of Purpose:</b>	Required monitor for maintenance area & the Winston-Salem MSA. Compliance w/NAAQS	AQI reporting. Compliance w/NAAQS.	Required monitor in Greensboro-High Point MSA. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure / general / background
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-0308-170	Yes - RFPS-1006-145	Yes - RFPS-1006-145
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes- Required monitor for the Winston-Salem MSA.	No – not a required monitor	Yes - required monitor for the Greensboro-High Point MSA.
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	Method will change in 2017

<sup>a</sup> The Hattie Avenue and Mendenhall monitor use an R & P Model 2025 PM2.5 Sequential Monitor with a very sharp cut cyclone, Air Quality System, AQS method code 145. The Lexington monitor uses a BAM 1020, AQS method code 170. All monitors operate year-round.

<sup>b</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS primary quality assurance organization and reporting agency 0403

**Table 38. 2017-2018 NAAQS Fine Particle Monitoring Network for the Durham-Chapel Hill, Asheville and Hickory MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-063-0015	37-021-0034 <sup>b</sup>	37-035-0004
<b>Site Name:</b>	Durham Armory	Board of Education	Hickory
<b>Street Address:</b>	801 Stadium Drive	175 Bingham Road	Water Tank 15 First Avenue
<b>City:</b>	Durham	Asheville	Hickory
<b>Latitude:</b>	36.032944	35.607500	35.728889
<b>Longitude:</b>	-78.905417	-82.583333	-81.365556
<b>MSA, CSA or CBSA represented:</b>	Durham-Chapel Hill	Asheville	Hickory
<b>Monitor Type:</b>	SLAMS	SLAMS	SLAMS
<b>Operating Schedule:</b>	1-in-3 day	1-in-3 day	Hourly, collocated w/1-in-6 day
<b>Statement of Purpose:</b>	Design value monitor for the Durham-Chapel Hill MSA. AQI reporting. Compliance w/NAAQS.	AQI reporting. Compliance w/NAAQS.	Maintenance monitor for the Hickory MSA. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	No	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes - RFPS-1006-145	Yes - RFPS-1006-145	Yes – EQPM-1013-209
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes – Required monitor for the Durham-Chapel Hill MSA.	No – not a required monitor	No - Maintenance monitor for the Hickory MSA.
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Will request change to 1-in-6-day frequency	Will request change to 1-in-6-day frequency	Method changed 1/1/2017

<sup>a</sup> Durham Armory and Board of Education monitors use an R & P Model 2025 PM2.5 Sequential Monitor with a very sharp cut cyclone, Air Quality System, AQS method code 145. The Hickory monitor uses a Met One BAM-1022 Monitor, AQS method code 209. All monitors operate year-round.

<sup>b</sup> Operated by the Western North Carolina Regional Air Quality Agency, AQS reporting agency 0779.

**Table 39 The 2017-2018 NAAQS Fine Particle Monitoring Network for the Fayetteville, Wilmington and Greenville MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-051-0009	37-129-0002	37-147-0006
<b>Site Name:</b>	William Owen	Castle Hayne	Pitt County Ag Center
<b>Street Address:</b>	4533 Raeford Road	6028 Holly Shelter Road	403 Government Circle
<b>City:</b>	Fayetteville	Castle Hayne	Greenville
<b>Latitude:</b>	35.041416	34.364167	35.638610
<b>Longitude:</b>	-78.953112	-77.838611	-77.358050
<b>MSA, CSA or CBSA represented:</b>	Fayetteville	Wilmington	Greenville
<b>Monitor Type:</b>	SLAMS	SLAMS	SLAMS
<b>Operating Schedule:</b>	1-in-6 day	hourly	1-in-3 day
<b>Statement of Purpose:</b>	AQI reporting. Compliance w/NAAQS.	AQI reporting. Compliance w/NAAQS..	Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	No	Yes	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes - RFPS-1006-145	Yes – EQPM-0308-170	Yes - RFPS-1006-145
<b>Meets Requirements of Part 58 Appendix D:</b>	No – not a required monitor	No – not a required monitor	No – not a required monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Will add collocated 1-in-6 day monitor	None	Method may change in 2017

<sup>a</sup> All monitors use an R & P Model 2025 PM2.5 Sequential Monitor with a very sharp cut cyclone, Air Quality System, AQS method code 145. All monitors operate year-round.

**Table 40 The 2017-2018 NAAQS Fine Particle Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-121-0004	37-123-0001	37-173-0002
<b>Site Name:</b>	Spruce Pine	Candor	Bryson City
<b>Street Address:</b>	138 Highland Avenue	112 Perry Drive	Parks & Rec Bldg, Center Street
<b>City:</b>	Spruce Pine	Candor	Bryson City
<b>Latitude:</b>	35.912487	35.262490	35.434767
<b>Longitude:</b>	-82.062082	-79.836613	-83.442133
<b>MSA, CSA or CBSA represented:</b>	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	SLAMS	SLAMS	SLAMS
<b>Operating Schedule:</b>	1-in-3 day	Hourly	Hourly
<b>Statement of Purpose:</b>	Compliance with NAAQS.	Required general/ background monitor for North Carolina	Required transport monitor for North Carolina; compliance w/NAAQS; air quality forecasting.
<b>Monitoring Objective:</b>	Population exposure	Welfare related impacts/ general/ background	Regional transport/ population exposure
<b>Scale:</b>	Neighborhood	Regional	Neighborhood

**Table 40 The 2017-2018 NAAQS Fine Particle Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-121-0004	37-123-0001	37-173-0002
<b>Site Name:</b>	Spruce Pine	Candor	Bryson City
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes - RFPS-1006-145	Yes – EQPM-0308-170	Yes – EQPM-0308-170
<b>Meets Requirements of Part 58 Appendix D:</b>	No – not required	Yes –required background monitor.	Yes – required transport monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Method may change in 2017	None	None

<sup>a</sup> The Spruce Pine monitor uses an R & P Model 2025 PM<sub>2.5</sub> Sequential Monitor with a very sharp cut cyclone, Air Quality System, AQS method code 145. The other monitors use a Met One BAM-1020 Monitor, AQS method code 170. All monitors operate year-round.

The DAQ evaluated each MSA with more than the required monitors to determine if all the current monitors in the MSA are still needed and providing valuable information. There are only two MSAs in 2017 with more than the required monitors excluding the monitors operated by the local programs. These MSAs are the Raleigh and the Winston-Salem MSAs. The monitors are the West Johnston monitor, 37-101-0002 and the Lexington monitor, 37-057-0002. The West Johnston monitor is in one of the fastest growing areas in the state. The Lexington monitor is the design value monitor for the Winston-Salem MSA and Lexington is in a fine particle maintenance area. Thus, the DAQ determined the Lexington monitor is necessary to demonstrate continuing maintenance of the standard and for the staff of DAQ to make informed decisions regarding development of state implementation plans and to provide air quality information to the public to ensure public health and welfare.

*B. Continuous Fine Particle Monitoring Network*

The DAQ currently operates 15 continuous fine particle monitoring sites and the local programs operate six. These monitors are used to meet federal requirements for air quality forecasting, providing real-time data to the public and meeting air quality index reporting requirements. Five of these monitors have been approved by the United States Environmental Protection Agency, EPA, for determining compliance with the national ambient air quality standards, NAAQS. Five of these monitors are also required by 40 CFR 58 Appendix D 4.7.2, which states:

“Requirement for Continuous PM<sub>2.5</sub> Monitoring. The state, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies.”

Based on Table 34, a continuous monitor collocated with an FRM is required in Charlotte, which is operated by the local program, Raleigh, Greensboro, Winston-Salem, which is operated by the local program, and Durham.

Besides being required by 40 CFR 58 Appendix D 4.7.2, continuous fine particle monitors are also required for real-time reporting (40 CFR 58 Appendix D 1.1(a), air quality forecasting and air quality index reporting (40 CFR 58 Appendix G 3). The DAQ is required by 40 CFR 58 Appendix G to do air quality index reporting in three MSAs that are not required to have a continuous monitor by 40 CFR 58 Appendix D: Asheville (operated by the local program), Fayetteville and Hickory. Thus, these three continuous monitors are needed to meet Appendix G requirements. Of the 13 remaining continuous monitors, five are FEMs - Bryson City, Lexington, Wilmington, Triple Oak and Candor - included in the FRM/FEM network and were evaluated earlier as part of that network. Three are operated by local programs. The DAQ evaluated the remaining five continuous monitors operated by the DAQ to determine if they still add value to the network and should continue operating.

The DAQ is evaluating the Met One BAM 1022 FEM to replace the 2025 monitor at the Pitt County Agricultural Center, West Johnston and Spruce Pine monitoring sites. On-site evaluation is necessary for the BAM because its performance is dependent on the locale where it is operating. Thus, the DAQ determined that the three continuous monitors involved in this evaluation need to continue operating.

The last two of the continuous fine particle sites to be evaluated are Blackstone and Leggett. The Blackstone site is a special purpose site established as part of a study commissioned by the NC legislature to measure background air quality in Lee County before shale gas development begins in that area. The fine particle special purpose, non-regulatory, continuous monitor started operating on Jan. 1, 2014 and is scheduled to run until shale gas development begins in that area or the study is ended. The Leggett fine particle continuous monitor is required for air quality forecasting in the Rocky Mount area, thus the DAQ cannot shut this monitor down while air quality forecasting continues for this area.

Table 41 through Table 46 lists the sites in the North Carolina fine particle monitoring network with continuous monitors, their sampling schedules, monitoring objectives, scale of representation and statement of purpose. These tables also indicate whether the monitor is suitable for comparison to the NAAQS, it meets 40 CFR 58 Appendix A, C, D and E requirements and any proposed changes.

**Table 41 The 2017-2018 Continuous Fine Particle Monitoring Network for the Charlotte-Concord-Gastonia MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041	37-119-0042	37-119-0045
<b>Site Name:</b>	Garinger	Montclair	Remount Road
<b>Street Address:</b>	1130 Eastway Drive	1935 Emerywood Drive	902 Remount Road
<b>City:</b>	Charlotte	Charlotte	Charlotte
<b>Latitude:</b>	35.2401	35.151283	35.212657
<b>Longitude:</b>	-80.7857	-80.866983	-80.874401
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia
<b>Monitor Type:</b>	Special purpose / NCore	Special purpose	Special purpose
<b>Operating Schedule:</b>	Hourly	Hourly	Hourly
<b>Statement of Purpose:</b>	Required by Appendix D for NCore sites. Required monitor for the Charlotte-Concord-Gastonia MSA. Real-time data reporting. Fine particle forecasting.	Real-time data reporting. Fine particle forecasting.	Near road monitoring site. AQI reporting.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Source oriented
<b>Scale:</b>	Neighborhood	Neighborhood	Microscale
<b>Suitable for Comparison to NAAQS:</b>	No	No	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-0308-170	Yes – EQPM-1013-209	Yes – EQPM-1013-209
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes- 1 of 1 required monitors for the Charlotte-Concord-Gastonia MSA. Also required for NCore	No – not a required monitor.	Yes –near road
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	Method changed April 3, 2017	Started 1/20/2017

<sup>a</sup> The Garinger monitor uses a Met One BAM 1020 monitor. The other sites use a BAM 1022. All monitors operate year-round and provide real-time air quality data to the public through AirNow and the state and local program websites. All monitors are operated by Mecklenburg County Air Quality, AQS reporting agency 0669.

**Table 42 The 2017-2018 Continuous Fine Particle Monitoring Network for the Raleigh and Greensboro-High Point MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-101-0002	37-183-0014	37-183-0021	37-081-0013
<b>Site Name:</b>	West Johnston	Millbrook	Triple Oak Road	Mendenhall
<b>Street Address:</b>	1338 Jack Road °	3801 Spring Forest Road	2826 Triple Oak Road	205 Willoughby Blvd.
<b>City:</b>	Clayton	Raleigh	Cary	Greensboro
<b>Latitude:</b>	35.590833	35.8561	35.8654	36.109167
<b>Longitude:</b>	-78.461944	-78.5742	-78.8195	-79.801111
<b>MSA, CSA or CBSA represented:</b>	Raleigh	Raleigh	Raleigh	Greensboro-High Point
<b>Monitor Type:</b>	Special purpose	Special purpose / NCore	SLAMS	Special purpose
<b>Operating Schedule:</b>	Hourly	Hourly	Hourly	Hourly
<b>Statement of Purpose:</b>	Required monitor for the Raleigh MSA. Real-time AQI reporting for the Raleigh MSA. Forecasting	Required monitor for the Raleigh MSA. Real-time AQI reporting for the Raleigh MSA. Forecasting	Near road monitoring site. AQI reporting. Compliance w/NAAQS.	Required monitor for the Greensboro-High Point MSA. Real-time AQI reporting for the Greensboro-Winston-Salem-High-Point CSA. Forecasting
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Source oriented	Population exposure / general / background
<b>Scale:</b>	Neighborhood	Neighborhood	Micro-scale	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	No	No	Yes	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-1013-209	Yes – EQPM-0308-170	Yes – EQPM-1013-209	Yes – EQPM-1013-209
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes - NCore	Yes –near road	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Started in 2016	Change to AQI monitor 1/1/2016	Started 1/1/2017	May become primary in 2017

<sup>a</sup> Monitors at West Johnston, Triple Oak and Mendenhall use a BAM 1022 monitor. The monitor at Millbrook is a BAM 1020. The DAQ is also evaluating a Teledyne D640X monitor at Millbrook

**Table 43 The 2017-2018 Continuous Fine Particle Monitoring Network for the Winston-Salem MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	370570002	37-067-0022 <sup>b</sup>	37-067-0030 <sup>b</sup>
<b>Site Name:</b>	Lexington Water Tower	Hattie Avenue	Clemmons School
<b>Street Address:</b>	938 South Salisbury Street	1300 block of Hattie Avenue	Fraternity Church Road
<b>City:</b>	Lexington	Winston-Salem	Clemmons
<b>Latitude:</b>	35.814444	36.110556	36.026000
<b>Longitude:</b>	-80.262500	-80.226667	-80.342000
<b>MSA, CSA or CBSA represented:</b>	Winston-Salem	Winston-Salem	Winston-Salem
<b>Monitor Type:</b>	SLAMS	Other	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly	Hourly
<b>Statement of Purpose:</b>	Real-time data reporting. Fine particle forecasting.	Required monitor for the Winston-Salem MSA. Real-time AQI reporting for the Greensboro-Winston-Salem-High Point CSA.	. Real-time AQI reporting for the Greensboro-Winston-Salem-High Point CSA.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	No	No	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-0308-170	No – AQS method code 702	No – AQS method code 702
<b>Meets Requirements of Part 58 Appendix D:</b>	No – not a required monitor	Yes – required monitor	No – not a required monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Became primary monitor 1/1/2016	None	None

<sup>a</sup> The Forsyth County monitors use an R & P Model 1400A PM2.5 Tapered-Element Oscillating Microbalance operated with the inlet heated to 50 degrees. The Lexington monitor is a BAM 1020. All monitors operate year-round. All monitors provide real-time air quality data to the public through AirNow and the state and local program websites.

<sup>b</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS primary quality assurance organization and reporting agency 0403

**Table 44 The 2017-2018 Continuous Fine Particle Monitoring Network for the Durham-Chapel Hill, Asheville, Fayetteville and Hickory MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-063-0015	37-021-0034 <sup>b</sup>	37-051-0009	37-035-0004
<b>Site Name:</b>	Durham Armory	Board of Education	William Owen	Hickory
<b>Street Address:</b>	801 Stadium Drive	175 Bingham Road	4533 Raeford Road	Water Tank 15 First Avenue
<b>City:</b>	Durham	Asheville	Fayetteville	Hickory
<b>Latitude:</b>	36.032944	35.607500	35.041416	35.728889
<b>Longitude:</b>	-78.905417	-82.583333	-78.953112	-81.365556
<b>MSA, CSA or CBSA represented:</b>	Durham-Chapel Hill	Asheville	Fayetteville	Hickory
<b>Monitor Type:</b>	Special purpose	Special purpose	Special purpose	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly	Hourly	Hourly
<b>Statement of Purpose:</b>	Required monitor for the Durham-Chapel Hill MSA Real-time AQI reporting for the Durham-Chapel Hill MSA.	Air quality index reporting. Fine particle forecasting.	Air quality index reporting. Fine particle forecasting.	Air quality index reporting. Fine particle forecasting.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes	No	No	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-0308-170	No – AQS method code 702	Yes – EQPM-1013-209	Yes – EQPM-0308-170 Yes – EQPM-1013-209
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes – required monitor	No – not a required monitor	No – not a required monitor	No – not a required monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	Method changed June 21, 2016	None	None

<sup>a</sup> The WNC monitor uses an R & P Model 1400A PM2.5 Tapered-Element Oscillating Microbalance operated with the inlet heated to 50 degrees. The Durham monitor is a BAM 1020. The Fayetteville monitor is a BAM 1022. All monitors operate year-round. All monitors provide real-time air quality data to the public through AirNow and the state websites.

<sup>b</sup> Operated by the Western North Carolina Regional Air Quality Agency, AQS reporting agency 0779.

**Table 45 The 2017-2018 Continuous Fine Particle Monitoring Network for the  
Wilmington, Greenville and Rocky Mount MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-129-0002	37-147-0006	37-065-0099
<b>Site Name:</b>	Castle Hayne	Pitt County Ag Center	Leggett
<b>Street Address:</b>	6028 Holly Shelter Road	403 Government Circle	7589 NC Hwy 33-NW
<b>City:</b>	Castle Hayne	Greenville	Leggett
<b>Latitude:</b>	34.364167	35.638610	35.988333
<b>Longitude:</b>	-77.838611	-77.358050	-77.582778
<b>MSA, CSA or CBSA represented:</b>	Wilmington	Greenville	Rocky Mount
<b>Monitor Type:</b>	SLAMS	Special purpose	Special purpose
<b>Operating Schedule:</b>	Hourly	Hourly	Hourly
<b>Statement of Purpose:</b>	Real-time AQI reporting. Compliance w/NAAQS.	Real-time AQI reporting. Fine particle forecasting.	Real-time AQI reporting. Fine particle forecasting.
<b>Monitoring Objective:</b>	Population exposure	Population exposure	General/ background
<b>Scale:</b>	Neighborhood	Neighborhood	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes	No	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-0308-170	Yes – EQPM-1013-209	No – AQS method code 171
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	Became NAAQS monitor 1/1/2016	May become primary monitor 1/1/2018	None

<sup>a</sup> The Castle Hayne monitor is a BAM 1020. The other monitors are BAM 1022s. The Leggett BAM is a Met-one BAM-1022 with a PM2.5 sharp cut cyclone.

**Table 46 The 2017-2018 Continuous Fine Particle Monitoring Network for the  
Valley, Piedmont and Coastal Sites that are not in an MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-105-0002	37-121-0004	37-123-0001	37-173-0002
<b>Site Name:</b>	Blackstone	Spruce Pine	Candor	Bryson City
<b>Street Address:</b>	4110 Blackstone Drive	138 Highland Avenue	112 Perry Drive	Parks & Rec Bldg, Center Street
<b>City:</b>	Sanford	Spruce Pine	Candor	Bryson City
<b>Latitude:</b>	35.432500	35.912487	35.262490	35.434767
<b>Longitude:</b>	-79.288700	-82.062082	-79.836613	-83.442133
<b>MSA, CSA or CBSA represented:</b>	Not in an MSA	Not in an MSA	Not in an MSA	Not in an MSA
<b>Monitor Type:</b>	Special purpose	Special purpose	SLAMS	SLAMS

**Table 46 The 2017-2018 Continuous Fine Particle Monitoring Network for the Valley, Piedmont and Coastal Sites that are not in an MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-105-0002	37-121-0004	37-123-0001	37-173-0002
<b>Site Name:</b>	Blackstone	Spruce Pine	Candor	Bryson City
<b>Operating Schedule:</b>	Hourly	Hourly	Hourly	Hourly
<b>Statement of Purpose:</b>	General/background site for shale gas development study.	Real-time AQI reporting.	General background site. Real-time AQI reporting. Compliance w/NAAQS.	Regional transport site. Low elevation, i.e. valley, mountain site on the NC side of the Great Smokey Mountains National Park. Forecasting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	General/background	Population exposure	General background/population exposure	Regional transport/population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Regional	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	No	No	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQPM-0308-170	Yes – EQPM-1013-209	Yes – EQPM-0308-170	Yes – EQPM-0308-170
<b>Meets Requirements of Part 58 Appendix D:</b>	No – not required	No – not required	Yes –required background monitor.	Yes – required transport monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	May become primary monitor	None	None

<sup>a</sup> The Spruce Pine monitor is a BAM 1022. The other monitors are BAM 1020s.

*C. Manual Speciation Fine Particle Monitoring Network*

The DAQ currently operates one manual speciation fine particle monitoring site and the local programs operate two. These monitors are used to meet federal requirements for the speciation trend network, STN, and for national core, NCore, monitoring stations as well as to provide Forsyth County with information on the composition of fine particles in Winston-Salem. The monitor at Garinger is required by 40 CFR 58 Appendix D 4.7.4, which requires the agency to continue operating STN

monitors. The monitors at Garinger and Millbrook are required by 40 CFR 58 Appendix D 3(b), which lists the required monitors at NCore sites.

In January 2015, the EPA ended funding for the monitors in Asheville, Rockwell, Lexington and Hickory. Thus, the monitors in Asheville, Rockwell and Lexington were shut down in January 2015. The Super Speciation Air Sampling System, SASS,<sup>TM</sup> monitor at Hickory broke during the first half of 2014 so DAQ shut it down in June 2014. Table 47 lists the sites in the North Carolina manual speciation fine particle monitoring network with their sampling schedules, monitoring objectives, scale of representation and statement of purpose. Table 47 also indicates whether the monitor is suitable for comparison to the NAAQS, it meets 40 CFR 58 Appendix A, C, D and E requirements and any proposed changes.

**Table 47 The 2017-2018 Fine Particle Manual Speciation Monitoring Network for the Charlotte-Concord-Gastonia, Raleigh and Winston-Salem MSAs<sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041 <sup>b</sup>	37-183-0014	37-067-0022 <sup>c</sup>
<b>Site Name:</b>	Garinger	Millbrook	Hattie Avenue
<b>Street Address:</b>	1130 Eastway Drive	3801 Spring Forest Road	1300 block of Hattie Avenue
<b>City:</b>	Charlotte	Raleigh	Winston-Salem
<b>Latitude:</b>	35.2401	35.8561	36.110556
<b>Longitude:</b>	-80.7857	-78.5742	-80.226667
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Raleigh	Winston-Salem
<b>Monitor Type:</b>	Speciation Trend Network / NCore	Supplemental Speciation / NCore	Supplemental Speciation
<b>Operating Schedule:</b>	1-in-3 day, 24-hour	1-in-3 day, 24-hour	1-in-6 day, 24-hour
<b>Statement of Purpose:</b>	Required Monitor for NCore	Required Monitor for NCore	Provide speciation data for Winston-Salem
<b>Monitoring Objective:</b>	Population exposure	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	No	No	No
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	No – AQS method codes 810-812, 838-842	No – AQS method codes 810-812, 838-842	No – AQS method codes 810-812, 838-842
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes- This site is a speciation trend network site & NCore.	Yes - NCore	No – not a required monitor
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None	None

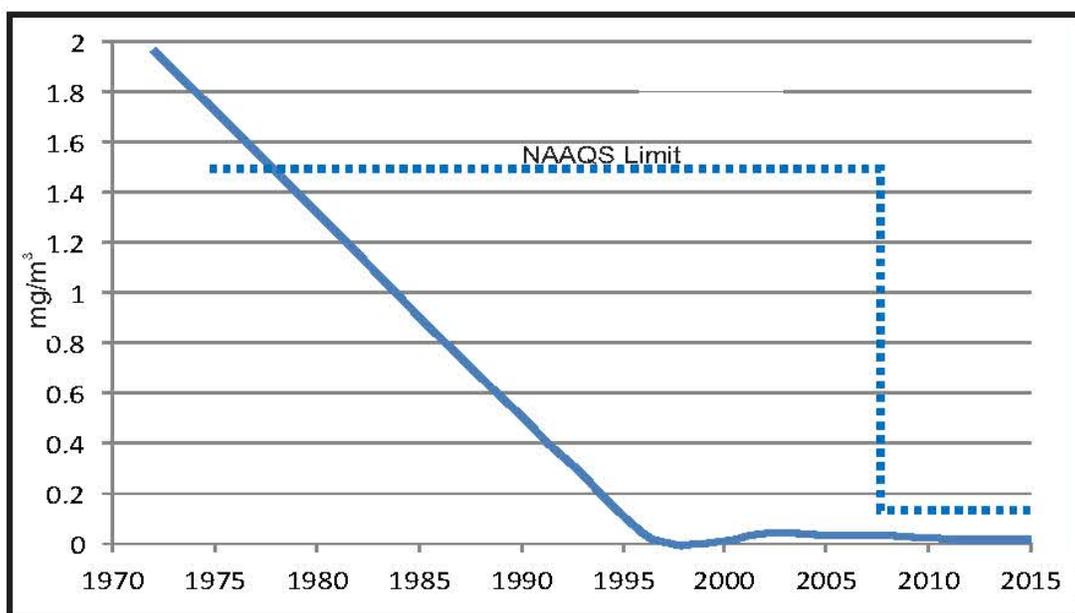
<sup>a</sup> All monitors use a Met One SuperSASS for metals and ions and an URG 3000N for elemental and organic carbon.

<sup>b</sup> Operated by Mecklenburg County Air Quality, AQS reporting agency 0669

<sup>c</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS reporting agency 0403

## VIII. Lead Monitoring Network

The North Carolina Division of Air Quality, DAQ, currently does not operate any lead monitors. The lead monitor located at the Raleigh Millbrook National Core, also known as NCore, monitoring site was shut down on April 30, 2016. As shown in Figure 68 statewide lead levels have fallen and currently remain below the standard, near or below the detection limit of the method. The 2013-2015 design values for lead in Raleigh and in Charlotte were zero.



**Figure 68. Statewide 24-hour lead levels through 2015**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air\\_Quality\\_Trends\\_in\\_North\\_Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air_Quality_Trends_in_North_Carolina.pdf) )

On Nov. 12, 2008, the United States Environmental Protection Agency, EPA, lowered the lead national ambient air quality standard, also known as NAAQS, to 0.15 micrograms per cubic meter and expanded the lead monitoring network to support the new standard.<sup>34</sup> On Dec. 27, 2010, the EPA finalized changes to the lead monitoring network.<sup>35</sup> These changes included lowering the threshold for fence line monitoring for lead-emitting facilities from one ton of lead per year to 0.5 tons of lead per year and changing the population oriented monitoring from urban areas with populations greater than 500,000 to NCore monitoring sites in urban areas with populations greater than 500,000. Fence line monitoring at facilities emitting more than one ton of lead per year

<sup>34</sup> National Ambient Air Quality Standards for Lead, Federal Register, Vol. 73, No. 219, \ Wednesday, Nov. 12, 2008, p. 66964, available on the worldwide web at <https://www.gpo.gov/fdsys/pkg/FR-2008-11-12/pdf/E8-25654.pdf>.

<sup>35</sup> Revisions to Lead Ambient Air Monitoring Requirements, Federal Register, Vol. 75, No. 247, Monday, Dec. 27, 2010, p. 81126, available on the worldwide web at <https://www.gpo.gov/fdsys/pkg/FR-2010-12-27/pdf/2010-32153.pdf#page=1>.

or that impact the ambient concentrations surrounding the facility such that ambient levels are at one half of the NAAQS or greater started on Jan. 1, 2010. Fence line monitoring at facilities emitting more than 0.5 ton of lead per year and population oriented monitoring at required NCore sites started on Dec. 27, 2011. On March 28, 2016, the EPA finalized changes to ambient monitoring quality assurance and other requirements, which removed the requirement for lead monitoring at NCore monitoring stations in urban areas with populations greater than 500,000.<sup>36</sup>

In 2009 the DAQ requested and received permission to not do fence-line lead monitoring at three facilities which were listed in the 2005 National Emission Inventory, also known as NEI, or the 2007 Toxic Release Inventory, also known as TRI, as emitting over one ton of lead per year. These facilities are:

- International Resistive Company, IRC, located in Boone,
- Nucor Steel located in Cofield, and
- Carolina Power and Light Company, Progress Energy, Roxboro Steam Station located in Semora.

The EPA granted the request and did not require the DAQ to monitor at any of these facilities because none of the facilities emitted one ton or more of lead per year. A copy of the EPA approval letter is provided in Appendix L. 2010 Network Plan EPA Approval Letter.

In 2011 the EPA listed eight facilities in North Carolina as emitting over 0.5 tons of lead per year based either on the 2008 NEI or the 2009 TRI. These facilities are:

- Duke Energy Carolinas, LLC - Belews Creek Steam Station, located in Stokes County;
- Progress Energy - Roxboro Plant, located in Person County;
- Duke Energy Carolinas, LLC - Marshall Steam Station, in Catawba County;
- U.S. Army Fort Bragg, located in Cumberland County;
- Blue Ridge Paper Products Inc., located in Canton, in Haywood County;
- Duke Power Company, LLC - Allen Steam Station, located in Gaston County;
- Royal Development Co., located in High Point, in Guilford County; and
- U.S. Marine Corps Camp Lejeune Marine Corps Base, located in Onslow County.

In addition to the eight facilities on the EPA list, the DAQ identified an additional facility, Saint-Gobain Containers, now doing business as Ardagh Glass, Incorporated,

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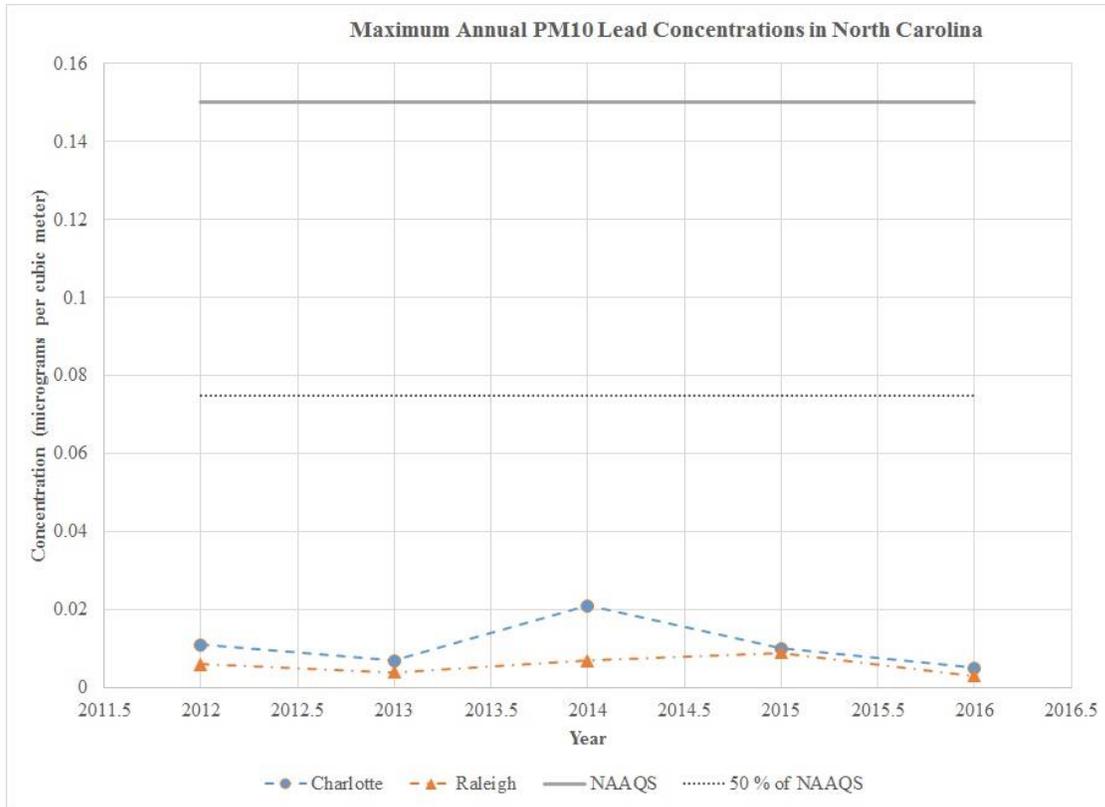
<sup>36</sup> Revisions to Ambient Monitoring Quality Assurance and Other Requirements, Federal Register, Vol. 81, No. 59, Monday, March 28, 2016, p. 17248, available on the worldwide web at <https://www.gpo.gov/fdsys/pkg/FR-2016-03-28/pdf/2016-06226.pdf>.

located in Wilson, in Wilson County, with reported 2009 lead emissions greater than 0.5 tons.

As mentioned earlier, the DAQ received permission not to monitor at one of these facilities, Progress Energy - Roxboro Plant in 2009. In 2011 the DAQ requested that this facility and six other of these facilities, Fort Bragg, Camp Lejeune, Royal Development Co., the Duke Energy Carolinas, LLC - Belews Creek Steam Station, the Duke Energy Carolinas, LLC - Marshall Steam Station and the Duke Power Company, LLC - Allen Steam Station, be removed from the list because they emit less than 0.5 tons per year and requested waivers for the other two, Blue Ridge Paper Products, Inc. and St. Gobain Containers, based on results of modeling. The EPA granted this request and did not require the DAQ to monitor at any of these facilities. A copy of the EPA approval letter is provided in Appendix H. 2011 Network Plan EPA Approval Letter.

In 2013, Fort Bragg again reported over 0.5 tons of fugitive lead emissions in the TRI. Calculation of the 2014 fugitive lead emissions using AP-42 emission factors resulted in 2014 emissions of less than 0.5 tons. Thus, in 2015 DAQ requested a waiver from lead monitoring at Fort Bragg. The EPA did not grant the waiver because the lead emissions were less than 0.5 tons. However, in 2015 the EPA did renew the waiver for Saint-Gobain Containers even though its lead emissions are currently less the 0.5 tons.

Under the 2010 lead monitoring rule, North Carolina was required to operate two population-oriented lead monitors located at the NCore monitoring sites—in Charlotte at Garinger High School and in Raleigh at Millbrook East Middle School. Both monitors started operation on Dec. 27, 2011. The first sampling day was Dec. 29. These monitors operated on a 1-in-6-day schedule and measure lead concentrations by analyzing the filters from the low volume PM<sub>10</sub> monitors that operated at the site. The samples were analyzed in batches of 50-80 using x-ray fluorescence, which is the federal reference method for the low-volume PM<sub>10</sub> lead monitoring method. Maximum lead concentrations measured at the site are shown in Figure 69.



**Figure 69. Maximum annual lead concentrations measured at North Carolina NCore Stations**

As mentioned earlier, in 2016 the EPA finalized changes to ambient monitoring quality assurance and other requirements to remove the requirement for lead monitoring at NCore monitoring stations. The measured lead concentrations at the North Carolina NCore stations are well below 50 percent of the standard as Figure 69 clearly demonstrates. Because the measured lead levels were so low, EPA Region 4 granted DAQ permission to end the lead monitoring at the Millbrook NCore station as soon as the new requirements became effective on April 27, 2016.

## IX. Urban Air Toxics Monitoring Network

Monitoring for urban air toxics, UAT, is conducted by the North Carolina Division of Air Quality, DAQ, at four sites operated by DAQ and at three sites operated by local programs. Currently, DAQ collects whole air samples in stainless steel six-liter-pressurized canisters at all seven sites. The samples are then analyzed using pre-concentration gas chromatography with mass spectrometric detection, GC/MS, via the Compendium Method for Toxic Organics, TO, 15 for the 65 compounds in Table 48.

**Table 48 List of Measured and Reported Urban Air Toxic Volatile Organic Compounds, VOC**

Propene	Hexane	cis-1,3 Dichloropropene
Freon 12	Methacrolein	1,1,2-Trichloroethane
Freon 22	1,1-Dichloroethane	Ethylpropylketone(3-h)
Freon 114	Vinyl Acetate	Tetrachloroethylene
Chloromethane	Methyl Vinyl Ketone	Methyl Butyl Ketone(2-h)
Isobutene	1,2-Dichloroethene	Dibromoethane
Vinyl chloride	Methyl Ethyl Ketone	Chlorobenzene
1,3-Butadiene	Chloroform	Ethylbenzene
Bromomethane	1,1,1-Trichloroethane	m- & p-Xylene
Chloroethane	Cyclohexane	o-Xylene
Freon 11	Carbon Tetrachloride	Styrene
Pentane	Benzene	Bromoform
Isoprene	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
Acrolein	Trichloroethylene	1,3,5-Trimethylbenzene
1,1-Dichloroethene	2-Pentanone	1,2,4-Trimethylbenzene
Freon 113	1,2-Dichloropropane	m-Dichlorobenzene
Methyl Iodide	3-Pentanone	1,2,3-Trimethylbenzene
Carbon Disulfide	1,4-Dioxane	p-Dichlorobenzene
Acetonitrile	Bromodichloromethane	Benzyl chloride
Methylene chloride	trans-1,3 Dichloropropene	o-Dichlorobenzene
Cyclopentane	Methyl Isobutyl Ketone	1,2,4-Trichlorobenzene
MTBE	Toluene	

The DAQ collects air samples on silica-2,4-dinitrophenylhydrazine, DNPH, cartridges with potassium iodide, KI, ozone scrubbing at Blackstone, Millbrook and Candor. The cartridges are extracted and analyzed using ultra high performance liquid chromatography(UHPLC) with ultraviolet(UV) detection for the list of compounds in Table 49.

**Table 49. List of Measured and Reported Urban Air Toxic Carbonyl Compounds**

Acetaldehyde	Formaldehyde	Propionaldehyde
Benzaldehyde	Hexaldehyde	Tolualdehyde(-m)
Butyraldehyde	Methacrolein	Valeraldehyde
Crotonaldehyde	Methyl Ethyl Ketone	

The DAQ established and operates an UAT monitoring network in conjunction with a national program originally proposed and designed by the EPA in 1999. The DAQ recognizes the importance of this network and supports the continuation of the program. Currently, the North Carolina program has six urban sites and one rural site. The objectives of the network proposed by the EPA in 1999 were stated as follows:

1. Measure pollutants of concern to the air toxics program;
2. Use scientifically sound monitoring protocols to ensure nationally consistent data of high quality;
3. Collect sufficient data to estimate annual average concentrations;
4. Complement existing national and state/local monitoring programs;
5. Reflect “community-oriented,” i.e. neighborhood-scale, population exposure; and
6. Represent geographic variability in annual average ambient concentrations.

The North Carolina network was developed with these objectives in mind to focus on the urban areas within the state and to work in collaboration with the three local air quality agencies that regulate air quality programs in the metropolitan areas within their respective jurisdiction. The network should complement the air toxics programs of each agency and provide a “flexible approach” to address air toxics issues in the local areas and to provide a framework to conduct more dedicated monitoring to characterize the spatial concentration patterns of specific toxic air pollutants within an urban area and to concentrate on problem areas.

The number of monitoring sites was chosen based on available funds, equipment and personnel including those in local programs and regional offices. The locations were chosen based on size of metropolitan statistical areas, MSAs, in North Carolina, existing sites in urban areas and support of local programs. The sites selected for the North Carolina UAT network were established in predominately urban areas as designated by the US Census Bureau, 2000 census. An “urban” area has been defined by EPA as a county with either a MSA population of at least 250,000 or in a county with at least 50 percent urbanization as described by the census. A “rural” county is defined as a county that has less than 50 percent urbanization as designated by the census.

Because there are no NAAQS for UAT, the EPA does not require the DAQ and local programs to operate a minimum number of required monitors.

The DAQ made the following changes during the last few years to the UAT monitoring network. The Research Triangle Park site shared with EPA was closed when a major road project forced EPA to move the building. When EPA re-established the site a safe distance from the road construction, DAQ decided to seek other possibly better located sites for the UAT monitoring that might be more representative of urban populations in North Carolina. At all North Carolina UAT sites monitoring has been discontinued for semi-volatile organic compounds, SVOCs, and carbonyl compounds by methods TO-13 and TO-11, respectively. However, sampling for carbonyl compounds by TO-11a resumed in July 2013 at two sites – Millbrook in Raleigh and Candor – and started at the Blackstone site in Nov. 2013. One GC/MS system used for VOCs analysis

by method TO-15 has been upgraded to lower detection limits. The Blackstone site is a special purpose monitoring site for monitoring VOCs and aldehyde concentrations prior to any shale gas development in this area.

Table 50 through Table 52 provide locations, the monitor type, operating schedules, monitoring objectives, scales and statement of purpose of the current air toxic-monitoring sites, as well as the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58. These tables also provide any proposed changes to the existing network. Sometime in the future DAQ may add a VOC monitoring site in Greensboro, Durham or Greenville. A specific location has not yet been identified so the proposed site is not included in the table. All monitors meet the requirements of Appendices A and E of 40 CFR 58. Appendix C and D requirements do not apply to UAT monitoring. All monitors are special purpose, non-regulatory monitors because there are no NAAQS for air toxic compounds. All monitors operate year-round on the EPA’s national 1-in-6-day schedule.

**Table 50 The 2017-2018 Air Toxics Monitoring Network for the Charlotte-Concord-Gastonia, Raleigh and Winston-Salem MSAs**

<b>AQS Site Id Number:</b>	37-119-0041 <sup>a</sup>	37-183-0014	37-067-0022 <sup>b</sup>
<b>Site Name:</b>	Garinger	Millbrook	Hattie Avenue
<b>Street Address:</b>	1130 Eastway Drive	3801 Spring Forest Road	1300 block of Hattie Avenue
<b>City:</b>	Charlotte	Raleigh	Winston-Salem
<b>Latitude:</b>	35.2401	35.8561	36.110556
<b>Longitude:</b>	-80.7857	-78.5742	-80.226667
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Raleigh	Winston-Salem
<b>Monitor Type:</b>	Non-regulatory	Non-regulatory	Non-regulatory
<b>Operating Schedule:</b>	24-hour, midnight to midnight, 1-in-6 day	24-hour, midnight to midnight, 1-in-6 day	24-hour, midnight to midnight, 1-in-6 day
<b>Statement of Purpose:</b>	Monitor as many HAPs as possible.	Monitor as many HAPs as possible.	Monitor as many HAPs as possible.
<b>Monitoring Objective:</b>	Population exposure	Population exposure; general/ background	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Not applicable	Not applicable	Not applicable
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Not applicable – uses AQS method code 150 <sup>c</sup>	Not applicable – uses AQS method code 150 and 202 <sup>d</sup>	Not applicable – uses AQS method code 150 <sup>c</sup>
<b>Meets Requirements of Part 58 Appendix D:</b>	Not applicable	Not applicable	Not applicable
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes	Yes

<b>Proposal to Move or Change:</b>	None	None	None
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<sup>a</sup> Operated by Mecklenburg County Air Quality, AQS primary quality assurance organization and reporting agency 0669

<sup>b</sup> Operated by Forsyth County Office of Environmental Assistance and Protection, AQS primary quality assurance organization and reporting agency 0403.

<sup>c</sup> AQS method code 150, sample collection in a stainless steel six liter- pressurized canister and analysis using pre-concentration gas chromatography with mass spectrometric detection, for VOCs.

<sup>d</sup> AQS method code 150, sample collection in a stainless steel six liter- pressurized canister and analysis using pre-concentration gas chromatography with mass spectrometric detection, for VOCs and 202, sample collection on a silica-DNPH-cartridge with KI O3 scrubber and analysis using HPLC ultraviolet absorption, for carbonyls.

**Table 51 The 2017-2018 Air Toxics Monitoring Network for the Asheville and Wilmington MSAs**

<b>AQS Site Id Number:</b>	37-021-0035 <sup>c</sup>	37-129-0010
<b>Site Name:</b>	AB Tech <sup>a</sup>	Battleship Site
<b>Street Address:</b>	AB Tech College	Battleship Drive
<b>City:</b>	Asheville	Wilmington
<b>Latitude:</b>	35.572222	34.235556
<b>Longitude:</b>	-82.558611	-77.955833
<b>MSA, CSA or CBSA represented:</b>	Asheville	Wilmington
<b>Monitor Type:</b>	Non-regulatory	Non-regulatory
<b>Operating Schedule:</b>	24-hour, midnight to midnight, 1-in-6 day	24-hour, midnight to midnight, 1-in-6 day
<b>Statement of Purpose:</b>	Monitor as many HAPs as possible.	Monitor as many HAPs as possible.
<b>Monitoring Objective:</b>	Population exposure	Population exposure
<b>Scale:</b>	Neighborhood	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Not applicable	Not applicable
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Not applicable – uses AQS method code 150 <sup>b</sup>	Not applicable – uses AQS method code 150 <sup>b</sup>
<b>Meets Requirements of Part 58 Appendix D:</b>	Not applicable	Not applicable
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> Operated by the Western North Carolina Regional Air Quality Agency, AQS reporting agency 0779.

<sup>b</sup> AQS method code 150, sample collection in a stainless steel six liter- pressurized canister and analysis using pre-concentration gas chromatography with mass spectrometric detection, for VOCs.

**Table 52 The 2017-2018 Air Toxics Monitoring Network for Areas not in MSAs**

<b>AQS Site Id Number:</b>	37-105-0002	37-123-0001
<b>Site Name:</b>	Blackstone	Candor
<b>Street Address:</b>	4110 Blackstone Drive	112 Perry Drive
<b>City:</b>	Sanford	Candor
<b>Latitude:</b>	35.432500	35.262490
<b>Longitude:</b>	-79.288700	-79.836613
<b>MSA, CSA or CBSA represented:</b>	Sanford	Not in an MSA
<b>Monitor Type:</b>	Special purpose	Non-regulatory
<b>Operating Schedule:</b>	24-hour, midnight to midnight, 1-in-6 day	24-hour, midnight to midnight, 1-in-6 day
<b>Statement of Purpose:</b>	Monitor as many HAPs as possible.	Monitor as many HAPs as possible.
<b>Monitoring Objective:</b>	General/ background	General/ background
<b>Scale:</b>	Urban	Regional
<b>Suitable for Comparison to NAAQS:</b>	Not applicable	Not applicable
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Not applicable – uses AQS method code 150 and 202 <sup>a</sup>	Not applicable – uses AQS method code 150 and 202 <sup>a</sup>
<b>Meets Requirements of Part 58 Appendix D:</b>	Not applicable	Not applicable
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> AQS method code 150, sample collection in a stainless steel six liter- pressurized canister and analysis using pre-concentration gas chromatography with mass spectrometric detection, for VOCs and 202, sample collection on a silica-DNPH-cartridge with KI O3 scrubber and analysis using HPLC ultraviolet absorption, for carbonyls.

## X. DAQ NCore Monitoring Network

This section provides information on the North Carolina Division of Air Quality national core, NCore, monitoring network. For information on the NCore site operated by Mecklenburg County Air Quality, see Appendix B. 2017 Annual Monitoring Network Plan for Mecklenburg County Air Quality. The East Millbrook Middle School NCore site was approved by the EPA on Oct. 30, 2009. See **Appendix M. NCore Monitoring Plan Approval Letter**.

### A. Overview

The NCore site operated by the DAQ is located at the East Millbrook Middle School site. Specifics for this site are provided below.

<u>Parameter</u>	<u>Description</u>
A) AQS identification number	37-183-0014
B) Site Name	Millbrook
C) Address	3801 Spring Forest Road, Raleigh, N.C.
D) Longitude/Latitude	-78.574167/ 35.856111 decimal degrees
E) Scale of Representation	Neighborhood
F) Monitoring Objective	Population oriented
G) Proximity to Local Emissions	None within 500 meters
H) MSA Description	Raleigh
I) Land Use	Urban

The DAQ has been operating monitors at this site since Sept. 16, 1998, and has no plans to relocate this site. The site is located at a school and the school has been very cooperative in allowing DAQ to make necessary changes at the site so that the site will meet 40 CFR 58 Appendix E requirements. The school property is fully developed and the DAQ does not anticipate that the Wake County School System will need to develop the area where the monitoring site is located or will evict us from their property anytime in the next 18 months or later.

### B. Monitor Siting Considerations

This site was modified as necessary to meet the entire EPA monitor siting criteria in 40 CFR 58 Appendix E. The following issues were addressed:

- 1) Trees were removed or trimmed such that all probe inlets are > 10 meters from any tree drip line.
- 2) All particulate matter monitors, filter based and continuous, are located on a 16'x16' wooden deck constructed in 2009. All inlets are within 1 to 4 meters of each other, all inlets are within one meter vertically of each other, all inlets

are between two and 15 meters above ground and all inlets are more than 20 meters from any roadway.

- 3) All continuous gaseous monitors, SO<sub>2</sub>, NO<sub>y</sub>, CO and O<sub>3</sub>, are housed in a temperature controlled walk-in shelter, which meets all EPA siting criteria.

With the changes made to the monitoring site by removing the trees and building the deck, the site is suitable for monitoring for fine particles for comparing the measured concentrations to the national ambient air quality standards. The platform is far enough from the road so the site will meet the necessary neighborhood scale requirements for population oriented monitoring.

*C. Monitors/Methods*

This NCore site has the following monitors in place and operating since Jan. 1, 2011, or before, except for lead, which began Dec. 27, 2011, and ended April 30, 2016, and nitrogen dioxide, NO<sub>2</sub>, which began Dec. 10, 2013:

<b>Parameter</b>	<b>Monitoring Objective</b>	<b>Scale of Representation</b>	<b>Operating Schedule</b>	<b>AQS Method Code</b>
Trace level sulfur dioxide, SO <sub>2</sub>	Population exposure	Neighborhood	Hourly data year-round	560
Trace level carbon monoxide, CO	Population exposure	Neighborhood	Hourly data year-round	554
Trace level reactive oxides of nitrogen, NO <sub>y</sub>	Population exposure	Neighborhood	Hourly data year-round	674
Nitrogen dioxide, NO <sub>2</sub>	Population exposure	Neighborhood	Hourly data year-round	200
Ozone, O <sub>3</sub>	Population exposure	Neighborhood	Hourly data year-round	047
PM <sub>2.5</sub> , fine PM, filter-based	Population exposure	Neighborhood	24-hour data on a 1-in-3-day schedule year-round	145
PM <sub>2.5</sub> , fine PM, continuous	Population exposure	Neighborhood	Hourly data year-round	733
Speciated PM <sub>2.5</sub> , filter based	Population exposure	Neighborhood	24-hour data on a 1-in-3-day schedule year-round	810-812, 838-842
PM <sub>10</sub> , continuous low volume sampler	Population exposure	Neighborhood	Hourly data year-round year round	122

<b>Parameter</b>	<b>Monitoring Objective</b>	<b>Scale of Representation</b>	<b>Operating Schedule</b>	<b>AQS Method Code</b>
PM <sub>10-2.5</sub> , coarse PM, by difference, PM <sub>10</sub> -PM <sub>2.5</sub>	Population exposure	Neighborhood	Hourly data year-round	186
<b>Meteorological measurements of:</b>				
Wind speed	Population exposure	Neighborhood	Hourly data year-round	020
Wind direction	Population exposure	Neighborhood	Hourly data year-round	020
Relative humidity	Population exposure	Neighborhood	Hourly data year-round	020
Ambient temperature	Population exposure	Neighborhood	Hourly data year-round	020

The monitor regulations were modified in 2012 to remove the requirement that all NCore sites monitor for speciated PM<sub>10-2.5</sub>, coarse PM, filter based. The DAQ has no plans to add a speciated PM<sub>10-2.5</sub> monitor to the site. In 2016 the monitoring regulations were modified to remove the requirement that all NCore sites monitor for PM<sub>10</sub> lead.<sup>37</sup> As a result DAQ ended the PM<sub>10</sub> lead analysis on April 30, 2016.

#### *D. Readiness Preparation*

In preparation for the installation of the NCore monitors, the following tasks were addressed:

<u>Parameter</u>	<u>Status</u>
A) Acquisition of trace level gaseous monitors	Completed
B) Acquisition of low concentration gas dilution calibrators	Completed
C) Certification of clean air generators	Completed
D) Method detection limit studies for trace level monitors	Completed
E) Installation of 10 meter NO <sub>y</sub> Tower	Completed
F) Installation of filter based and continuous PM monitors	Completed
G) Installation of trace level gaseous monitors	Completed

<sup>37</sup> Revisions to Ambient Monitoring Quality Assurance and Other Requirements, Federal Register, Vol. 81, No. 59, Monday, March 28, 2016, available on the worldwide web at <https://www.gpo.gov/fdsys/pkg/FR-2016-03-28/pdf/2016-06226.pdf>.

H) Preparation of trace level gaseous monitor QAPP/SOPs	Completed
I) Meteorological tower	existing
J) Ozone monitor	existing

*E. Waiver Requests*

Subject to the review of the administrator, DAQ requested and received the following waivers from the specific minimum requirements for NCore sites. The EPA approval letter is provided in Appendix H. 2011 Network Plan EPA Approval Letter.

1. Millbrook Meteorological Tower

The sampling site located at the Millbrook Middle School has been designated as an EPA NCore site. In addition to specified monitor types, the collection of meteorological data is also required and includes, at a minimum, wind speed, wind direction, relative humidity and ambient temperature. The Millbrook site has been in operation since 1989 and the meteorological tower has the required sensors in place.

The tower is located approximately due south and 15.5 meters from the shelters that house the various monitors, see Figure 70. The wind direction/speed sensors are located at a height of 10 meters above ground and the relative humidity sensor is located at two meters. Ambient temperature sensors are located at 2 meters and 10 meters above ground. The tower is located in an open, grassy area that is free from any obstructions in a 270° arc to the prevailing winds that come from the south/west direction. The tower is positioned 15.5 meters from the shelters on a 3 percent uphill grade. This grade adds approximately one meter to the height of the tower above the shelters. This siting does not meet the EPA requirement for the tower being at a distance 10 times the height of the shelter, which is 3.7 meters. Additionally, a single tree, approximately 7 meters tall, is located 18 meters to the south southwest of the tower.



**Figure 70. Millbrook NCore Site**  
 (from City of Raleigh and Wake County iMAPS, <http://maps.raleighnc.gov/iMAPS/> )

Since the position of the meteorological tower is free from any obstructions in a 270° arc to the prevailing winds that come from the south and west direction, DAQ is confident the measurements provided will be representative of meteorological conditions in the area of

interest. The state, therefore, requested and the EPA granted a waiver and deemed the position of the tower to be acceptable.

## *2. NO<sub>y</sub> probe inlet placement*

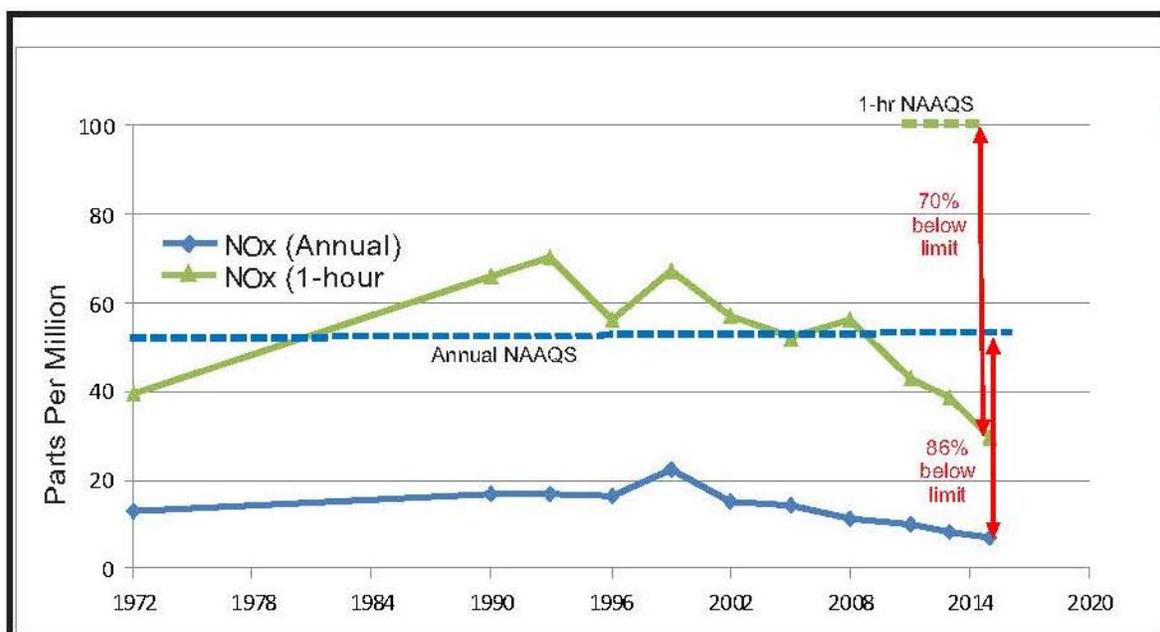
NCore probe siting guidance for NO<sub>y</sub> is a suggested probe inlet height of 10 meters. The NO<sub>y</sub> probe inlet was initially mounted at a height of 5.08 meters from the ground at the proposed NCore site. DAQ requested and received a waiver of the 10-meter probe height requirement primarily for safety considerations and to facilitate maintenance on the sampling inlet, that is cleaning of the cross fitting, and to provide access for performance of calibration test points under reduced multi-gas calibrator system pressures that are near ambient conditions.

The monitoring site is located at a middle school and elementary school and next to a day care. The converter box for the NO<sub>y</sub> monitor is very heavy and requires a special tower to support the weight in winds above 40 miles per hour or a tower with guy wires. Because the tower needs to be located next to the monitoring shelter to minimize the length of tubing involved to transport sample from the converter box to the monitor, there is no space at the site for guy wires to stabilize the tower. The guy wires would block ingress and egress from the monitoring shelter and create a safety hazard for the monitoring technicians. The DAQ was concerned that placing the converter box on a 10-m tower without guy wires at this site would be too dangerous because winds often gust to over 40 miles per hours during thunderstorms, hurricanes and other severe weather events.

Later the DAQ decided to invest resources installing a new tower at the site because the difference in cost between properly grounding the existing tower and installing a new tower rated to hold the weight of the converter box without guy wires was small compared to the cost of properly grounding the tower. Thus, after the new tower was installed in late 2010, the DAQ increased the height of the probe inlet from 5.08 meters to 10 meters.

## XI. Nitrogen Dioxide Monitoring Network

The North Carolina Division of Air Quality, DAQ, currently operates three nitrogen dioxide monitors. Mecklenburg County Air Quality operates two nitrogen dioxide monitors and Forsyth County Office of Environmental Assistance and Protection, Forsyth County, operates one nitrogen dioxide monitor. As shown in Figure 71 statewide nitrogen oxide levels have fallen and currently remain below the standard.



**Figure 71. Statewide 1-hour and annual NO<sub>x</sub> levels through 2015**

(from *Air Quality Trends in North Carolina* located at [https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air Quality Trends in North Carolina.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/Air%20Quality%20Trends%20in%20North%20Carolina.pdf) )

In 2010 the EPA changed the nitrogen dioxide primary National Ambient Air Quality Standards, also known as NAAQS, from an annual to an hourly standard of 100 parts per billion and established a new nitrogen dioxide monitoring network to support the new standard.<sup>38</sup> On Dec. 30, 2016, the requirement was removed to establish near-road NO<sub>2</sub> monitoring stations in Core Based Statistical Areas, CBSAs, having populations between 500,000 and 1,000,000 persons.<sup>39</sup> The 2010 NO<sub>2</sub> network, as modified in 2016, has three types of monitoring sites:

- Near road sites – micro-scale near-road nitrogen dioxide monitoring stations in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high average annual daily traffic, AADT, counts. An additional near-road NO<sub>2</sub> monitoring station is required for any CBSA with a population of 2,500,000

<sup>38</sup> Primary National Ambient Air Quality Standards for Nitrogen Dioxide, Federal Register, Vol. 75, No. 26, Feb. 9, 2010, available on the worldwide web at <https://www3.epa.gov/ttn/naaqs/standards/nox/fr/20100209.pdf>.

<sup>39</sup> Revision to the Near-road NO<sub>2</sub> Minimum Monitoring Requirements, Federal Register, Vol. 81, No. 251, Dec. 30, 2016, available on the worldwide web at <https://www.gpo.gov/fdsys/pkg/FR-2016-12-30/pdf/2016-31645.pdf>.

persons or more, or in any CBSA with a population of 1,000,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations.

- Area wide sites – monitoring stations in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest nitrogen dioxide concentrations representing the neighborhood or larger spatial scales.
- Regional administrator required monitoring – additional nitrogen dioxide monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, selected by the regional administrators, in collaboration with states, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations.

North Carolina has two CBSAs that are larger than 1,000,000 or more persons, not counting Virginia Beach-Norfolk-New Port News. Thus, North Carolina is required to have near road monitoring stations in the Charlotte and Raleigh areas and area wide sites in the Charlotte and Raleigh areas. In addition to the near-road and area-wide sites, the site operated by Forsyth County at Hattie Avenue was selected by the region 4 administrator for regional administrator required monitoring.<sup>40</sup>

#### A. Near Road Monitoring

For information on the near road monitoring site in the Charlotte area see Appendix B. 2017 Annual Monitoring Network Plan for Mecklenburg County Air Quality. Site selection for the Raleigh area is described below.

**The EPA approved the Triple Oak Road near road site for the Raleigh CBSA in 2012. Appendix N. 2012 Network Plan EPA Approval Letter provides the approval letter from the EPA. For details on the selection of Triple Oak Road and other locations that were considered see the 2012 Annual Monitoring Network Plan for the North Carolina Division of Air Quality.<sup>41</sup> Table 53 provides the most recently available traffic information for the area from the North Carolina Department of Transportation.**

Table 54 provides the most recently available traffic information using the traffic sensor located at the site. Using actual traffic data confirms that the monitor is in the area with the highest traffic.

**Table 53. Fleet Equivalent Average Annual Daily Traffic for Selected Road Segments in the Raleigh Metropolitan Statistical Area<sup>42</sup>**

Station	Route	Location	Station	Percent Passenger	2015 AADT	Fleet Equivalent AADT
813	I-40	From Exit 285 to 287	09MC0031	94	167,000	267,960
1	I-40	From Exit 287 to 289	09MC0031	94	174,000	257,180

<sup>40</sup> The list of NO<sub>2</sub> monitors selected for regional administrator required monitoring is available on the worldwide web at <https://www3.epa.gov/ttn/amtic/svpop.html>.

<sup>41</sup> The 2012 network plan is available at <https://www3.epa.gov/ttn/amtic/files/networkplans/NCNetwork2012plan.pdf>.

<sup>42</sup> Average annual daily traffic data is available from the NC Department of Transportation at <http://www.ncdot.gov/projects/trafficsurvey/>.

807	I-40	From Exit 283 to 284	09MC0031	94	151,000	232,540
811	I-40	From Exit 284 to 285	09MC0031	94	149,000	229,460
634	I-40	From Exit 297 to 298	09MC0033	92	119,000	204,680
895	US 1-64	West of I-40	10MC0009	95	138,000	200,100
889	I-40	From Exit 303 to 306	10MC0021	91	105,000	190,050
169	I-440	From Exit 7 to 8	09MC0048	96	138,000	187,680

**Table 54. Fleet Equivalent Average Annual Daily Traffic for Road Segments in the Raleigh Metropolitan Statistical Area Using Microwave Radar Data**

Route	Location	2013 Traffic Monitor Data			2014 Traffic Monitor Data		
		Percent Passenger	AADT	Fleet Equivalent AADT	Percent Passenger	AADT	Fleet Equivalent AADT
I-40	Exit 283 to 284	95	140,133	205,797	95	142,442	209,166
I-40	Exit 284 to 285	95	133,655	192,580	95	135,694	195,828
I-40	Exit 287 to 289	96	130,419	182,003	96	134,040	186,343
I-40	Exit 285 to 287	98	141,006	166,657	98	143,633	168,415
I-440	Exit 7 to 8	97	111,733	140,247	99	127,376	139,201
I-40	Exit 301 to 302	98	137,314	167,224	97	104,622	133,486
I-440	Exit 9 to Exit 10	99	116,082	132,321	98	115,369	132,133
I-40	Exit 297 to 298	97	114,740	143,302	97	100,657	127,177
I440	Exit 6 to 7	99	107,115	119,403	99	106,478	119,094
I-440	Exit 8 to 9	99	109,108	117,890	99	109,698	118,789

**An aerial view of the location is shown in**

Figure 72. The monitoring probe is located 18 meters from the edge of I-40 and 4.3 meters above the ground. The monitoring station is approximately one kilometer from I-540 and 0.5 kilometers from Airport Boulevard. The Airport Boulevard ramp ends approximately 300 meters southeast from the monitoring site. The location is at grade with the roadway. There are no barriers between the road and the monitoring station.



**Figure 72 Wake County Near-Road Monitoring Station Location, red circle**

*B. Area wide sites*

The area wide sites are located at the NCore sites in Charlotte and Raleigh. Mecklenburg County Air Quality operated a nitrogen dioxide monitor at the Garinger site since Nov. 12, 1999. The DAQ began operating a nitrogen dioxide monitor at the Millbrook site on Dec. 10, 2013.

*C. Regional Administrator Required Monitoring*

For information on the Hattie Avenue regional administrator required monitoring site see Appendix C. 2017 Annual Monitoring Network Plan for Forsyth County Office of Environmental Assistance and Protection.

Table 55 and Table 56 provide the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the nitrogen dioxide monitoring network in the Charlotte-Concord-Gastonia and Raleigh MSAs, respectively. Table 57 and Table 58 provide the location, the statement of purpose, the status for each monitoring site regarding whether it is suitable for comparison to the NAAQS and meets the requirements in Appendices A, C, D and E of 40 CFR 58 and a summary of proposed and planned changes to the nitrogen dioxide monitoring network in the Winston-Salem MSA and in other areas in North Carolina that are outside of MSAs, respectively.

**Table 55 The 2017-2018 Nitrogen Dioxide Monitoring Network for the Charlotte-Concord-Gastonia MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-119-0041	37-119-0045
<b>Site Name:</b>	Garinger	Remount Road
<b>Street Address:</b>	1130 Eastway Drive	902 Remount Road
<b>City:</b>	Charlotte	Charlotte
<b>Latitude:</b>	35.2401	35.212657
<b>Longitude:</b>	-80.7857	-80.874401
<b>MSA, CSA or CBSA represented:</b>	Charlotte-Concord-Gastonia	Charlotte-Concord-Gastonia
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly
<b>Statement of Purpose:</b>	Area wide site in Charlotte-Concord-Gastonia MSA. AQI reporting. Compliance w/NAAQS.	Near road monitoring site. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure	Source oriented
<b>Scale:</b>	Neighborhood	Microscale
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – RFNA-1289-074	Yes – EQNA-0512-200
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes- area wide	Yes –near road
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> The near road monitor uses a chemiluminescence detector with a photolytic convertor, Air Quality System, AQS, method code 200. The area wide monitor uses a Thermo 42i, AQS method code 074. Both monitors are operated by Mecklenburg County Air Quality, AQS primary quality assurance and reporting agency 0669

**Table 56 The 2017-2018 Nitrogen Dioxide Monitoring Network for the Raleigh MSA <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-183-0014	37-183-0021
<b>Site Name:</b>	Millbrook	Triple Oak Road
<b>Street Address:</b>	3801 Spring Forest Road	2826 Triple Oak Road
<b>City:</b>	Raleigh	Cary
<b>Latitude:</b>	35.8561	35.8654
<b>Longitude:</b>	-78.5742	-78.8195
<b>MSA, CSA or CBSA represented:</b>	Raleigh	Raleigh
<b>Monitor Type:</b>	SLAMS	SLAMS
<b>Operating Schedule:</b>	Hourly	Hourly
<b>Statement of Purpose:</b>	Area wide site in Raleigh MSA. AQI reporting. Compliance w/NAAQS.	Near road monitoring site. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure; general/background	Source oriented
<b>Scale:</b>	Neighborhood	Microscale
<b>Suitable for Comparison to NAAQS:</b>	Yes	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes	Yes

<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQNA-0512-200	Yes – EQNA-0512-200
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes- area wide	Yes –near road
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes	Yes
<b>Proposal to Move or Change:</b>	None	None

<sup>a</sup> Both monitors use a chemiluminescence detector with a photolytic convertor, Air Quality System, AQS, method code 200

**Table 57 The 2017-2018 Winston-Salem MSA Nitrogen Dioxide Monitoring Network <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-067-0022
<b>Site Name:</b>	Hattie Avenue
<b>Street Address:</b>	Corner of 13 <sup>th</sup> & Hattie Avenue
<b>City:</b>	Winston-Salem
<b>Latitude:</b>	36.110556
<b>Longitude:</b>	-80.226667
<b>MSA, CSA or CBSA represented:</b>	Winston-Salem
<b>Monitor Type:</b>	SLAMS
<b>Operating Schedule:</b>	Hourly
<b>Statement of Purpose:</b>	Regional administrator required monitor for Region 4. AQI reporting. Compliance w/NAAQS.
<b>Monitoring Objective:</b>	Population exposure
<b>Scale:</b>	Neighborhood
<b>Suitable for Comparison to NAAQS:</b>	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes
<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – RFNA-1194-099
<b>Meets Requirements of Part 58 Appendix D:</b>	Yes – required regional administrator monitor.
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes
<b>Proposal to Move or Change:</b>	None

<sup>a</sup> The monitor uses a chemiluminescence detector with a catalytic convertor, Air Quality System, AQS, method code 099 and is operated by Forsyth County Office of Environmental Assistance and Protection, AQS reporting agency 0403.

**Table 58 The 2017-2018 Nitrogen Dioxide Monitoring Network for Areas not in MSAs <sup>a</sup>**

<b>AQS Site Id Number:</b>	37-105-0002
<b>Site Name:</b>	Blackstone
<b>Street Address:</b>	4110 Blackstone Drive
<b>City:</b>	Sanford
<b>Latitude:</b>	35.432500
<b>Longitude:</b>	-79.288700
<b>MSA, CSA or CBSA represented:</b>	None
<b>Monitor Type:</b>	Special purpose
<b>Operating Schedule:</b>	Hourly
<b>Statement of Purpose:</b>	General/background site for shale gas development study
<b>Monitoring Objective:</b>	General/ background
<b>Scale:</b>	Urban
<b>Suitable for Comparison to NAAQS:</b>	Yes
<b>Meets Requirements of Part 58 Appendix A:</b>	Yes

<b>Meets Requirements of Part 58 Appendix C:</b>	Yes – EQNA-0512-200
<b>Meets Requirements of Part 58 Appendix D:</b>	No
<b>Meets Requirements of Part 58 Appendix E:</b>	Yes
<b>Proposal to Move or Change:</b>	None

<sup>a</sup> Monitor uses a chemiluminescence detector with a photolytic convertor, Air Quality System, AQS, method code 200

## **XII. Photochemical Assessment Monitoring Station, PAMS, Network**

On Oct. 26, 2015, the EPA published a revised national ambient air quality standard, NAAQS, for ozone. 80 Fed. Reg. 65,291 (2015). In addition to establishing a revised NAAQS for ozone the EPA also finalized revisions to the photochemical assessment monitoring station, PAMS, network requirements. The PAMS network requirements were originally established in 1993 and required areas in certain ozone nonattainment areas to gather ambient monitoring data that would be useful in evaluating control strategies and better understand ozone formation. See 58 Fed. Reg. 8452 (Feb. 12, 1993). The 2015 revisions to the PAMS monitoring requirements significantly changed the program and imposed for the first time PAMS ambient monitoring requirements at National Core, NCore, sites in ozone attainment areas. The provision requiring PAMS in attainment areas was not included in the proposed rulemaking. Absent granting of a waiver, North Carolina is required to install two PAMS stations – one in Charlotte (Site Name “Garinger” 371190041) and one in Raleigh (Site Name “Millbrook” 371830014) by June of 2019. The PAMS network plan is not required to be part of the network plan until 2018.

**XIII. EPA Approval Dates for Quality Management Plan and Quality Assurance Project Plans**

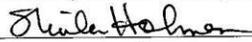
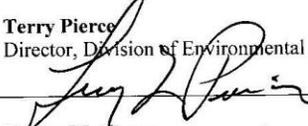
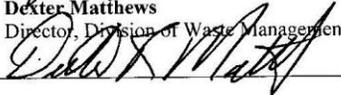
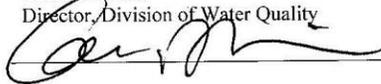
The dates the United States Environmental Protection Agency, EPA, approved the quality management plan and quality assurance project plans, QAPPs, for the North Carolina Division of Air Quality, DAQ, are provided in Table 59.

**Table 59. Dates the EPA Approved the Quality Management Plan and Quality Assurance Project Plans**

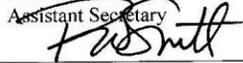
<b>Document</b>	<b>Date Approved by EPA</b>
Quality Management Plan	Aug. 18, 2011
Quality Assurance Project Plan for PM 2.5 Monitoring	Jan. 16, 2002
Quality Assurance Project Plan for Criteria Pollutant Monitoring	Nov. 6, 2006
Quality Assurance Project Plan for NCore Monitoring	(submitted Oct. 12, 2010)
Quality Assurance Project Plan for Urban Air Toxics Monitoring	(Submitted July 2, 2014)
Quality Assurance Project Plan for Data Requirements Rule Sulfur Dioxide Monitoring	Jan. 6, 2017

The DAQ is currently in the process of revising the PM 2.5, NCore and Criteria Monitoring QAPPs. The NCore and Criteria Pollutant QAPPs were revised and combined into one document and submitted to the EPA for approval on Dec. 14, 2015. The EPA provided DAQ with comments on March 14, 2016. The DAQ revised the QAPP based on EPA’s comments and added the SO2 DRR QAPP to it but the EPA suggested that DAQ submit separate QAPPs. The DAQ is currently working on separate QAPPs and plans to submit them for approval in 2017.

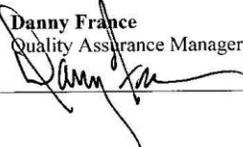
Concurrence and Approvals

- |     |           |   |       |                 |
|-----|-----------|---|-------|-----------------|
| (1) | Name      | <b>Sheila Holman</b>  | Phone | (919) 733-3340  |
|     | Title     | Director, Division of Air Quality   |       |                 |
|     | Signature |  | Date  | <u>6-13-11</u>  |
| (2) | Name      | <b>Terry Pierce</b>   | Phone | (919) 733-0711  |
|     | Title     | Director, Division of Environmental Health  |       |                 |
|     | Signature |  | Date  | <u>06/15/11</u> |
| (3) | Name      | <b>Dexter Matthews</b>  | Phone | (919) 508-8414  |
|     | Title     | Director, Division of Waste Management  |       |                 |
|     | Signature |  | Date  | <u>6-7-11</u>   |
| (4) | Name      | <b>Coleen Sullins</b>   | Phone | (919) 807-6300  |
|     | Title     | Director, Division of Water Quality   |       |                 |
|     | Signature |  | Date  | <u>6/23/11</u>  |

Approval for Departmental Implementation

- |     |           |   |       |                |
|-----|-----------|---|-------|----------------|
| (8) | Name      | <b>Robin Smith</b>  | Phone | (919) 715-4141 |
|     | Title     | Assistant Secretary   |       |                |
|     | Signature |    | Date  | <u>7/15/11</u> |
| (9) | Name      | <b>Dee Freeman</b>  | Phone | (919) 733-4984 |
|     | Title     | Secretary, Department of Environment and Natural Resources                          |       |                |
|     | Signature |  | Date  | <u>7.15.11</u> |

Approval for Environmental Protection Agency

- |      |           |   |       |                |
|------|-----------|---|-------|----------------|
| (10) | Name      | <b>Danny France</b>   | Phone | (706) 355-8738 |
|      | Title     | Quality Assurance Manager, EPA Region 4   |       |                |
|      | Signature |  | Date  | <u>8/18/11</u> |

**Figure 73. Signature Page from the DEQ Quality Management Plan**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

Science and Ecosystem Support Division  
990 College Station Road  
Athens, Georgia 30605-2720



JAN 15 2002

Mr. Hoke P. Kimball, Chief  
NCDENR  
Division Of Air Quality  
Ambient Monitoring Section  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641  
Project No. 02-0225

Dear Mr. Kimball:

We have received your letter dated December 11, 2001, requesting EPA approval, and transmitting the Quality Assurance Project Plan (QAPP); the PM<sub>2.5</sub> Speciation QA Plan, Section I, Electronic Calibrations Branch Responsibilities and Section II, Operator Responsibilities; as well as the signed Identification and Approval, Section 1.0 Title Page.

In accordance with your request, EPA Region 4 hereby approve these additions to the NC-DAQ PM<sub>2.5</sub> QAPP and has enclosed the signed QAPP Identification and Approval sheet. Should you or your staff have any question(s), please give Herbert Burden a call at 706) 355-8737.

Sincerely,

Gary Bennett  
Office of Quality Assurance and  
Data Integration

cc: Ed Carreras  
Herbert Burden



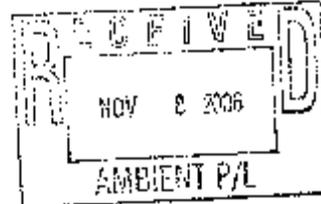
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

*(Book copied 11/13)*

REGION 4

Science and Ecosystem Support Division  
999 College Station Road  
Athens, Georgia 30605-2720

NOV 8 2006



Mr. Hoke P. Kimball  
NC Department of Environment, Health,  
And Natural Resources,  
1641 Mail Service Center  
Raleigh, NC 27699-1641

SESD Project #07 0065

Dear Mr. Kimball:

We have reviewed the Criteria Pollutants Quality Assurance Project Plan (QAPP) for the North Carolina Division of Air Quality ambient air monitoring program. This QAPP is:

- **Quality Assurance Project Plan for the North Carolina Division of Air Quality Ambient Air Quality Monitoring Program, Revision 0, dated September 30, 2006.**

EPA hereby approves this QAPP. Enclosed is the signature page of the QAPP which has been signed to indicate Region 4 approval. If you have any questions or comments, please contact Jerry W. Berger at (706) 255-8739.

Sincerely,

Marilyn Thornton, Chief  
Office of Quality Assurance and  
Data Integration

Enclosure

cc: Doug Neely  
Stephanie Wimpey

**From:** Redmond, Donnie  
**Sent:** Tuesday, October 12, 2010 8:16 AM  
**To:** Garver.daniel@epa.gov; Sciera.Katherine@epamail.epa.gov  
**Cc:** Steger, Joette  
**Subject:** NCDAQ NCore QAPP  
**Attachments:** NCore QAPP\_final 10\_08\_2010.pdf

Daniel,

Attached for EPA review and approval is NC DAQ's NCore QAPP. This electronic version is our submittal – no hard copy will be mailed unless specifically required.

Our Air Planning Agreement says to submit such changes to you. If you're not the correct contact, please let me know who is.

Thanks,  
Donnie

**Please note new email address: [donnie.redmond@ncdenr.gov](mailto:donnie.redmond@ncdenr.gov)**

Donnie Redmond, Ambient Monitoring Section Chief  
NC DENR, Division of Air Quality  
Ambient Monitoring Section  
1641 Mail Service Center  
Raleigh, NC 27699-1641  
Phone: 919-733-1487  
Fax: 919-715-7476  
[www.ncair.org](http://www.ncair.org)

\*\*\*\*\*  
E-mail correspondence to and from this address may be subject to the  
North Carolina Public Records Law and may be disclosed to third parties.  
\*\*\*\*\*

**Figure 74. NCore QAPP Submittal Documentation**

# 1.0 Approval Sheet

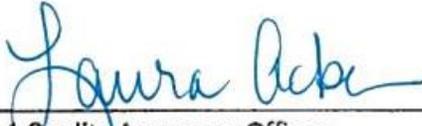
**Title: Quality Assurance Project Plan for the North Carolina Division of Air Quality SO<sub>2</sub> Data Requirements Rule Monitoring Program**

The attached *Quality Assurance Project Plan for the North Carolina Division of Air Quality SO<sub>2</sub> Data Requirements Rule Monitoring Program* is hereby recommended for approval and commits the State of North Carolina, Department of Environmental Quality (Division of Air Quality) to follow the elements described within.

1) Signature:  Date 12/29/16  
DEQ, Air Quality Division Director

2) Signature:  Date 12/29/16  
DAQ Acting Quality Assurance Manager

3) Signature:  Date 12/28/2016  
Duke Energy Project Manager

4) Signature:  Date 01/06/17  
EPA Region 4 Quality Assurance Officer

**Figure 75. Signature page for the Sulfur Dioxide Data Requirements Rule Quality Assurance Project Plan**

#### **XIV. Equipment Condition of North Carolina Monitoring Sites**

Ozone calibrators Thermo 49 CPS are in good condition. The Electronics and Calibration Branch, ECB, is currently using four calibrators for audit devices and lab standards. The manufacturer stopped support for this equipment in August 2015. The calibrators have been replaced with Thermo 49i-PS calibrators and will be deployed in 2017 after testing and verifications.

Ozone analyzers Thermo 49i and calibrators Thermo 49i-PS are new, having been purchased in 2013 and 2014, and are in good condition. The Division of Air Quality, DAQ, has acquired 45 each and has deployed them to the field since the beginning of the 2015 ozone season. Currently we have 28 sites in operation and audit eight sites for the local and tribal programs.

EnviroNics Model 7000 Zero Air Generators, ZAG, are new, having been purchased in 2014 and are in good condition. ECB has five units and they are used in the maintenance lab at the technician's work benches.

API Teledyne Model 701 ZAGs are new, having been purchased in 2014 and 2015 and are in good condition. ECB has 74 of these ZAGs and deployed them starting in 2015 to all DAQ sites requiring zero air.

API Teledyne Model 751H Portable ZAGs are new, having been purchased in 2014 and 2015 and are in good condition. ECB has two of these ZAGs and uses them to conduct audits.

The ECB zero air supply, ZAS, were removed at the end of the 2014 ozone season. ECB will keep one on hand as backup to the ZAGs. All the other units were sent to surplus in 2015.

SO<sub>2</sub> analyzers Thermo 43C are between 11 and 15 years old and are in fair condition. The manufacturer stopped support for this equipment in August 2015. The analyzers have been replaced with 43i's and will be deployed by 2017.

SO<sub>2</sub> analyzers Thermo 43i are new, having been purchased in 2015 and are in good condition. ECB has 11 - 43i's and eight - 43i-TLE analyzers. They are currently supporting seven year-round sites, of which two are data requirement rule sites, five three-year rotating sites and two audit sites for the data requirements rule.

CO analyzers Thermo 48C are at the end of their lifecycle and will be replaced by 2017 with 48i-TLE's. The manufacturer stopped support for this equipment in August 2015.

CO analyzers Thermo 48i-TLE (three in 2006, one in 2012, two in 2015) are in fair to new condition. Parts are hard to acquire for the older 48i's. The analyzers support three sites in DAQ and Mecklenburg County.

NO<sub>y</sub> Reactive Nitrogen Thermo 42i-Y analyzers (three – 2007, one – 2012) are in fair to good condition. DAQ is working to purchase additional units in the future.

Thermo 146C calibrators used with SO<sub>2</sub>, CO and NO<sub>y</sub> are in fair to poor condition and were only supported by the manufacturer until August 2015. The division will work to replace them in the next one to two years. There is only one in operation and it will be replaced in 2017.

Thermo 146i calibrators used with SO<sub>2</sub>, CO and NO<sub>y</sub> are new (2015) and in good condition. The division has 15 and will work to replace the 146C models by 2017.

NH<sub>3</sub> Ammonia monitors - Model 17C; DAQ stopped monitoring for this pollutant in June 2015. The older three pieces of equipment were sent to surplus in 2015. ECB kept the two newer units for any future requirements.

NO<sub>2</sub> Nitrogen Dioxide Teledyne T200UP analyzers are in good condition. DAQ has five (2013 and 2014) units. ECB is researching replacing them with CAPS Monitors in the future.

NO<sub>2</sub> Nitrogen Dioxide Teledyne T700U calibrators are in good condition. DAQ has six (2012, 2013 and 2014) units. DAQ is working to purchase additional units in the future.

NO<sub>3</sub> nitrate analyzers and generators – R&P Model 8400N; DAQ owns two each (2003), one operates at the continuous speciation site at Millbrook CSS. One unit is in fair condition and the other unit is being used for spare parts.

SO<sub>4</sub> sulfate analyzers – Thermo Model 5020c; DAQ owns two (2005); one is operating at the Millbrook CSS and is in fair to good condition. They will no longer be supported by Thermo after 2015. DAQ buys maintenance parts annually for this equipment. The Model 5020c SO<sub>4</sub> monitor at the Millbrook CSS was replaced with the new unit in late 2013. The one removed from the Millbrook CSS is on the shelf at ECB for a spare.

Anderson particulate machines, DAQ has kept two (1987) in its inventory, they are in fair condition and can be maintained by ECB.

Total suspended particulate, TSP, DAQ has kept six (1996) in its inventory, they are in fair condition and can be maintained by ECB. ECB sent the other systems to surplus in 2015.

Wedding PM<sub>10</sub> monitors, DAQ has kept one (1991) in its inventory and it is in fair condition and can be maintained by ECB. ECB will surplus unused Weddings in 2017.

URG 3000N particulate monitors, DAQ owns five (2010) two are in good condition and the other three are used as spares to support the remaining units

Met One SASS 9800 particulate monitors, DAQ owns five older units and one (2016) are in fair condition to new condition. The older units will be used as spares to maintain the remaining units.

Thermo Partisol 2025 PM<sub>2.5</sub> units; DAQ owns 40 (1998 – 2001); while showing some age, they are in poor to fair condition. These units are no longer supported by the manufacturer and will be gradually replaced beginning in 2017.

Thermo Partisol 2025i PM<sub>2.5</sub> units; DAQ owns four; they are in new condition. The two received in 2015 do not have cold weather kits and it is too expensive to upgrade them, they will be used for spare parts. The two received in 2016; one will be installed at the Millbrook site and the second one will go to Mecklenburg County. DAQ has purchased seven units for 2017 and will deploy them gradually in 2017-2018.

Beta attenuation monitors, BAM, Model 1020 – DAQ owns 24; units were acquired between 2008 and 2015; equipment is in good to new condition. DAQ is working to purchase additional units in the future.

Beta attenuation monitors, BAM, Model 1022 – DAQ owns 14, equipment was new (2015 and 2016) and in good condition. DAQ is working to purchase additional units in the future.

Tapered element oscillating microbalance, TEOM, monitors are in poor condition, no longer supported by the manufacturer and have been replaced in the field with BAMs. The equipment will be sent to surplus in 2017.

Xontek 911 VOC samplers are in fair to good condition after some reconditioning and replacement of obsolete pumps and circuit boards. There are 16 units that are over 20 years old and six that were purchased in 2014. DAQ is working to purchase additional units in the future.

ATEC 2200-1C aldehyde samplers are in fair to poor condition. Some are serviceable but in need of replacement. DAQ is working to purchase additional units in the future.

## XV. Resources

1. Title 40 Code of Federal Regulations Part 58, Ambient Air Quality Surveillance. Part 58 and Part 58 Amended: Federal Register/Vol. 71 No. 200/Tuesday, Oct. 17, 2006/Rules and Regulations.
2. Title 40 Code of Federal Regulations Part 58, Ambient Air Quality Surveillance. APPENDIX A TO PART 58—QUALITY ASSURANCE REQUIREMENTS FOR MONITORS USED IN EVALUATIONS OF NATIONAL AMBIENT AIR QUALITY STANDARDS: Electronic Code Of Federal Regulations, May 19, 2016, available at [http://www.ecfr.gov/cgi-bin/textidx?SID=87c8d2b6f9ef2f4c8b11437b1077746b&mc=true&node=ap40.6.58\\_161.a&rgn=div9](http://www.ecfr.gov/cgi-bin/textidx?SID=87c8d2b6f9ef2f4c8b11437b1077746b&mc=true&node=ap40.6.58_161.a&rgn=div9).
3. Title 40: Protection of Environment, PART 58—AMBIENT AIR QUALITY SURVEILLANCE, APPENDIX D TO PART 58—NETWORK DESIGN CRITERIA FOR AMBIENT AIR QUALITY MONITORING, available at [http://www.ecfr.gov/cgi-bin/textidx?SID=da14c4661eddf14519d93a82e410ec9&mc=true&node=ap40.6.58\\_161.d&rgn=div9](http://www.ecfr.gov/cgi-bin/textidx?SID=da14c4661eddf14519d93a82e410ec9&mc=true&node=ap40.6.58_161.d&rgn=div9).
4. State of North Carolina, Department of Transportation. Traffic Count Information. <http://www.ncdot.org/travel/statemapping/trafficvolumemaps/default.html>. 1500 Mail Service Center, Raleigh, NC, 27699-1500.
5. State of North Carolina, Department of Transportation. Traffic Survey Annual Average Daily Traffic. <http://www.ncdot.gov/projects/trafficsurvey/default.html>. 1500 Mail Service Center, Raleigh, NC, 27699-1500.
6. List of Designated Reference and Equivalent Methods. Issue Date: Dec. 17, 2016. <https://www3.epa.gov/ttn/amtic/files/ambient/criteria/AMTIC%20List%20Dec%202016-2.pdf>. United States Environmental Protection Agency, National Exposure Research Laboratory, Human Exposure & Atmospheric Sciences Division (MD-D205-03), Research Triangle Park, NC 27711.
7. United States Census Bureau, Population Division. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016. Released March 23, 2017, available at <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.
8. Office of Management and Budget, OMB BULLETIN NO. 13-01: Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas and Combined Statistical Areas and Guidance on Uses of the Delineations of These Areas, Feb. 28, 2013, available at <https://obamawhitehouse.archives.gov/sites/default/files/omb/bulletins/2013/b13-01.pdf>, accessed May. 18, 2017.
9. Office of Management and Budget, OMB BULLETIN NO. 15-01: Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas and Combined Statistical Areas and Guidance on Uses of the Delineations of These Areas, July. 15, 2015, available at <https://obamawhitehouse.archives.gov/sites/default/files/omb/bulletins/2015/15-01.pdf>, accessed May 18, 2017.
10. Ambient Air Monitoring Network Assessment Guidance, Analytical Techniques for Technical Assessments of Ambient Air Monitoring Networks, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Quality Assessment

Division, Research Triangle Park, NC; available at <http://www.epa.gov/ttnamti1/files/ambient/pm25/datamang/network-assessment-guidance.pdf>.

11. Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard, Federal Register of Aug. 21, 2015, (80 FR 51052) (FRL-9928-18-OAR), 2015-20367, available at <https://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf>.
12. SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, U.S. EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, December 2013, Draft.
13. Notification of Change – Addendum to the “2015 Annual Monitoring Network Plan for Mecklenburg County Air Quality” - Relocation of County Line (37-119-1009) Ozone Monitoring Station to 35.314158, -80.713469 (proposed site name: University Meadows), Feb. 10, 2016, available at <http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=7805>.
14. **42 U.S.C.** United States Code, 2013 Edition Title 42 - THE PUBLIC HEALTH AND WELFARE CHAPTER 85 - AIR POLLUTION PREVENTION AND CONTROL SUBCHAPTER I – PROGRAMS AND ACTIVITIES Part C - Prevention of Significant Deterioration of Air Quality subpart i - clean air Sec. 7475 - Preconstruction requirements, available at <https://www.gpo.gov/fdsys/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapIpartC-subparti-sec7475.htm>.
15. 2011 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, available at <http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=7843>.
16. 2015 State of North Carolina Ambient Air Monitoring Network Plan, The U. S. EPA Region 4 Comments and Recommendations, available at <http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=7440>.
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**Table A-1 Summary of Monitoring Sites and Types of Monitors**

Site ID Site Name	CO		SO <sub>2</sub>		NO <sub>y</sub>		NO <sub>2</sub>	O <sub>3</sub>	Pb	PM <sub>10</sub>		PM <sub>2.5</sub>			Meteorology			UAT
	R	T	R	T	H	T				M	C	M	C	S	WS/WD	AT/RH	RF/SR	
370030005 Taylorsville- Liledoun								X			X							
370110002 Linville Falls								X										
370130151 Bayview Ferry			X											X				
370190005 Southport DRR				X										X				
370210030 <sup>a</sup> Bent Creek								X										
370210034 <sup>a</sup> Board of Ed												X	X					
370210035 <sup>a</sup> AB Tech College																		VOC
370210036 <sup>b</sup> Skyland DRR				X										X				
370270003 Lenoir			X					X										
370330001 Cherry Grove								X		X								
370350004 Hickory Water Tower											X	X						
370510008 Wade								X										
370510009 Wm Owen										X	2	X						
370510010 Honeycutt			X					X										
370570002 Lexington Water Tower											X	X						
370630015 Durham Armory			X					X		X	X	X						
370650099 Leggett								X				X						
370670022 <sup>c</sup> Hattie Ave.			X				X	X		X	X	X	X					VOC
370670030 <sup>c</sup> Clemmons								X				X						

**Table A-1 Summary of Monitoring Sites and Types of Monitors**

Site ID Site Name	CO		SO <sub>2</sub>		NO <sub>y</sub>		NO <sub>2</sub>	O <sub>3</sub>	Pb	PM <sub>10</sub>		PM <sub>2.5</sub>			Meteorology			UAT
	R	T	R	T	H	T				M	C	M	C	S	WS/WD	AT/RH	RF/SR	
370671008 <sup>c</sup> Union Cross								X							X	AT		
370750001 <sup>d</sup> Joanna Bald								X										
370770001 Butner								X										
370810013 Mendenhall								X		X	E	X					SR	
370870008 Waynesville E.S.								X										
370870013 Canton DRR				X														
370870035 Fry Pan								X										
370870036 Purchase Knob								X										
371010002 West Johnston								X			E	X						
371050002 Blackstone				X		X	X	X				X		X	X			VOC ALD
371070004 Lenoir Community College								X		X								
371090004 Crouse								X										
371170001 Jamesville			X					X		X								
371190041 <sup>e</sup> Garinger	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	VOC
371190042 <sup>e</sup> Montclair									X	X	X	X						
371190044 <sup>e</sup> Redmont Rd	X					X					X	X						
371190046 <sup>e</sup> University Meadows								X									SR	
371210004 Spruce Pine Hospital											E	X						
371230001 Candor										X		X		X	X			VOC ALD
371290002 Castle Hayne								X	X		E	X						
371290006 New Hanover			E															
371290010 Battleship																		VOC
371450003 Bushy Fork								X										

**Table A-1 Summary of Monitoring Sites and Types of Monitors**

Site ID Site Name	CO		SO <sub>2</sub>		NO <sub>y</sub>		NO <sub>2</sub>	O <sub>3</sub>	Pb	PM <sub>10</sub>		PM <sub>2.5</sub>			Meteorology			UAT
	R	T	R	T	H	T				M	C	M	C	S	WS/WD	AT/RH	RF/SR	
371450004 <sup>b</sup> Semora DRR			X												X			
371470006 Pitt Co Ag Cen								X				X	X					
371570099 Bethany			X					X										
371590021 Rockwell								X									SR	
371730002 Bryson City								X				X		X	X			
371790003 Monroe M. S.								X										
371830014 Millbrook		X		X		X	X	X		X	X	X	X	X	X	X	X	VOC ALD
371830021 Triple Oak Rd		X					X					X						
371990004 Mt Mitchell								X										

CO = Carbon monoxide  
 SO<sub>2</sub> = Sulfur dioxide  
 NO<sub>y</sub> = Reactive oxides of nitrogen  
 O<sub>3</sub> = Ozone  
 Pb = Lead  
 PM<sub>10</sub> = Particles of 10 micrometers or less in aerodynamic diameter  
 PM<sub>2.5</sub> = Fine particles  
 X = monitor operating at site  
 E = monitor at site will end  
 P = monitoring proposed to start at site  
 R = 48C monitor for CO, 43i monitor for SO<sub>2</sub>

T = 48i or Teledyne API (TAPI) 300EU monitor for CO, 43i TLE monitor for SO<sub>2</sub>  
 M = 2025 or 2025i Sequential  
 C = TEOM or BAM1020 or 1022  
 S = Met One SASS monitor and URG 3000N  
 WS/WD = Wind speed & direction  
 AT/RH = air temperature & relative humidity  
 RF/SR = Rainfall & solar radiation  
 UAT = Urban air toxics  
 VOC = Volatile organic compounds  
 ALD = Aldehydes and ketones

<sup>a</sup> Operated by the Western North Carolina Regional Air Quality Agency

<sup>b</sup> Operated by Duke Energy Progress

<sup>c</sup> Operated by the Forsyth County Office of Environmental Assistance and Protection

<sup>d</sup> This monitor is owned by the United States Forest Service and operated by the North Carolina Division of Air Quality

<sup>e</sup> Operated by the Mecklenburg County Air Quality

## **Appendix B. 2017 Annual Monitoring Network Plan for Mecklenburg County Air Quality**

Available at:

[http://charmeck.org/mecklenburg/county/LUESA/AirQuality/Air-Quality-Data/Scripts/MCAQ%20Annual%20Monitoring%20Network%20Plan\\_2017\\_2018\\_Public\\_Comment.pdf](http://charmeck.org/mecklenburg/county/LUESA/AirQuality/Air-Quality-Data/Scripts/MCAQ%20Annual%20Monitoring%20Network%20Plan_2017_2018_Public_Comment.pdf)

**Appendix C. 2017 Annual Monitoring Network Plan for Forsyth County Office of Environmental Assistance and Protection**

Available at:

[http://daq.state.nc.us/monitor/monitoring\\_plan/Forsyth\\_2011\\_Plan.pdf](http://daq.state.nc.us/monitor/monitoring_plan/Forsyth_2011_Plan.pdf)

## Appendix D. EPA Approval Letter for 2016-2017 Network Plan Addendum for the Skyland DRR Monitoring Site



### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

APR 27 2017.

Mr. Mike Abraczinskas  
Director  
Division of Air Quality  
North Carolina Department of  
Environmental Quality  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Dear Mr. Abraczinskas:

On December 28, 2016, the North Carolina Division of Air Quality (NC-DAQ) submitted to the U.S. Environmental Protection Agency an addendum to the state of North Carolina's 2016 annual ambient air monitoring network plan (Network Plan). The addendum to the Network Plan (Addendum), proposes an additional sulfur dioxide (SO<sub>2</sub>) monitor to be located near the Duke Energy Asheville (Duke Asheville) facility and to meet SO<sub>2</sub> Data Requirements Rule (DRR) requirements.

The EPA finalized the SO<sub>2</sub> DRR (40 CFR Part 51, Subpart BB) on August 10, 2015. This rule requires characterization of air quality, using ambient air monitoring or air modeling, near sources with SO<sub>2</sub> emissions greater than 2,000 tons per year or sources that have been identified by an air agency as requiring further air quality characterization. The Duke Asheville facility was previously identified by North Carolina as requiring further air quality characterization under the SO<sub>2</sub> DRR.

For monitoring near Duke Asheville, the NC-DAQ and the Western North Carolina Regional Air Quality Agency (WNCRAQA) engaged the EPA staff early in the process of locating SO<sub>2</sub> DRR monitors and discussed with the EPA staff locations that could appropriately characterize the maximum SO<sub>2</sub> concentrations near Duke Asheville. In February 2016, the EPA staff visited potential sites with NC-DAQ and WNCRAQA staff and discussed modeling results. In selecting the sites, the NC-DAQ followed the procedures outlined in the EPA's SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document (Monitoring TAD). NC-DAQ staff performed modeling according to the Monitoring TAD procedures to inform decisions about areas of expected maximum concentration and EPA modeling staff reviewed the modeling files for accuracy.

The Skyland Drive DRR monitoring site (AQS ID 37-021-0036) is near a maximum predicted 1-hr SO<sub>2</sub> concentration location that is also frequently predicted to have daily maximum 1-hr SO<sub>2</sub> concentration values. Using the process in the Monitoring TAD, this site is nearest the 68th highest ranked receptor and on the same ridge line as the highest ranked modeling receptor. This site also is located such that it has a clear line of sight to the facility stacks. Based on the modeling provided by NC-DAQ, the EPA agrees that this site is representative of an area of maximum concentration. All of the other areas of predicted maximum concentration are also on elevated terrain. The Skyland Drive DRR site is representative of elevated terrain emissions impact from Duke Asheville. Thus, the EPA believes that the Skyland DRR site will be representative of the maximum 1-hour SO<sub>2</sub> concentrations in the area surrounding the Duke Asheville facility.

The EPA approves the Network Plan Addendum which proposes the Skyland Drive DRR monitor to characterize maximum 1-hour SO<sub>2</sub> concentrations near Duke Asheville. Also, the EPA appreciates that NC-DAQ and WNCRAQA staff engaged the EPA Region 4 staff early in 2016 in discussions of the appropriate location for characterizing SO<sub>2</sub> concentrations near Duke Asheville.

Thank you for working with the EPA Region 4 to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,

A handwritten signature in blue ink that reads "Carol H. Kember for". The signature is written in a cursive style.

Beverly H. Banister  
Director  
Air, Pesticides and Toxics Management Division

cc: Mr. David Brigman, Director  
Western North Carolina Regional Air Quality Agency

## Appendix E. 2016-2017 Network Plan EPA Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

DEC 15 2016

Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environmental Quality  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Dear Ms. Holman:

Thank you for submitting the state of North Carolina's 2016 annual ambient air monitoring network plan (Network Plan), dated July 1, 2016. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality (NC-DAQ), and the local air quality agencies in North Carolina. The U.S. Environmental Protection Agency also received an addendum to the Network Plan (Addendum), dated September 1, 2016, which provided additional information on the proposed sulfur dioxide (SO<sub>2</sub>) monitor to be located near the CPI Southport facility to meet SO<sub>2</sub> Data Requirements Rule (DRR) requirements. This letter is in response to both the Network Plan and Addendum.

The EPA Region 4 understands that the NC-DAQ provided the public a 30-day review period for its draft Network Plan and Addendum. Comments on the draft plan were submitted by several stakeholders and the final Network Plan includes the NC-DAQ's responses to these comments. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, the EPA is not required to offer another comment period.

The EPA approves North Carolina's 2016 Network Plan and Addendum. The Network Plan and Addendum proposed the installation of four SO<sub>2</sub> DRR monitors as well as other changes to the North Carolina monitoring network. The EPA approves all of these changes including all four proposed SO<sub>2</sub> monitoring locations to characterize the area of expected maximum SO<sub>2</sub> concentrations near the emissions sources. Details regarding the EPA's review of the Network Plan and Addendum are provided in the enclosed comments.

Thank you for working with the EPA Region 4 to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,



Beverly H. Banister  
Director  
Air, Pesticides and Toxics Management Division

Enclosure

cc: Ms. Leslie Rhodes, Director  
Mecklenburg County Land Use and  
Environmental Services Agency

Mr. William M. Barnette, Director  
Forsyth County Environmental Affairs Department

Mr. David Brigman, Director  
Western North Carolina Regional Air Quality Agency

## 2016 State of North Carolina Ambient Air Monitoring Network Plan The U.S. EPA Region 4 Comments and Recommendations

This document contains the U.S. EPA comments and recommendations on the state of North Carolina's 2016 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements are listed for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and lead (Pb).

The minimum monitoring requirements are based on core based statistical area (CBSA) boundaries as defined by the U.S. Office of Management and Budget (OMB); July 1, 2015, population estimates from the U.S. Census Bureau; and historical ambient air monitoring data. Minimum monitoring requirements for O<sub>3</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>, only apply to metropolitan statistical areas (MSAs), which are a subset of CBSAs. OMB currently defines 17 MSAs in the state of North Carolina. The July 1, 2015 population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and July 1, 2015 Population Estimates**

<b>MSA Name</b>	<b>Population</b>
Charlotte-Concord-Gastonia, NC-SC	2,426,363
Virginia Beach-Norfolk-Newport News, VA-NC	1,724,876
Raleigh, NC	1,273,568
Greensboro-High Point, NC	752,157
Winston-Salem, NC	659,330
Durham-Chapel Hill, NC	552,493
Asheville, NC	446,840
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	417,668
Fayetteville, NC	376,509
Hickory-Lenoir-Morganton, NC	362,510
Wilmington, NC	277,969
Jacksonville, NC	186,311
Greenville, NC	175,842
Burlington, NC	158,276
Rocky Mount, NC	148,069
New Bern, NC	126,245
Goldsboro, NC	124,132

### **Monitoring Network Changes Proposed by the North Carolina Division of Air Quality (NC-DAQ)**

Monitors proposed for discontinuation and the EPA's determination are summarized in Table 2. Detailed rationale for the EPA's approval of the specific network changes can be found in the pollutant sections of this document.

**Table 2: Monitors Proposed for Discontinuation**

AQS ID	Site Name	Pollutant	Type	Comments
37-119-0003	#11 Fire Station	PM <sub>10</sub>	SLAMS	Approved
37-119-0041	Garinger	Pb	SLAMS	Approved - no longer required after monitoring rule change
37-119-0043	Oakdale	PM <sub>2.5</sub>	SLAMS	Approved - monitor will be used at existing near-road site to meet near-road PM <sub>2.5</sub> requirements
37-183-0014	Millbrook School	Pb	SLAMS	Approved - no longer required after monitoring rule change

The EPA reviewed these requests for monitor discontinuation and determined that they meet the requirements of 40 CFR §58.14(c) for monitor discontinuation. The minimum monitoring requirements for PM<sub>2.5</sub>, PM<sub>10</sub>, and Pb found in 40 CFR Part 58, Appendix D will continue to be met for the respective CBSAs after the monitors are discontinued.

The NC-DAQ has proposed in the Network Plan a number of monitors to begin operating in 2017, including four SO<sub>2</sub> Data Requirements Rule (DRR) sites and additional monitoring at existing near-road monitoring sites. These monitors and the EPA's determination are summarized in Table 3.

**Table 3: Monitors Proposed for Startup**

AQS ID	Site Name	Pollutant	Type	Comments
37-119-0045	Remount Road	CO, PM <sub>2.5</sub>	SLAMS	Approved – startup of CO and PM <sub>2.5</sub> monitors at the existing near-road site
37-183-0021	Triple Oak Road	CO, PM <sub>2.5</sub>	SLAMS	Approved – startup of CO and PM <sub>2.5</sub> monitors at the existing near-road site
37-145-0004	Semora DRR	SO <sub>2</sub>	SLAMS	Approved – SO <sub>2</sub> monitor to characterize maximum concentrations near Duke Roxboro facility
37-087-0013	Canton DRR	SO <sub>2</sub>	SLAMS	Approved – SO <sub>2</sub> monitor to characterize maximum concentrations near Evergreen Packaging facility
37-019-0005	Southport DRR	SO <sub>2</sub>	SLAMS	Approved – SO <sub>2</sub> monitor to characterize maximum concentrations near CPI Southport facility
37-013-0151	Bayview	SO <sub>2</sub>	SLAMS	Approved – existing SO <sub>2</sub> monitor to characterize maximum concentrations near PCS Phosphate facility

### Waivers for Ambient Air Monitoring Requirements

The EPA Region 4 requires that waivers to any ambient air monitoring requirements subject to 40 CFR Part 58 be, at a minimum, submitted with each 5-year network assessment submittal or as needed in any annual network plan submittal.

The NC-DAQ requested a waiver from the requirement that the ozone season start in March for five mountain top O<sub>3</sub> sites in North Carolina (Linville Falls (AQS ID 37-011-0002); Joanna Bald (AQS ID 37-075-0001); Frying Pan (AQS ID 37-087-0035); Purchase Knob (AQS ID 37-087-0035); and Mt Mitchell (AQS ID 37-199-0004)). The request was for the ozone season to start in April in 2017 and

future ozone seasons. The EPA approves this request. More details of this request and waiver are found in the O<sub>3</sub> pollutant section.

The Network Plan requested two waivers of monitoring requirements at the Charlotte NCore site, Garinger (AQS ID 37-119-0041), operated by the Mecklenburg County Air Quality (MCAQ) program. MCAQ requested renewal of the waiver of the requirement that the meteorological tower be located ten times the height of an obstruction away from the obstruction. It is EPA Region 4's understanding that this waiver was granted as part of the original EPA OAQPS approval of the NCore site. This waiver requires approval by the EPA Administrator. MCAQ also requested a waiver as allowed under 40 CFR Part 58, Appendix D, Section 3(b)(1) to allow substitution of NO<sub>x</sub> monitoring for the required NO<sub>y</sub> monitoring. This waiver also requires approval by the EPA Administrator; therefore, these waiver requests have been forwarded to the EPA Office of Air Quality and Standards (OAQPS) for review.

MCAQ also requested for the Charlotte near-road monitoring site, Remount Road (AQS ID 37-119-0045), a waiver of the requirement that the meteorological tower be located ten times the height of an obstruction away from an obstruction that is 100 to 300 meters from the meteorological tower. The Network Plan states that a billboard is within five times the height differential of the meteorological sensor, at the Remount Road site. For a near-road monitoring site this criteria is not a specific requirement found in the regulations of 40 CFR Part 58. However, this guideline is laid out in EPA's *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements* (QA Handbook Volume IV), which discusses guidelines for meteorological towers in Section 1 of the handbook.

The EPA considers onsite meteorology to be an important and valuable parameter collected at near-road sites and appreciates MCAQ's consideration of this issue. The EPA's *Near-road NO<sub>2</sub> Monitoring Technical Assistance Document* (TAD) references the QA Handbook Volume IV and states that:

A key advantage to having meteorological data collected onsite would be the ability to correlate the occurrence of peak NO<sub>2</sub> concentrations (and other pollutant peaks) to wind conditions. Data analysis of the collected pollutant data will be greatly enhanced by knowing whether winds are calm, parallel to the road, or at any other angle making the monitoring site relatively upwind or downwind when peak NO<sub>2</sub> concentrations are measured.

By being collocated at the near-road site and having minimal obstructions, a meteorological sensor and tower would likely meet the objectives above and collect measurements that should be representative of meteorological conditions in the area of interest, the near-roadway environment.

The EPA's guidance on obstructions for meteorological measurements is not a regulatory requirement that must be met at near-road monitoring sites, so in this case there is not a requirement to be waived. However, pending further information, the EPA likely supports the current configuration of the meteorological measurements at the Remount Road site as being representative of near-road meteorological conditions. The EPA requests that MCAQ submit to the EPA further rationale and/or evidence that the meteorological parameters collected at the Remount Road site are sufficiently representative of the near-road environment. This submittal can include a wind rose, a site diagram with measurements to obstructions, and a discussion of the representativeness of the configuration with respect to the meteorological measurement objectives laid out in the near-road NO<sub>2</sub> TAD and quoted above. Also, the EPA requests that MCAQ include this information in the next network plan. The EPA

will reevaluate this request once it has received further information about the site and meteorological measurement configuration.

The NC-DAQ also requested renewal of the waiver at the Raleigh NCore site, Millbrook (AQS ID 37-183-0014) of the requirement for the meteorological tower to be ten times the height of the monitoring shelter away from the monitoring shelter. It is EPA Region 4's understanding that this waiver was granted as part of the original EPA OAQPS approval of the NCore site. This waiver requires approval by the EPA Administrator; therefore, this request has been forwarded to the EPA OAQPS for review.

### **Air Quality Index (AQI) Reporting 40 CFR §58.50+**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the state required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Myrtle Beach-Conway-North Myrtle Beach. The NC-DAQ reports AQI information for all 10 MSA's and, thus, meets the AQI reporting requirements.

### **National Core (NCore) Monitoring Network 40 CFR Part 58, Appendix D, Section 3.0**

Ambient air monitoring network criteria for NCore sites are found in 40 CFR Part 58, Appendix D, Section 3. The NC-DAQ listed two NCore sites in its Network Plan. The first site (AQS ID 37-183-0014) is located at the Millbrook School site in Raleigh, NC and is operated by the NC-DAQ. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by MCAQ. The EPA approval of these sites was granted on October 30, 2009. The 2016 Network Plan meets the minimum monitoring requirements for NCore sites.

The requirement to measure Pb at NCore sites in areas with populations greater than 500,000 was proposed for elimination due to the low concentrations being measured at these sites nationwide. On March 28, 2016, the EPA published changes in the ambient air monitoring rules for the NCore network design and removed Pb monitoring from the requirements (see 81 FR 17248, March 28, 2016). This rule became effective on April 27, 2016. The NC-DAQ requested to shut down the Pb monitors at the Raleigh NCore site (AQS 37-183-0014) and the Charlotte NCore site (AQS 37-119-0041). Both sites collected more than three years of Pb data and did not measure any exceedances of the NAAQS, with concentrations well below the standard. The EPA approves the request to shut down the Pb monitors at both NCore sites.

### **O<sub>3</sub> Monitoring Requirements 40 CFR Part 58, Appendix D, Section 4.1 and Table D-2**

On March 28, 2016, the EPA published changes in the ambient air monitoring rules (see 81 FR 17248). One of the changes to the monitoring rule was to extend the 2017 and future O<sub>3</sub> seasons for North Carolina to March through October from the previous O<sub>3</sub> season of April through October. The O<sub>3</sub> seasons for each state can be found in 40 CFR Part 58, Appendix D, Table D-3. The Network Plan requested a waiver of the O<sub>3</sub> season requirement for the following mountaintop sites in North Carolina: Linville Falls (AQS ID 37-011-0002); Joanna Bald (AQS ID 37-075-0001); Frying Pan (AQS ID 37-087-0035); Purchase Knob (AQS ID 37-087-0035); and Mt. Mitchell (AQS ID 37-199-0004). The NC-

DAQ requested this change due to accessibility concerns with these sites during February to calibrate the equipment and prepare for collecting data on March 1, 2017. According to the NC-DAQ, the roads used to access these high elevation sites can often be impassable or closed by federal or local authorities until sometime in March, due to winter weather conditions.

Forty (40) CFR Part 58, Appendix D, Section 4.1 (i) states:

“...Deviations from the O<sub>3</sub> monitoring season must be approved by the EPA Regional Administrator. These requests will be reviewed by Regional Administrators taking into consideration, at a minimum, the frequency of out-of-season O<sub>3</sub> NAAQS exceedances, as well as occurrences of the Moderate air quality index level, regional consistency, and logistical issues such as site access. Any deviations based on the Regional Administrator's waiver of requirements must be described in the annual monitoring network plan and updated in AQS.”

Due to the accessibility issues for these sites and since temperatures at these site are typically colder in March than the other O<sub>3</sub> sites in the North Carolina network (thus O<sub>3</sub> concentrations are likely lower), the EPA grants a waiver of the O<sub>3</sub> season requirement found in Table D-3 for these five mountain-top sites. However, since the waiver is based on access and weather conditions, the EPA requests that the NC-DAQ begin monitoring at these sites as soon as access and weather permits, but no later than April 1<sup>st</sup> of each year.

In response to the state's 2013 Network Plan, the EPA approved the relocation of the Waggin Trail O<sub>3</sub> monitoring site (AQS ID 37-003-0004) to the Taylorsville O<sub>3</sub> monitoring site (AQS ID 37-003-0005). The former Waggin Trail site and the Taylorsville site are located in the Hickory, NC area and are less than two kilometers (km) apart. These two sites operated for three months simultaneously and showed good comparability. In response to the 2014 Network Plan, the EPA approved the relocation of the Golfview O<sub>3</sub> monitoring site (AQS ID 37-051-1003) to the Honeycutt O<sub>3</sub> monitoring site (AQS ID 37-051-0010). The former Golfview site and the Honeycutt site are located in the Fayetteville, NC area, both on the southwest side of the city about nine kilometers apart.

In instances where relocation occurs, the sites may be deemed to be measuring the same air mass. In these cases, the data from the two sites can be linked in order to create a combined design value (DV). Forty CFR Part 50, Appendix U(2)(c) states that a single data record from two sites for the purpose of calculating a combined DV may be approved by the EPA:

“In certain circumstances, including but not limited to site closures or relocations, data from two nearby sites may be combined into a single site data record for the purpose of calculating a valid design value. The appropriate Regional Administrator may approve such combinations after taking into consideration factors such as distance between sites, spatial and temporal patterns in air quality, local emissions and meteorology, jurisdictional boundaries, and terrain features.”

The NC-DAQ requested approval to combine the data from these two relocated ozone sites with the data from their former locations for the purpose of computing complete DVs. The EPA approves this request. Combined O<sub>3</sub> DVs for the Waggin Trail and Taylorsville sites as well as the Golfview and Honeycutt sites will now be possible for comparison to the NAAQSs.

OMB changed the composition of several MSA boundaries in February of 2013, including adding Brunswick County, North Carolina to the Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA.

This change triggered the requirement to establish an O<sub>3</sub> monitor in this MSA. In the Network Plan, the NC-DAQ provided a copy of a memorandum of agreement (MOA) it has entered into with South Carolina Department of Health and Environmental Control (SC DHEC) to collectively meet the O<sub>3</sub> monitoring requirements for this MSA. The SC DHEC submitted an addendum to its 2015 annual monitoring network plan that provided information on a location for a new O<sub>3</sub> monitor to meet this requirement. The EPA conditionally approved the startup of the Coastal Carolina site (AQS 45-051-0008) pending resolution of 40 CFR Part 58, Appendix E siting requirement issues at the site. It is the EPA's understanding that the Coastal Carolina site started operating during the summer of 2016 and that the SC DHEC is working to address the siting criteria issues.

The state of North Carolina's proposed O<sub>3</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-2 for all MSAs.

### **CO Monitoring Requirements 40 CFR Part 58, Appendix D, Section 4.2**

Ambient air monitoring network design criteria for CO are found in 40 CFR Part 58, Appendix D, Section 4.2. CBSAs with populations over one million are required to operate one CO monitor collocated with a near-road NO<sub>2</sub> site. The Network Plan proposed operating a CO monitor at the near-road sites in the Raleigh and Charlotte-Concord-Gastonia CBSAs, by January 1, 2017, as required by 40 CFR §58.13(e)(2). Specifically, the NC-DAQ would operate a CO monitor at the Triple Oak near-road site (AQS ID 37-183-0021) in the Raleigh CBSA and MCAQ would operate a CO monitor at the Remount Road near-road site (AQS ID 37-119-0045) in the Charlotte-Concord-Gastonia CBSA. The EPA approves the startup of CO monitors at these two existing near-road monitoring sites.

NCORE sites are required by Section 3.0(b) to also operate CO monitors. The NC-DAQ operates a CO monitor in the Raleigh MSA at the Millbrook site (AQS ID: 37-183-0014) and MCAQ operates a CO monitor at the Garinger site (AQS ID 37-119-0041), in the Charlotte-Concord-Gastonia MSA. These monitors fulfill North Carolina's CO monitoring requirements.

### **NO<sub>2</sub> Monitoring Requirements 40 CFR Part 58, Appendix D, Section 4.3**

Ambient air monitoring network design criteria for NO<sub>2</sub> are found in 40 CFR Part 58, Appendix D, Section 4.3. There are three types of required NO<sub>2</sub> monitoring: near-road, area-wide, and Regional Administrator. These types of NO<sub>2</sub> monitoring are described in Sections 4.3.2, 4.3.3, and 4.3.4, respectively.

The EPA previously approved the Triple Oak site (AQS ID 37-183-0021) and the Remount Road site (AQS ID 37-119-0045) to meet the near-road NO<sub>2</sub> requirements for the Raleigh and Charlotte-Concord-Gastonia CBSAs, respectively.

Section 4.3.2 also requires the establishment of an NO<sub>2</sub> near-road site in CBSAs with populations between 500,000 and 1,000,000 by January 1, 2017. The Greensboro-High Point, NC; Winston-Salem, NC; and Durham-Chapel Hill, NC CBSAs fall into this population range as of the Census Bureau's 2015 estimates. The EPA is reconsidering this requirement (also known as Phase 3 of the near-road network) and has published a proposal that would remove it from 40 CFR Part 58, Appendix D (<https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0486-0001>). Accordingly, and with

the approval of the EPA, the North Carolina air quality agencies are not required to conduct planning activities for near-road sites in these three CBSAs are necessary at this time. The EPA expects to complete the final rule eliminating the requirement before the January 1, 2017, deadline to initiate Phase 3 monitoring operations.

The EPA previously approved the selection of the Garinger (AQS ID 37-119-0041) and Millbrook (AQS ID 37-183-0014) sites to meet the area-wide NO<sub>2</sub> monitoring requirement for the Charlotte-Concord-Gastonia and Raleigh CBSAs, respectively. The EPA also previously selected the Hattie Avenue site (AQS ID 37-067-0022), operated by the Forsyth County Office of Environmental Assistance and Protection (FC-OEAP), as a location for a Regional Administrator required NO<sub>2</sub> monitor to help protect susceptible and vulnerable populations. The full list of NO<sub>2</sub> monitors identified by the EPA Regional Administrators can be found on the EPA’s website at <http://www3.epa.gov/ttnamti1/svpop.html>.

**SO<sub>2</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix D, Section 4.4**

Ambient air monitoring network design criteria for SO<sub>2</sub> are found in 40 CFR Part 58, Appendix D, Section 4.4. This section requires that “[t]he population weighted emissions index (PWEI) shall be calculated by states for each core based statistical area (CBSA).” As a result, the SO<sub>2</sub> monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within the boundaries of the parent CBSA and is one of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO<sub>2</sub> monitor at an NCore station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, Section 4.4.

Table 4 shows the location of required SO<sub>2</sub> monitors based on the 2012 PWEI. Existing SO<sub>2</sub> monitoring sites described in the Network Plan meet the minimum requirements of 40 CFR Part 58. The NC-DAQ operates regulatory SO<sub>2</sub> monitors in the Charlotte-Gastonia-Concord, NC-SC; Durham-Chapel Hill, NC; and Wilmington, NC CBSAs to meet the PWEI requirements. North Carolina has an MOA with the Virginia Department of Environmental Quality to share the SO<sub>2</sub> minimum monitoring requirements for the Virginia Beach-Norfolk-Newport News, VA-NC CBSA and Virginia operates the regulatory SO<sub>2</sub> monitor.

**Table 4: PWEI and SO<sub>2</sub> Required Monitors in North Carolina**

CBSA Name	July 2012 PWEI Values	July 2012 PWEI Required Monitors
Virginia Beach-Norfolk-Newport News, VA-NC	78,540	1
Charlotte-Gastonia-Concord, NC-SC	34,426	1
Durham, NC	16,885	1
Wilmington, NC	10,045	1

The EPA finalized the SO<sub>2</sub> DRR (40 CFR Part 51, Subpart BB) on August 10, 2015. This rule requires air quality near sources with SO<sub>2</sub> emissions greater than 2,000 tons per year (tpy) be characterized using ambient air monitoring or modeling. The NC-DAQ proposed four monitoring sites to characterize the maximum ambient 1-hr SO<sub>2</sub> concentrations near facilities in North Carolina under the SO<sub>2</sub> DRR, which are summarized in the Table 5 below.

**Table 5: Proposed SO<sub>2</sub> Monitors to Meet the SO<sub>2</sub> DRR**

<b>AQS ID</b>	<b>Site Name</b>	<b>Nearby Facility</b>	<b>Location Comment</b>
37-145-0004	Semora DRR	Duke Roxboro	Location is nearest the 64 <sup>th</sup> ranked modeling receptor; 300 meters from the #1 ranked receptor; many of the higher ranked receptors were in lower elevation locations (a localized terrain feature) that were not able to be accounted for in the modeling.
37-087-0013	Canton DRR	Evergreen Packaging	Location is nearest to the 6 <sup>th</sup> , 10 <sup>th</sup> , and 15 <sup>th</sup> ranked modeling receptors; within 100 meters of the top three ranked receptors.
37-019-0005	Southport DRR	CPI Southport	Location is nearest to the 13 <sup>th</sup> ranked modeling receptor; also close to the 6 <sup>th</sup> ranked receptor and nearby the top 3 receptors.
37-013-0151	Bayview	PCS Phosphate	Existing site that is nearest the 15 <sup>th</sup> ranked feasible modeling receptor; heavily forested area and river made many locations not feasible for monitoring.

The NC-DAQ engaged EPA staff early in the process of locating SO<sub>2</sub> DRR monitors and worked with EPA staff to locate sites that could appropriately characterize the maximum SO<sub>2</sub> concentrations near each source. EPA staff visited each of the proposed sites with NC-DAQ staff. In selecting the sites, the NC-DAQ followed the procedures outlined in the EPA’s “SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document” (monitoring TAD). NC-DAQ staff performed modeling according to the monitoring TAD procedures to inform decisions about areas of expected maximum concentration and EPA modeling staff reviewed the modeling files for accuracy. Each of the four proposed sites is near a maximum predicted 1-hr SO<sub>2</sub> concentration location that is also frequently predicted to have daily maximum 1-hr SO<sub>2</sub> concentration values. Semora DRR, Canton DRR, and Southport DRR are new monitoring sites, whereas Bayview is an existing SO<sub>2</sub> monitoring site. The EPA Region 4 reviewed the NC-DAQ’s selection of the proposed SO<sub>2</sub> DRR monitoring locations and approves all four sites to characterize the maximum ambient 1-hr SO<sub>2</sub> concentrations near each of the four sources.

Please ensure that the appropriate quality assurance project plan (QAPP) covering the SO<sub>2</sub> DRR monitoring is updated as necessary and approved by the EPA before data collection is required to begin on January 1, 2017. It is the EPA’s understanding that Duke Energy staff will operate the Semora DRR monitor in accordance with the NC-DAQ QAPP and standard operating procedures, approved by the EPA Region 4 SESD, and that NC-DAQ staff will quality assure and report the data to the EPA. NC-DAQ staff will operate, quality assure, and report the data from the other three approved SO<sub>2</sub> monitors to the EPA Air Quality System (AQS) database.

**Pb Monitoring Requirements**  
**40 CFR Part 58, Appendix D, Section 4.5**

Forty (40) CFR Part 58, Appendix D, Section 4.5 requires that “[a]t a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year...” Section 4.5(a)(ii) provides the following provisions for a waiver of the Pb monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source

will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

In its approval of the state’s 2011 Network Plan, and pursuant the provisions of the above section, the EPA granted waivers of the source-oriented ambient air monitoring requirements at two sources: Evergreen Packaging (formerly named Blue Ridge Paper Products Inc.) in Canton, NC and Saint Gobain Containers in Wilson, NC. In the 2015 network plan, NC-DAQ requested a renewal of both of these waivers. In the EPA’s response to the 2015 network plan, the EPA renewed the waiver for the Saint Gobain Containers facility in Wilson, NC for five years, until 2020. The EPA did not renew the waiver of source oriented Pb monitoring requirements for Evergreen Packaging in Canton, NC, since the Pb monitoring requirement for the Evergreen Packaging facility no longer applies. The most recent emissions data for Evergreen Packaging indicated that the facility currently emits less than the 0.5 tpy threshold. At this time, no facility in North Carolina other than Saint Gobain emits more than 0.5 tpy of Pb and is subject to required Pb source-oriented monitoring. The North Carolina Pb monitoring network meets the source oriented Pb monitoring requirements.

The requirement to measure Pb at NCore sites in areas over 500,000 populations was proposed for elimination due to the low concentrations being measured at these sites nationwide. On March 28, 2016, the EPA published changes in the ambient air monitoring rules for the NCore network design and removed Pb monitoring from the requirements (81 FR 17248). This rule became effective on April 27, 2016. The Network Plan requested to shut down the Pb monitor at the Raleigh NCore site (AQS ID 37-183-0014) and the Charlotte NCore site (AQS ID 37-119-0041). Both sites collected more than three years of Pb data and did not measure any exceedances of the NAAQS, with measured concentrations well below the standard. The EPA approves the request to shut down the Pb monitors at both the Raleigh and Charlotte NCore sites. The North Carolina Pb monitoring network meets the Pb monitoring requirements in 40 CFR Part 58.

### **PM<sub>10</sub> Monitoring Requirements**

#### **40 CFR Part 58, Appendix A, Section 3.3**

#### **40 CFR Part 58, Appendix D, Section 4.6 and Table D-4**

The Network Plan proposes to discontinue PM<sub>10</sub> monitoring at the #11 Fire Station site (AQS ID 37-119-0003) operated by MCAQ. MCAQ terminated monitoring at this site due to safety concerns and a significant cost to remedy the safety issues. The concentrations observed at this site have been well below the NAAQS over the last five years and the minimum PM<sub>10</sub> monitoring requirements will continue to be met in the Charlotte-Concord-Gastonia CBSA with the discontinuation of monitoring at the #11 Fire Station site. Thus, the EPA approves the permanent discontinuation of the #11 Fire Station PM<sub>10</sub> site.

In 2015, the EPA approved a waiver of the requirement to operate a second PM<sub>10</sub> monitor in the Raleigh MSA. Since PM<sub>10</sub> levels have been significantly lower than the NAAQS for the last decade, the EPA granted this waiver. A renewal of this waiver must be requested in the 2020 Network Assessment.

The state of North Carolina’s current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, Section 3.3.4 are being met. These include the requirement that 15 percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated. These collocation requirements

are assessed at the primary quality assurance organization (PQAO) level. There are three agencies that are separate PQAOs in North Carolina: the NC-DAQ, MCAQ, and the FC-OEAP. All three PQAOs meet these requirements.

### **PM<sub>2.5</sub> Monitoring Requirements**

#### **40 CFR Part 58, Appendix A, Section 3.2**

#### **40 CFR Part 58, Appendix D, Section 4.7 and Table D-5**

In order to save resources, MCAQ requested in the Network Plan to discontinue PM<sub>2.5</sub> monitoring at the Oakdale site (AQS ID 37-119-0043) at the end of 2016. This monitor would then be relocated, and begin operating on January 1, 2017, to the Remount Road near-road site (AQS ID 37-119-0045) to meet the PM<sub>2.5</sub> near-road monitoring requirements. The Oakdale monitor has historically measured the lowest PM<sub>2.5</sub> concentrations in the MCAQ PM<sub>2.5</sub> network and the PM<sub>2.5</sub> levels at the near-road site are expected to be higher. The EPA approves the shutdown of the Oakdale site in conjunction with the startup of PM<sub>2.5</sub> monitoring at the existing near-road monitoring site.

The state of North Carolina's PM<sub>2.5</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs. Manual PM<sub>2.5</sub> collocation requirements are found in 40 CFR Part 58, Appendix A, Section 3.2.3. These include the requirement that 15 percent of each network of manual PM<sub>2.5</sub> methods (at least one site) be collocated. The manual collocation requirements for PM<sub>2.5</sub> are currently being met in the monitoring networks of each PQAO: NC-DAQ, MCAQ, and FC-OEAP.

### **PM<sub>2.5</sub> Near-road Monitoring Requirements**

#### **40 CFR Part 58, Appendix D, Section 4.7.1(b)(2)**

Regulatory requirements in 40 CFR Part 58, Appendix D, Section 4.7.1(b)(2) require that “[f]or CBSAs with a population of 1,000,000 or more persons, at least one PM<sub>2.5</sub> monitor is to be collocated at a near-road NO<sub>2</sub> station.” PM<sub>2.5</sub> near-road monitoring is required in the Charlotte-Concord-Gastonia, NC-SC and Raleigh, NC CBSAs, by January 1, 2017. The Network Plan proposes to start PM<sub>2.5</sub> monitoring at the existing near-road sites in these CBSAs in 2017: Remount Road (AQS ID 37-119-0045) in Charlotte and Triple Oak (AQS ID 37-183-0021) in Raleigh.

MCAQ plans to operate a filter-based, federal reference method (FRM) PM<sub>2.5</sub> sampler as the primary PM<sub>2.5</sub> monitor at the Remount Road site. In addition, MCAQ will operate a collocated, continuous federal equivalent method (FEM) PM<sub>2.5</sub> monitor at the Remount Road site. Forty (40) CFR § 58.12(d)(ii) requires EPA approval to reduce the sampling frequency of primary PM<sub>2.5</sub> samplers. The EPA approves this operating schedule since a continuous monitor, that is comparable to the NAAQS, will be collocated with the 1 in 6 day operating FRM sampler.

### **PM<sub>2.5</sub> Continuous Monitoring Requirements**

#### **40 CFR Part 58, Appendix D, Section 4.7.2**

Regulations for continuous PM<sub>2.5</sub> monitoring require “...State, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [federal reference method/federal equivalent method/approved regional method] monitors, unless at least one of the required FRM/FEM/ARM

monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies.” These minimum continuous PM<sub>2.5</sub> monitoring requirements are met in the all MSAs in the state. Also, the continuous PM<sub>2.5</sub> collocation requirements are met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2016 Network Plan meets all of the design criteria of 40 CFR Part 58.

**PM<sub>2.5</sub> Continuous Federal Equivalent Methods**  
**40 CFR § 58.10(e)**

EPA regulations contain provisions for handling data collected using continuous PM<sub>2.5</sub> FEMs. These procedures are found at 40 CFR § 58.11(e). If an agency can demonstrate that the FEM data are not of sufficient comparability to a collocated FRM, then the monitoring agency may request that the FEM data not be used in comparison to the NAAQS.

In response to the 2014 Network Plan, the EPA approved five FEM monitors not be considered comparable to the PM<sub>2.5</sub> NAAQS at the following sites: Kenansville (AQS ID 37-061-0002); Jamesville (AQS ID 37-117-0001); Castle Hayne (AQS ID 37-129-0002); the former Dillard School site (AQS ID 37-191-0005); and Blackstone (AQS ID 37-105-0002). The NC-DAQ currently reports the data from these monitors to the AQS parameter code 88502 (PM<sub>2.5</sub> mass used for AQI purposes).

The 2016 Network Plan requested that three additional FEM monitors' data not be comparable to the PM<sub>2.5</sub> NAAQS: Hickory (AQS ID 37-035-0004); Lexington (AQS ID 37-057-0002); and Millbrook (AQS ID 37-183-0014). The NC-DAQ demonstrated that the PM<sub>2.5</sub> continuous FEMs at these three sites are not of sufficient comparability to a collocated FRM. The EPA approves NC-DAQ's request that these FEM monitors not be considered comparable to the PM<sub>2.5</sub> NAAQS at the Hickory, Lexington, and Millbrook sites.

**PM<sub>2.5</sub> Background and Transport Sites**  
**40 CFR Part 58, Appendix D, Section 4.7.3**

Forty (40) CFR Part 58, Appendix D, Section 4.7.3 requires that “[e]ach State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport.” The Network Plan identifies the Candor site (AQS ID 37-123-0001) as a PM<sub>2.5</sub> general background site and the Bryson City site (AQS ID 37-173-0002) as a PM<sub>2.5</sub> regional transport site. Therefore, the NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

**PM<sub>2.5</sub> Chemical Speciation Network (CSN)**  
**40 CFR Part 58, Appendix D, Section 4.7.4**

In 2013-14, the EPA conducted an assessment of the PM<sub>2.5</sub> CSN in an effort to optimize the network and to create a network that is sustainable going forward. As a result of this assessment, the EPA defunded a number of monitoring sites, eliminated the CSN PM<sub>2.5</sub> mass measurement, reduced the frequency of carbon blanks, reduced sample frequency at some monitoring sites, and reduced the number of the icepacks in shipment during the cooler months of the year.

The EPA defunded four CSN monitors at sites in North Carolina: Rockwell (AQS ID 37-159-0021); Lexington Water Tower (AQS ID 37-057-0002); Asheville's Board of Education (AQS ID 37-021-

0034); and Hickory Water Tower (AQS ID 37-035-0004). CSN monitors at these sites were shutdown on December 31, 2014. The EPA continues to fund three CSN monitors in North Carolina: Garinger (AQS ID 37-119-0041) operated by MCAQ; Hattie Avenue (AQS ID 37-067-0022) operated by the FC-OEAP; and Millbrook (AQS ID 37-183-0014) operated by the NC-DAQ.

**Photochemical Assessment Monitoring Station (PAMS)  
40 CFR Part 58, Appendix D, Section 5.0**

With the promulgation of a new ozone NAAQS on October 1, 2015, the EPA finalized changes to the PAMS program. By June 1, 2019, the NCore sites in Raleigh and Charlotte will be required to implement PAMS monitoring. The EPA recognizes there are several implementation challenges to work through and we commit to working closely with the NC-DAQ and MCAQ to minimize the burden of implementing this new monitoring program. At this time, the PAMS requirement is being met in the state of North Carolina.

**Monitoring Siting Criteria  
40 CFR Part 58, Appendix E**

In the Network Plan, the NC-DAQ did a great job of providing detailed descriptions and photos of every monitoring site in the NC-DAQ monitoring network. The NC-DAQ also included “Site Review Forms for CY2015”. These forms did a great job documenting the NC-DAQ’s thorough evaluation of each site. The EPA greatly appreciates the inclusion of these forms in the Network Plan.

The site review for the Triple Oak near-road monitoring site (AQS ID 37-183-0021) stated that the NO<sub>2</sub> monitoring probe is located 8 meters from the nearest tree dripline and the recommendations section of the form indicates that the current site status will be maintained. This spacing does not meet regulatory siting requirements found in 40 CFR Part 58, Appendix E. Triple Oak is a unique site in that it is shared with researchers from the EPA’s Office of Research and Development (ORD) and was jointly selected by NC-DAQ, EPA ORD and EPA OAQPS. The EPA ORD uses the Triple Oak site to conduct ongoing research on near-road emissions and monitoring methods. In developing the 2017 Network Plan, the NC-DAQ should work with EPA ORD, EPA OAQPS, and EPA Region 4 staff to meet Appendix E siting criteria for CO, NO<sub>2</sub>, and PM<sub>2.5</sub> at this near-road site and/or submit a waiver request for some of the siting requirements as appropriate and allowed by the regulations.

**Additional Comments**

This year the EPA evaluated site metadata in AQS for all Region 4 agencies. We identified the following metadata that should be updated in AQS by the NC-DAQ, MCAQ, and the FC-OEAP in Table 6 below.

**Table 6: Site Metadata Needing Updates in AQS**

AGENCY	AQS ID	COUNTY	SITE NAME	COMMENTS
NC-DAQ	37-121-0004	Mitchell	BRR Hospital	Add local site name
	37-183-0021	Wake	Triple Oak	Add near road network affiliation
	37-063-0015	Durham	Durham Armory	Confirm/update latitude and longitude; add measurement scale for PM <sub>2.5</sub> and PM <sub>10</sub> monitoring
	37-013-0151	Beaufort	Bayview Ferry	Confirm/update latitude and longitude; add measurement scale for SO <sub>2</sub> monitoring
	37-003-0005	Alexander	Taylorsville Liledoun	Confirm/update latitude and longitude
	37-183-0014	Wake	Millbrook School	Add measurement scale for SO <sub>2</sub> monitoring
	37-077-0001	Granville	Butner	Add measurement scale for O <sub>3</sub> monitoring
	37-145-0003	Person	Bushy Fork	Add measurement scale for O <sub>3</sub> monitoring
	37-147-0006	Pitt	Pitt Agri. Center	Add measurement scale for PM <sub>2.5</sub> monitoring
MCAQ	37-119-0003	Mecklenburg	#11 Fire Station	Add local site name
FC-OEAP	37-067-0030	Forsyth	Clemmons Middle	Confirm/update latitude and longitude

## Appendix F. 2014-2015 Network Plan EPA Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

JUL 16 2015

Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environment and Natural Resources  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Dear Ms. Holman:

Thank you for submitting the state of North Carolina's 2014 annual ambient air monitoring network plan (Network Plan), dated October 10, 2014. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality (NC-DAQ) and the local air quality agencies in North Carolina.

The U.S. Environmental Protection Agency understands that the NC-DAQ provided a 30-day public comment period and received two public comments on the Network Plan. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, the EPA is not required to offer another comment period.

The EPA approves North Carolina's 2014 Network Plan with the exceptions noted below. The Network Plan requested the permanent discontinuation of ten monitors. The EPA approves the shutdown of eight of these ten monitors: six PM<sub>2.5</sub> monitors, one ozone monitor, and one PM<sub>10</sub> monitor. However, the EPA does not approve the shutdown of two of the monitors, which are both ozone monitors (Franklinton and Bushy Fork). Both monitors have recorded ozone levels that are within the range of the proposed ozone National Ambient Air Quality Standard. Additionally, the EPA approves the temporary shutdown of one ozone monitor (Arrowood), the relocation of one ozone monitor (Honeycutt), and the shutdown of five Chemical Speciation Network (CSN) PM<sub>2.5</sub> monitors (defunded by EPA). Discussions of each of these proposed monitor changes is included in the enclosure.

Also, North Carolina's proposed O<sub>3</sub> monitoring network does not meet the minimum requirements for the Myrtle Beach-Conway-North Myrtle Beach MSA. The boundary for the area was changed in February of 2013 and this change has triggered the requirement for an O<sub>3</sub> monitor in this MSA. The 2014 Network Plan indicates that NC-DAQ has entered into discussions with South Carolina and other stakeholders to identify an appropriate location for a new monitoring site. Once a suitable monitoring location is identified, information regarding the site can be provided as an amendment to the most current Network Plan.

Thank you for working with us to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,



Beverly H. Banister  
Director  
Air, Pesticides and Toxics Management Division

**Enclosure**

cc: Mr. Donnie Redmond  
Ambient Monitoring Section Chief, NC-DAQ

Ms. Leslie Rhodes, Director  
Mecklenburg County Land Use and  
Environmental Services Agency

Mr. William M. Barnette, Director  
Forsyth County Environmental Affairs Department

Mr. David Brigman, Director  
Western North Carolina Regional Air Quality Agency

## 2014 State of North Carolina Ambient Air Monitoring Network Plan The U.S. EPA Region 4 Comments and Recommendations

This document contains the U. S Environmental Protection Agency's comments and recommendations on the state of North Carolina's 2014 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements are listed for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and lead (Pb).

The minimum monitoring requirements are based on core based statistical area (CBSA) boundaries as defined by the U.S. Office of Management and Budget (OMB), July 1, 2013, population estimates from the U.S. Census Bureau, and historical ambient air monitoring data. Minimum monitoring requirements for O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, only apply to metropolitan statistical areas (MSAs), which are a subset of CBSAs. OMB currently defines 17 MSAs in the state of North Carolina. On February 1, 2013, OMB redefined the CBSA boundaries based on 2010 census data. In North Carolina, there are two recently defined MSA's: Myrtle Beach-Conway-North Myrtle Beach, SC-NC and New Bern, NC that were previously defined as micropolitan CBSAs. Additionally, some MSA populations changed due to the inclusion and/or exclusion of counties from OMB's February 2013 MSA delineations. The July 1, 2013 population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and Populations**

<b>MSA Name</b>	<b>2014 Population</b>
Charlotte-Concord-Gastonia, NC-SC	2,335,358
Virginia Beach-Norfolk-Newport News, VA-NC	1,707,369
Raleigh, NC	1,214,516
Greensboro-High Point, NC	741,065
Winston-Salem, NC	650,820
Durham-Chapel Hill, NC	534,578
Asheville, NC	437,657
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	404,951
Fayetteville, NC	377,193
Hickory-Lenoir-Morganton, NC	363,572
Wilmington, NC	268,601
Jacksonville, NC	185,220
Greenville, NC	174,263
Burlington, NC	154,378
Rocky Mount, NC	150,667
New Bern, NC	127,657
Goldsboro, NC	124,583

## **Minimum O<sub>3</sub> Monitoring Requirements 40 CFR Part 58, Appendix D, Table D-2**

The state of North Carolina's proposed O<sub>3</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-2 for all MSAs, except the Myrtle Beach-Conway-North Myrtle Beach MSA.

OMB changed several MSA boundaries in February of 2013, including adding Brunswick County, North Carolina to the Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA. This change has triggered the requirement for an O<sub>3</sub> monitor in this MSA. The 2014 Network Plan indicates that NC-DAQ has entered into discussions with the South Carolina Department of Health and Environmental Control (SC DHEC) and other stakeholders to identify an appropriate location for a new monitoring site. Once a suitable monitoring location is identified, information regarding the site can be provided as an amendment to the most current Network Plan.

The Network Plan also proposes to shutdown three O<sub>3</sub> monitors: Franklinton (AQS ID 37-069-0001), Bushy Fork (AQS ID 37-145-0003), and Mocksville (AQS ID 37-059-0003). The EPA approves the shutdown of the Mocksville monitor. The Mocksville monitor is upwind of Forsyth County in the Winston-Salem MSA and has read consistently lower than the other ozone monitors in the MSA. When the Mocksville monitor is shutdown, the Winston-Salem, NC MSA will still meet the minimum ozone monitoring requirements found in 40 CFR Part 58, Appendix D. The EPA has already notified NC-DAQ of its preliminary approval to discontinue the Mocksville ozone monitor.

The EPA does not approve the shutdown of the Bushy Fork and Franklinton O<sub>3</sub> monitors. The EPA looked at historical comparisons of ozone concentrations, meteorology, and the spatial distribution of O<sub>3</sub> monitors in the Durham-Chapel Hill, NC and Raleigh, NC MSAs to make this determination. The EPA does not approve the shutdown of the Bushy Fork O<sub>3</sub> monitor because it has consistently recorded the highest ozone concentrations in the Durham-Chapel Hill, NC MSA. Additionally, the Bushy Fork O<sub>3</sub> monitor has recorded ozone design values in the range of the EPA's proposed O<sub>3</sub> standard (65-70 ppb). The EPA also does not approve of the shutdown of the Franklinton O<sub>3</sub> monitor because it is the only downwind monitor of the Raleigh metropolitan area and because its recent design values have been near the range of the EPA's proposed O<sub>3</sub> standard (65-70 ppb).

The Network Plan and the letter from NC-DAQ dated December 16, 2014 proposes to relocate the Golfview (AQS ID 37-051-1003) O<sub>3</sub> monitoring site to a new location. The NC-DAQ no longer has property access to the Golfview site and had to find an alternate O<sub>3</sub> monitoring site. The new site is named Honeycutt (AQS ID 37-051-0010) and is within three miles of the Golfview site. Both the new and old sites are located in Cumberland County in the Fayetteville, NC MSA. The EPA has reviewed the NC-DAQ's request to relocate the Golfview O<sub>3</sub> site and determined that this monitor meets the relocation requirements of 40 CFR § 58.14(c)(6). The Honeycutt site should be representative of the same spatial scale as the Golfview site.

The Mecklenburg County Air Quality (MCAQ) agency through the Network Plan and other communications informed the EPA that it discontinued operation of the O<sub>3</sub> monitor at its Arrowood site (AQS ID 37-119-1005). The property for the Arrowood site was sold and MCAQ's lease was not renewed. MCAQ searched for a new location for the monitor but has not found a suitable location.

MCAQ will evaluate the need to replace this monitor in its 2015 Network Assessment and Network Plan.

The EPA reviewed meteorology and historical ozone concentrations in the Charlotte area. The Arrowood site is typically upwind of the Charlotte urban area and has recorded lower ozone values than the other ozone monitors in the area. Without the Arrowood ozone monitor operating, the Charlotte-Concord-Gastonia MSA still meets the minimum ozone monitoring requirements found in 40 CFR Part 58, Appendix D. The EPA approves the temporary shutdown of the Arrowood ozone monitor for the 2015 ozone season. The EPA will evaluate and respond to the information the MCAQ provides in its 2015 North Carolina Network Plan and Network Assessment about whether to replace the Arrowood O<sub>3</sub> monitor.

**Minimum PM<sub>10</sub> Monitoring Requirements**

**40 CFR Part 58, Appendix A, 3.3.1**

**40 CFR Part 58, Appendix D, Table D-4**

In the 2014 Network Plan, NC-DAQ requested to shutdown the PM<sub>10</sub> monitor at the Hickory site (AQS ID 37-035-0004). The measured concentrations are less than 40 percent of the standard and trending downward. Also the Hickory, NC MSA’s population is less than 500,000 and therefore a monitor is not required to meet minimum PM<sub>10</sub> monitoring requirements. The EPA approves the shutdown of Hickory PM<sub>10</sub> monitor.

The state of North Carolina’s current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, 3.3.1 are currently being met. These include the requirement that 15 percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated.

**Minimum PM<sub>2.5</sub> Monitoring Requirements**

**40 CFR Part 58, Appendix A, 3.2.5**

**40 CFR Part 58, Appendix D, Table D-5**

The state of North Carolina’s current PM<sub>2.5</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs. Manual PM<sub>2.5</sub> collocation requirements are found in 40 CFR Part 58, Appendix A, 3.2.5. These include the requirement that 15 percent of each network of manual PM<sub>2.5</sub> methods (at least one site) must be collocated. The manual collocation requirements for PM<sub>2.5</sub> are currently being met in the Network Plan.

The Network Plan proposes to shutdown six PM<sub>2.5</sub> monitors, which are listed in the Table 2 below.

**Table 2: PM<sub>2.5</sub> Monitors Proposed for Discontinuation**

AQS ID	Site Name	County	MSA
37-071-0016	Grier School	Gaston	Charlotte-Concord-Gastonia
37-081-0014	Colfax	Gulford	Greensboro-High Point
37-037-0004	Pittsboro	Chatham	Durham-Chapel Hill
37-001-0002	Hopedale	Alamance	Burlington
37-155-0005	Linkhaw	Robeson	Not an MSA
37-191-0005	Dillard School	Wayne	Goldsboro

The EPA reviewed historical design values, annual PM<sub>2.5</sub> trends, nearby monitor correlations, meteorology, and spatial coverage when evaluating the requests to shutdown these monitors. The Grier School monitor is upwind of the Charlotte urban area and has consistently recorded lower concentrations than nearby monitors. The PM<sub>2.5</sub> concentrations at the Colfax site correlate well with concentrations at the Mendenhall site, which is nearby and also in Gulliford County, NC. The Pittsboro monitor is upwind of the Durham-Chapel Hill area and has consistently recorded lower concentrations than nearby monitors. PM<sub>2.5</sub> concentrations at Hopedale correlate well with the nearby monitors and the Hopedale site is spatially surrounded by other monitors. The Linkhaw monitor has consistently recorded lower PM<sub>2.5</sub> concentrations than nearby monitors, is not in an MSA, and is upwind of urban areas.

The Dillard School monitor, which is located in the Goldsboro, NC CBSA, is not required as part of the minimally required PM<sub>2.5</sub> network based on the CBSA's population. In addition, PM<sub>2.5</sub> concentrations measured by the monitor have been significantly lower than the NAAQS. It should be noted, however, that an EPA review of data found that the Dillard School monitor has consistently recorded higher concentrations than nearby monitors and that the concentrations do not correlate well with the other nearby monitors. The EPA recommends that NC-DAQ investigate why the Dillard School PM<sub>2.5</sub> concentrations have been historically higher than concentrations at surrounding, more urbanized areas. The higher levels could indicate a local source effect in the Goldsboro area that is not recorded at other nearby monitors.

For the reasons above, the EPA approves the shutdown of PM<sub>2.5</sub> monitors at these six requested sites: Grier School, Colfax, Pittsboro, Hopedale, Linkhaw, and Dillard. After the shutdown of these PM<sub>2.5</sub> monitors, the state's network will still meet the minimum monitoring requirements found in 40 CFR Part 58, Appendix D.

The Network Plan also proposes to shutdown the PM<sub>2.5</sub> FRM monitor at the Board of Education site (AQS ID 37-021-0034) in Asheville, NC. Based on communications with Western North Carolina Regional Air Quality Agency (WNCRAQA) staff, it is the EPA's understanding that the WNCRAQA has decided to continue to operate this monitor in 2015. Thus, the EPA considers this request withdrawn and neither approves nor disapproves the shutdown of the PM<sub>2.5</sub> FRM at the Board of Education site.

#### **PM<sub>2.5</sub> Continuous Monitoring Requirements 40 CFR Part 58, Appendix D, 4.7.2**

Regulatory requirements for continuous PM<sub>2.5</sub> monitoring require that "...State, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [federal reference method/federal equivalent method/approved regional method] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies." These minimum continuous PM<sub>2.5</sub> monitoring requirements are currently met in the all MSAs in the state. Also, the continuous PM<sub>2.5</sub> collocation requirements are currently met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2014 Network Plan meets all of the design criteria of 40 CFR Part 58.

As part of the 2013 revisions to the PM<sub>2.5</sub> NAAQS, the EPA created new procedures for handling data collected using continuous PM<sub>2.5</sub> FEMs. These procedures are found at 40 CFR § 58.10(e). If an agency

can demonstrate that the FEM data are not of sufficient comparability to a collocated FRM, then the monitoring agency may request that the FEM data not be used in comparison to the NAAQS.

In its Network Plan, the NC-DAQ has demonstrated that the PM<sub>2.5</sub> continuous FEMs at four sites are not of sufficient comparability to a collocated FRM. The EPA approves NC-DAQ's request that these FEM monitors not be considered comparable to the PM<sub>2.5</sub> NAAQS at the following sites: Kenansville (AQS ID 37-061-0002); Jamesville (AQS ID 37-117-0001); Castle Hayne (AQS ID 37-129-0002); and Dillard School (AQS ID 37-191-0005).

NC-DAQ also requested that the PM<sub>2.5</sub> FEM at the Blackstone site (AQS ID 37-105-0002) not be considered comparable to the NAAQS. This monitor is not collocated with an FRM. However, the other four FEMs that the NC-DAQ requested to not be comparable to the NAAQS do not show sufficient comparability with collocated FRMs and the Blackstone FEM is the same make and model of FEM as the other four monitors that are collocated. Thus, the EPA also approves the request to consider the Blackstone FEM not comparable to the NAAQS.

The EPA requests that the NC-DAQ report the data from these monitors to the AQS parameter code 88502. This approval also includes the historical data collected at these monitors (approximately three years), so the historical data can be reassigned to parameter code 88502 as well. Also, the minimum PM<sub>2.5</sub> monitoring requirements will continue to be met without counting these continuous monitors.

#### **PM<sub>2.5</sub> Background and Transport Sites 40 CFR Part 58, Appendix D, 4.7.3**

40 CFR Part 58, Appendix D, 4.7.3 requires that "each State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport." The Network Plan identifies six PM<sub>2.5</sub> sites as general background sites that include: Mendenhall (AQS ID: 37-081-0013), Cherry Grove (AQS ID: 37-033-0001), Kenansville (AQS ID: 37-061-0002), Boone (AQS ID: 37-189-0003), Candor (AQS ID: 37-123-0001), and Jamesville (AQS ID: 37-117-0001). The Network Plan identifies three regional transport sites for PM<sub>2.5</sub> identified as: Cherry Grove (AQS ID: 37-033-0001), Jamesville (AQS ID: 37-117-0001), and Bryson City (AQS ID: 37-173-0002). Therefore, the NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

#### **PM<sub>2.5</sub> Chemical Speciation Network**

The EPA conducted an assessment of the PM<sub>2.5</sub> Chemical Speciation Network (CSN) in an effort to optimize the network and to create a network that is sustainable going forward. As a result of this assessment, the EPA is defunding a number of monitoring sites, eliminating the CSN PM<sub>2.5</sub> mass measurement, reducing the frequency of carbon blanks, reducing sample frequency at some monitoring sites, and reducing the number of the packs in shipment during the cooler months of the year.

The EPA defunded four CSN monitors at sites in North Carolina: Rockwell (AQS ID: 37-159-0021); Lexington Water Tower (AQS ID 37-057-0002); Hattie Avenue (AQS ID 37-067-0022); Asheville's Board of Education (AQS ID 37-021-0034); and Hickory Water Tower (AQS ID 37-035-0004). CSN monitors at these sites were shutdown on December 31, 2014.

## **Pb Monitoring Requirements 7**

40 CFR Part 58, Appendix D, 4.5 requires that “At a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year...”

Section 4.5(a)(ii) of Appendix D to 40 CFR Part 58 provides the following provisions for a waiver of the Pb monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

In its approval of the state’s 2011 Network Plan, pursuant the provisions of the above section, the EPA granted the waivers of the source-oriented ambient air monitoring requirements at two sources: Blue Ridge Paper Products, Inc. in Canton, NC and Saint Gobain Containers in Wilson, NC. The waivers must be renewed every five years as part of the network assessment required under 40 CFR §58.10(d). The next network assessment is due in 2015 and should include a renewal request for these waivers or a plan to monitor near the two Pb sources.

40 CFR Part 58, Appendix D, 3(b) requires that “NCORE sites in CBSAs with a population of 500,000 people (as determined in the latest census) or greater shall also measure Pb either as Pb-TSP or Pb-PM<sub>10</sub>.” This monitoring was required to begin December 27, 2011. The Network Plan indicates that Pb-PM<sub>10</sub> sampling is ongoing at the Charlotte NCore site (AQS ID: 37-119-0041) and the Raleigh NCore site (AQS ID: 37-183-0014). As a result, the Pb monitoring network described in the Network Plan meets the design criteria of 40 CFR Part 58.

## **SO<sub>2</sub> Monitoring Requirements**

### **40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for SO<sub>2</sub> are found in Section 4.4 of Appendix D to 40 CFR Part 58. This section requires that “The population weighted emissions index (PWEI) shall be calculated by states for each core based statistical area (CBSA).” As a result, the SO<sub>2</sub> monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within the boundaries of the parent CBSA and is one of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO<sub>2</sub> monitor at an NCore station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, 4.4.

Table 3 shows the required SO<sub>2</sub> monitors based on the 2012 PWEI. Existing SO<sub>2</sub> monitoring sites described in the Network Plan meet the minimum requirements of 40 CFR Part 58. The NC-DAQ operates regulatory SO<sub>2</sub> monitors in the Charlotte-Gastonia-Concord, NC-SC; Durham, NC; and Wilmington, NC CBSAs to meet the PWEI requirements. The Virginia Department of Environmental Quality operates a regulatory SO<sub>2</sub> monitor in the Virginia Beach-Norfolk-Newport News, VA-NC CBSA. The EPA recommends that North Carolina update its MSA agreement with Virginia to include

sharing the SO<sub>2</sub> minimum monitoring requirements for the Virginia Beach-Norfolk CBSA and include this update in the 2015 Network Plan.

**Table 3: PWEI and SO<sub>2</sub> Required Monitors in North Carolina**

CBSA Name	July 2012 PWEI Values	July 2012 PWEI Required Monitors
Virginia Beach-Norfolk-Newport News, VA-NC	78,540	1
Charlotte-Gastonia-Concord, NC-SC	34,426	1
Durham, NC	16,885	1
Wilmington, NC	10,045	1

**NO<sub>2</sub> Monitoring Requirements  
40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for NO<sub>2</sub> are found in Section 4.3 of Appendix D to 40 CFR Part 58. There are three types of required NO<sub>2</sub> monitoring: near-road, area-wide, and Regional Administrator required. These types of NO<sub>2</sub> monitoring are described in sections 4.3.2, 4.3.3, and 4.3.4, respectively.

The EPA previously approved the Triple Oak site (AQS ID 37-183-0021) and the Remount Road site (AQS ID 37-119-0045) in fulfillment of the near-road NO<sub>2</sub> requirements for the Raleigh CBSA and the Charlotte-Concord-Gastonia CBSA.

The Greensboro-High Point, NC; Winston-Salem, NC; and Durham-Chapel Hill, NC CBSAs are currently required to have near-road NO<sub>2</sub> monitoring by January 1, 2017. A new NO<sub>2</sub> monitoring rule is expected to be promulgated in 2016. The new rule may change the NO<sub>2</sub> near-road monitoring requirements for CBSA's with a populations between 500,000 and 1,000,000 people, such as the Greensboro-High Point, NC; Winston-Salem, NC; and Durham-Chapel Hill, NC CBSAs.

The EPA previously approved the selection of the Garinger (AQS ID: 37-119-0041) and Millbrook (AQS ID: 37-183-0014) sites in fulfillment of the area-wide NO<sub>2</sub> monitoring requirement for the Charlotte-Concord-Gastonia and Raleigh CBSAs.

The EPA also previously selected the Hattie Avenue site (AQS ID 37-067-0022) operated by Forsyth County Office of Environmental Assistance and Protection as a location for a Regional Administrator required NO<sub>2</sub> monitor to help protect susceptible and vulnerable populations. The full list of NO<sub>2</sub> monitors identified by the EPA's Regional Administrators can be found on the EPA's website at <http://www.epa.gov/ttnamti1/svpop.html>.

**Air Quality Index (AQI) Reporting  
40 CFR §58.50**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the state required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh-Cary, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Wilmington. NC-DAQ meets these AQI reporting requirements.

## National Core (NCore) Monitoring Network

Ambient air monitoring network criteria for NCore sites are found in Section 3 of Appendix D to 40 CFR Part 58. NC-DAQ designated two NCore sites in the 2014 Network Plan. The first site (AQS ID 37-183-0014) is located at the East Millbrook Middle School site in Raleigh, NC. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by the Mecklenburg County Air Quality (MCAQ), a Division of the Mecklenburg County Land Use and Environmental Services Agency. The EPA approval of these sites was granted on October 30, 2009. The 2014 Network Plan meets the minimum monitoring requirements for NCore sites.

## Monitoring Network Changes Proposed by NC-DAQ

The NC-DAQ received comments on the Network Plan from the Medical Advocates for Healthy Air and the Southern Environmental Law Center on behalf of itself, the North Carolina League of Conservation Voters, the Sierra Club, the Southern Alliance for Clean Energy, and the Western North Carolina Alliance. The NC-DAQ provided a response to these comments as part of its final Network Plan. The public comments expressed concern over the numerous monitor shutdown requests in the Network Plan. The EPA conducted its own analysis of North Carolina's ambient air monitoring network including historical design values, annual PM<sub>2.5</sub> and O<sub>3</sub> trends, nearby monitor correlations, meteorology, and spatial coverage when evaluating the requests to discontinue the requested regulatory monitors. The EPA's rationale for approval or disapproval of specific network changes can be found above in the pollutant sections of this document.

Monitors proposed for discontinuation or relocation and the EPA's determination are summarized in Table 4.

**Table 4: Monitors Proposed for Discontinuation**

AQS ID	Site Name	Pollutant	Type	Comments
37-119-1005	Arrowood	O <sub>3</sub>	SLAMS	Approved: Temporary shutdown for 2015 only; MCAQ property lease not renewed; MCAQ will provide justification for permanent relocation or shutdown in 2015 Network Plan.
37-069-0001	Franklinton	O <sub>3</sub>	SLAMS	Not Approved
37-051-1003	Golfview	O <sub>3</sub>	SLAMS	Approved: Monitor will be relocated to the Honeycutt site.
37-059-0003	Mocksville	O <sub>3</sub>	SLAMS	Approved: Monitor shutdown at the end of the 2014 O <sub>3</sub> season
37-145-0003	Bushy Fork	O <sub>3</sub>	SLAMS	Not Approved
37-071-0016	Grier School	PM <sub>2.5</sub>	SLAMS	Approved: Monitor shutdown 12/31/2014
37-081-0014	Colfax	PM <sub>2.5</sub>	SLAMS	Approved: Monitor shutdown 12/31/2014
37-037-0004	Pittsboro	PM <sub>2.5</sub>	SLAMS	Approved: Monitor shutdown 12/31/2014

37-001-0002	Hopedale	PM <sub>2.5</sub>	SLAMS	Approved: Monitor shutdown 12/31/2014
37-155-0005	Linkhaw	PM <sub>2.5</sub>	SLAMS	Approved: Monitor shutdown
37-191-0005	Dillard School	PM <sub>2.5</sub>	SLAMS	Approved
37-035-0004	Hickory	PM <sub>10</sub>	SLAMS	Approved: Monitor shutdown 12/31/2014
37-035-0004	Hickory Water Tower	PM <sub>2.5</sub> Speciation	CSN	Monitor shutdown 12/31/2014; Defunded by the EPA
37-021-0034	Board of Education	PM <sub>2.5</sub> Speciation	CSN	Monitor shutdown 12/31/2014; Defunded by the EPA
37-067-0022	Hattie Avenue	PM <sub>2.5</sub> Speciation	CSN	Monitor shutdown 12/31/2014; Defunded by the EPA
37-057-0002	Lexington Water Tower	PM <sub>2.5</sub> Speciation	CSN	Monitor shutdown 12/31/2014; Defunded by the EPA
37-159-0021	Rockwell	PM <sub>2.5</sub> Speciation	CSN	Monitor shutdown 12/31/2014; Defunded by the EPA

The EPA reviewed these requests for monitor discontinuation or relocation and determined that the approved requests meet the requirements of 40 CFR §58.14(c) for monitor discontinuation and relocation. The minimum monitoring requirements for PM<sub>2.5</sub>, PM<sub>10</sub>, and O<sub>3</sub> found in Appendix D to 40 CFR Part 58 will continue to be met for the respective MSAs after the approved monitors are discontinued or relocated.

The EPA also has reviewed and approves the location for the startup of the monitor listed in Table 5.

**Table 5: Monitors Proposed for Relocation/Startup**

AQS ID	Site Name	Pollutant	Type	Comments
37-051-0010	Honeycutt	Ozone	SLAMS	Approved: will replace Golfview site

## **Appendix G. Request for Exclusion of PM<sub>2.5</sub> Continuous FEM data from Comparison to the NAAQS**

### *Introduction:*

The North Carolina Division of Air Quality, DAQ, monitoring program has historically operated fine particle, PM<sub>2.5</sub>, continuous monitors primarily to support forecasting and reporting of the air quality index, AQI. These monitors supply data every hour to update the AQI on our web site as well as on national web sites such as AIRNow ([www.airnow.gov](http://www.airnow.gov)). We have been using these monitors since the early part of the last decade as we implemented the PM<sub>2.5</sub> monitoring program. Over the last few years, some PM<sub>2.5</sub> continuous monitors have been approved as federal equivalent methods, FEMs. By utilizing an approved FEM, any subsequent data produced from the method may be eligible for comparison to the United States Environmental Protection Agency's, EPA's, health based standard known as the national ambient air quality standard, NAAQS. The primary advantage of operating a PM<sub>2.5</sub> continuous FEM is that it can support both the AQI, while also supplying data that are eligible for comparison to the NAAQS. Thus, a network utilizing PM<sub>2.5</sub> continuous FEMs can minimize the number of filter-based FRMs operated in the network, which are primarily used for comparison to the NAAQS. These filter-based FRMs are resource intensive in that they require field operations as well as pre- and post-sampling laboratory analysis which results in data not being available for approximately 2-4 weeks after sample collection.

Our monitoring program has been working with PM<sub>2.5</sub> continuous FEMs including deployment at several sites to evaluate their performance. Although the PM<sub>2.5</sub> continuous FEMs are automated methods, these methods still require careful attention in their set-up, operation and validation of data. Once DAQ collected enough data we began to evaluate the performance of these methods compared to collocated FRMs. That evaluation is explained further below and includes our recommendations on the use of the data from these methods.

### *Request for Exclusion of PM<sub>2.5</sub> Continuous FEM data from Comparison to the NAAQS:*

In accordance with the PM NAAQS rule published on Jan. 15, 2013 (78 FR 3086) and specific to the provisions detailed in §58.10 (b)(13) and §58.11 (e) we are requesting that data from the following monitors be set aside for comparison to the NAAQS. While our agency is working to optimize the monitoring instrumentation we use to meet all our monitoring objectives, we are not yet at a point where the comparability of the PM<sub>2.5</sub> continuous FEMs operated in our network (or a sub-set of our network) compared to collocated FRMs is acceptable such that we are comfortable using the continuous FEM data for comparison to the NAAQS. We intend to continue working with the vendor to improve the continuous FEM performance, including revised procedures, software upgrades or retrofit of improved components (unless such changes void its FEM status). After assessing the comparability of the PM<sub>2.5</sub> FEMs to the collocated FRMs for our network, we have determined that the sites listed below do not meet the comparability requirements. Detailed one-page assessments from which the information described below was obtained are included at the end of this section.

**Table 60. Request for Exclusion of PM2.5 Continuous FEM Data**

<i>Sites with PM2.5 continuous FEMs that are collocated with FRMs:</i>											
Site Name	City	Site ID	Cont. POC	Method Description	PM2.5 Cont. Begin Date	PM2.5 Cont. End Date	Continuous/FRM Sampler pairs per season	Slope (m)	Intercept (y)	Meets bias requirement	Correlation (r)
William Owen	Fayetteville	37-051-0009	3	Met One BAM-1022 Mass Monitor w/VSCC	12/30/2015	12/31/2016	Winter = 13 Spring = 12 Summer = 13 Fall = 13 Total = 51	0.72	2.39	No	0.86
Durham Armory	Durham	37-063-0015	3	Met One BAM-1020 Mass Monitor w/VSCC	5/29/2015	12/31/2016	Winter = 32 Spring = 36 Summer = 47 Fall = 55 Total = 170	0.86	3.04	No	0.68
Pitt County Agricultural Center	Greenville	37-147-0006	3	Met One BAM-1022 Mass Monitor w/VSCC	3/09/2016	12/31/2016	Winter = 3 Spring = 25 Summer = 28 Fall = 26 Total = 82	1.13	-0.86	No	0.97
Millbrook	Raleigh	37-183-0014	3	Met One BAM-1020 Mass Monitor w/VSCC	6/1/2009	12/31/2016	Winter = 84 Spring = 77 Summer = 81 Fall = 86 Total = 328	1.02	2.26	No	0.82
<i>Sites with PM2.5 continuous FEMs that are not collocated with FRMs:</i>											
Site Name	City	Site ID	Cont. POC	Method Description	PM2.5 Cont. Begin Date	PM2.5 Cont. End Date					
Blackstone	Not in a City	37-105-0002	3	Met One BAM-1020 Mass Monitor w/VSCC	1/1/2014	12/31/2015					

*Period of Exclusion of Data from the PM<sub>2.5</sub> Continuous FEMs:*

The above table details the period of available data by monitor for which we are basing our recommendation to exclude PM<sub>2.5</sub> continuous FEM data. Per EPA Regional Office approval, we will load or move as necessary these data to EPA's AQS database in a manner where the data are only used for the appropriate monitoring objective(s) (i.e., use data for both the NAAQS and AQI, just the AQI or neither the NAAQS or AQI). Additionally, we will continue to load any new data generated for the next 18 months (intended to represent the period until Dec. 31, 2018) in the same manner or until such time as we request and receive approval from the EPA Regional Office to change the monitoring objectives that the data from the PM<sub>2.5</sub> continuous FEMs can support.

*PM<sub>2.5</sub> Continuous FEM data for Reporting the AQI:*

While we are requesting the monitors above not be used for comparison to the NAAQS, we do believe that the data are of sufficient comparability to collocated FRMs that they be used in AQI reporting. Therefore, with EPA Regional Office approval we will report these data on our web site and to AIRNow ([www.airnow.gov](http://www.airnow.gov)). Additionally, we intend to store the data in EPA's AQS database that is used for "acceptable AQI" reporting (i.e., parameter code 88502) so that data users will know that these data are appropriate for use in AQI calculations.

*Continued Operation of PM<sub>2.5</sub> Monitors to Support NAAQS and AQI Reporting*

While we are requesting that data from the monitors listed above be set aside for comparison to the NAAQS, we will continue to operate PM<sub>2.5</sub> FRMs to support the objective of comparison to the NAAQS. We will also operate our PM<sub>2.5</sub> continuous monitors for use in AQI reporting. Each of these FRM and PM<sub>2.5</sub> continuous monitors will be operated at the locations previously described in this plan and at the locations that meet the objectives of the network design criteria for ambient air quality monitoring described in Appendix D to Part 58.

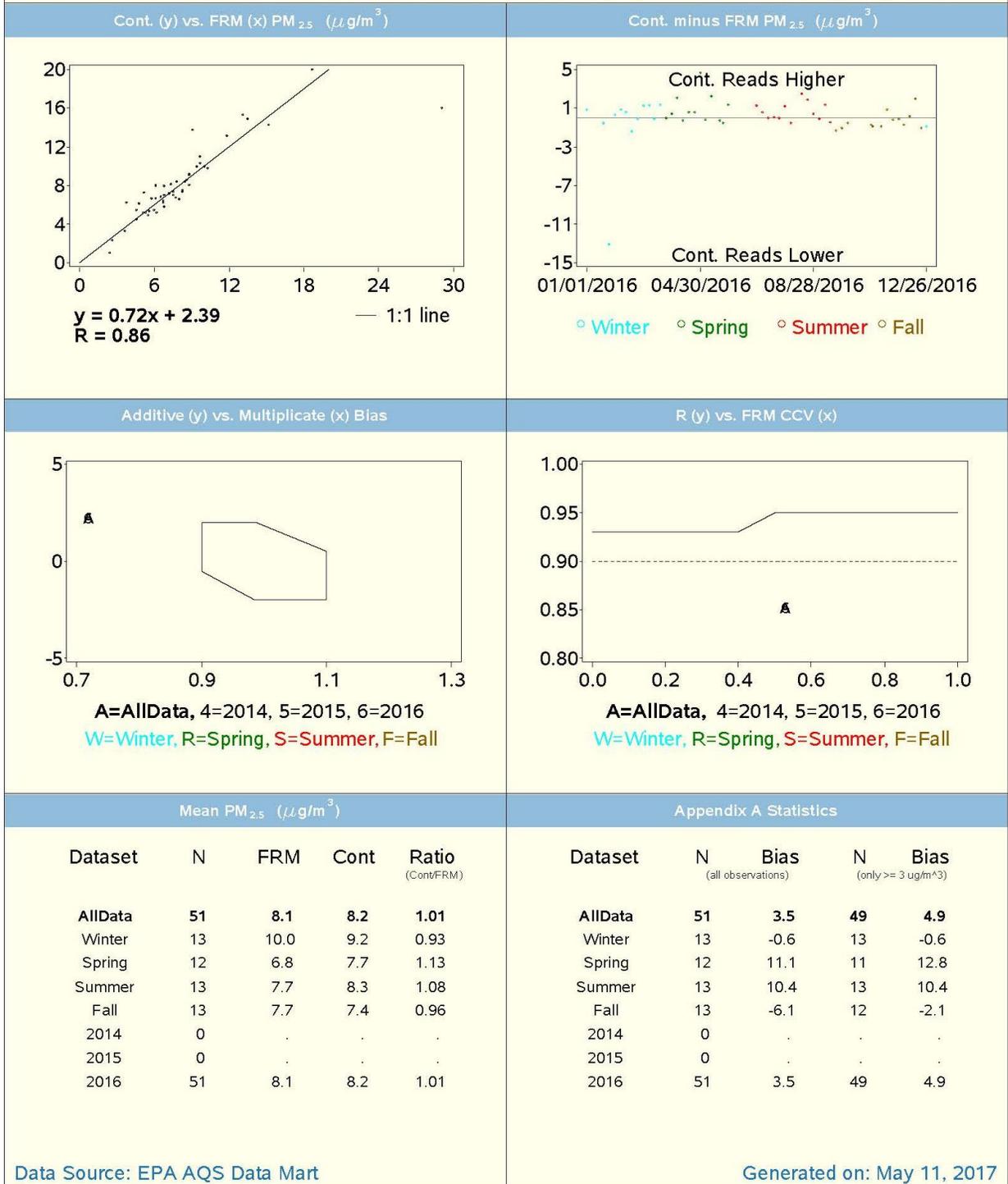
*Assessments:*

The one-page assessments provided as Figure 76 to Figure 79 are locations where our agency has collocated PM<sub>2.5</sub> FRM and continuous FEM monitors. Each of these assessments is represented in "Table 60. Request for Exclusion of PM<sub>2.5</sub> Continuous FEM Data" above.

# PM<sub>2.5</sub> Continuous Monitor Comparability Assessment

## Site 37-051-0009: Fayetteville, NC

FRM: R & P Model 2025 PM<sub>2.5</sub> Sequential Air Sampler w/VSCC - Gravimetric (145,118), PM<sub>2.5</sub> - Local Conditions (88101), POC=1  
 Cont: Met One BAM-1022 Mass Monitor w/ VSCC or TE-PM<sub>2.5</sub> - Beta Attenuation (209), PM<sub>2.5</sub> - Local Conditions (88101), POC=3

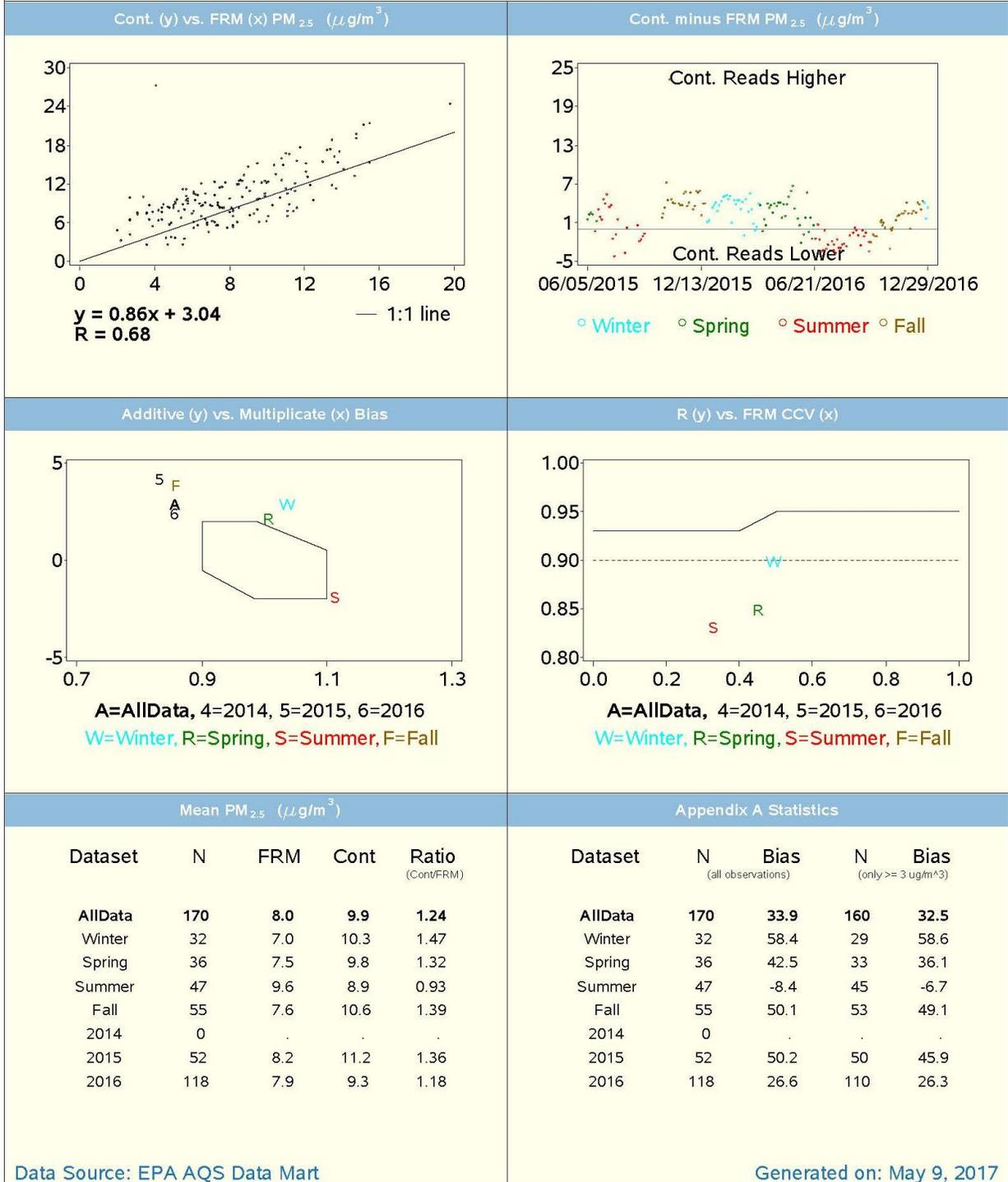


**Figure 76. Comparison of the beta attenuation monitor with the federal reference monitor at William Owen in Fayetteville**

# PM<sub>2.5</sub> Continuous Monitor Comparability Assessment

## Site 37-063-0015: Durham, NC

FRM: R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC - Gravimetric (145,118), PM2.5 - Local Conditions (88101), POC=1  
 Cont: Met One BAM-1020 Mass Monitor w/VSCC - Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=3

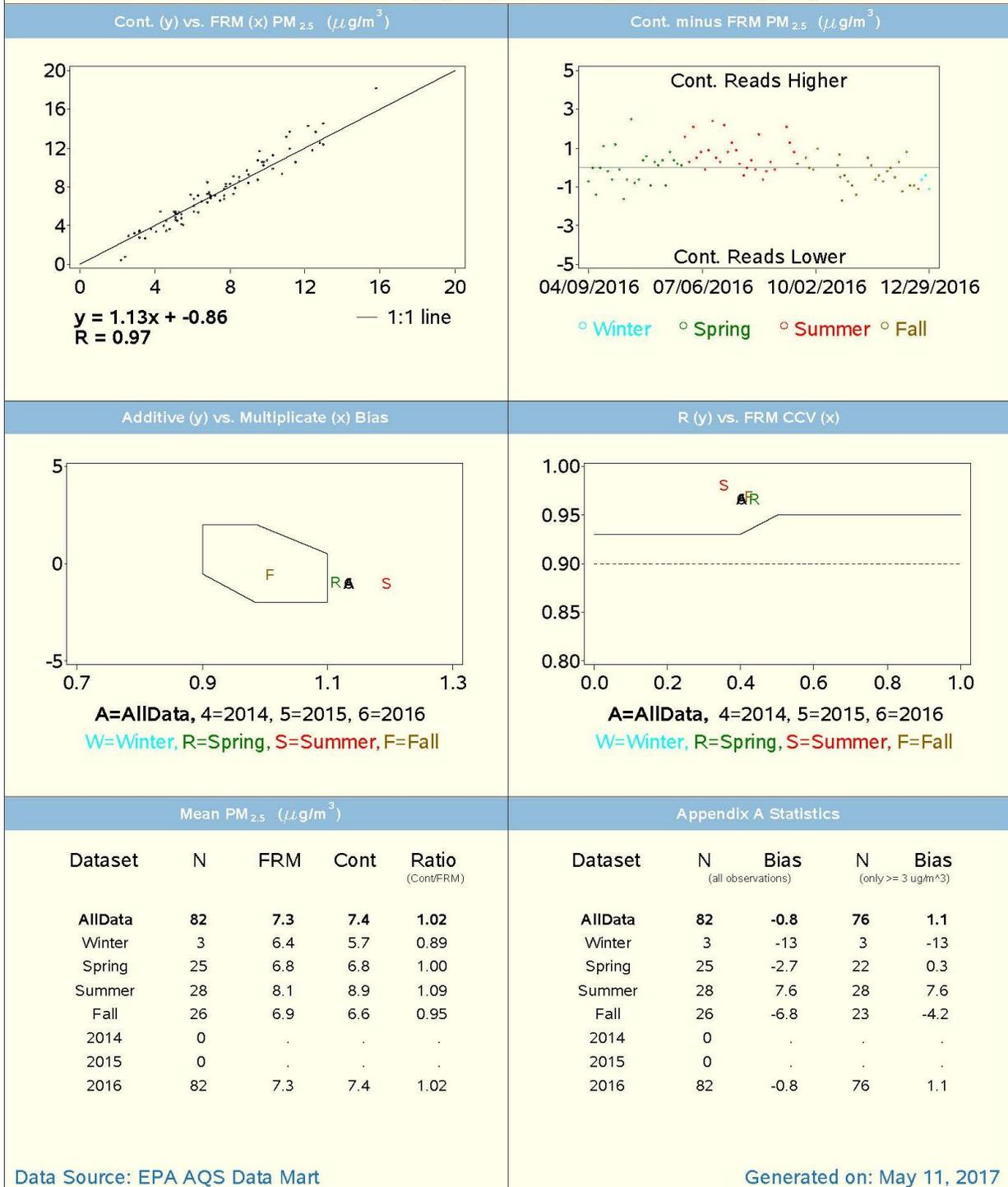


**Figure 77. Comparison of the beta attenuation monitor with the federal reference monitor at Durham Armory in Durham, North Carolina**

# PM<sub>2.5</sub> Continuous Monitor Comparability Assessment

## Site 37-147-0006: Not in a City, NC

FRM: R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC - Gravimetric (145,118), PM2.5 - Local Conditions (88101), POC=1  
 Cont: Met-One BAM W/PM2.5 VSCC - Beta Attenuation (733), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=3

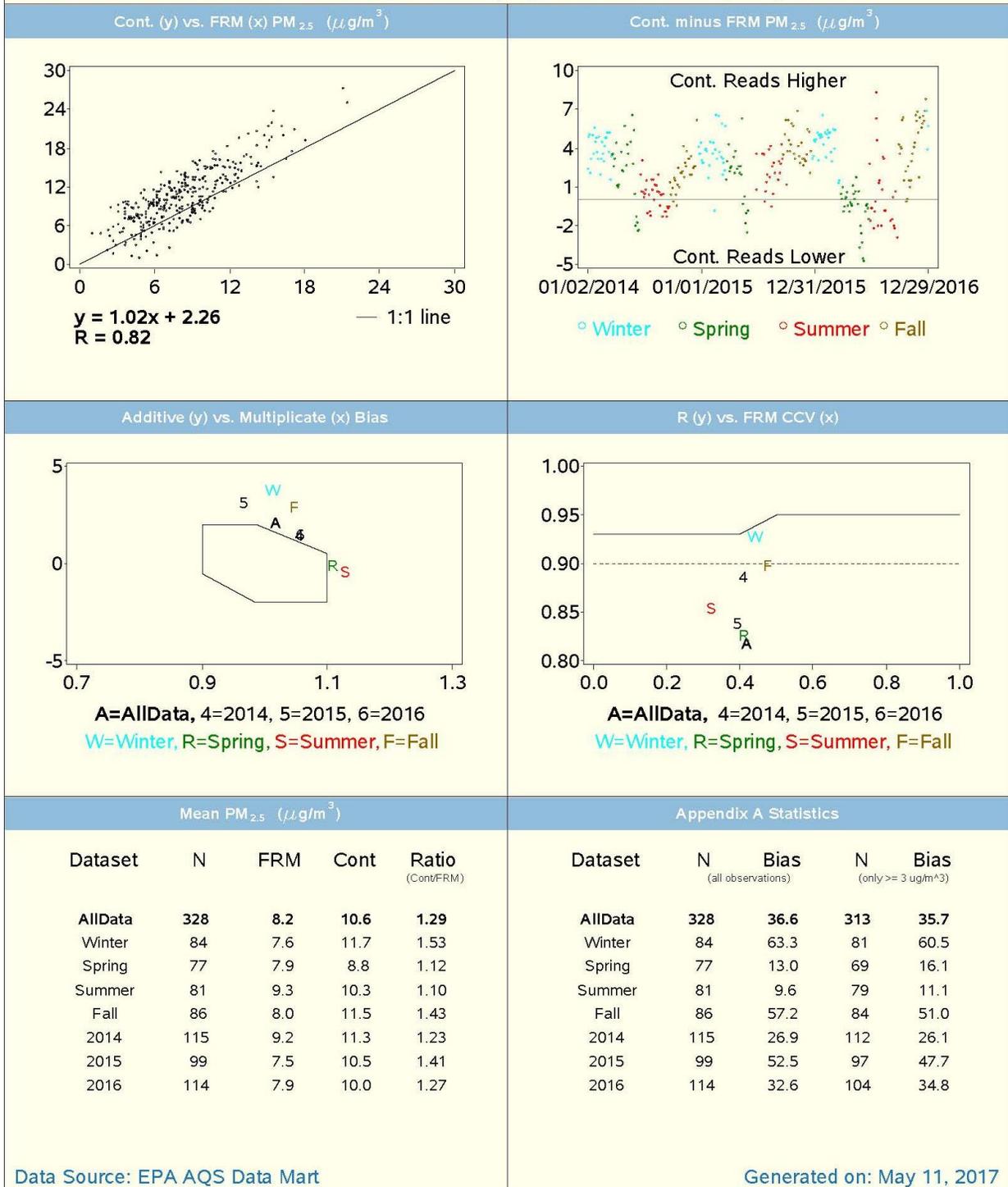


**Figure 78. Comparison of the beta attenuation monitor with the federal reference monitor at Pitt County Agricultural Center in Greenville, North Carolina**

# PM<sub>2.5</sub> Continuous Monitor Comparability Assessment

## Site 37-183-0014: Raleigh, NC

FRM: R & P Model 2025 PM<sub>2.5</sub> Sequential Air Sampler w/VSCC - Gravimetric (145,118), PM<sub>2.5</sub> - Local Conditions (88101), POC=1  
 Cont: Met One BAM-1020 Mass Monitor w/VSCC - Beta Attenuation (170), PM<sub>2.5</sub> - Local Conditions (88101), POC=3



Data Source: EPA AQS Data Mart

Generated on: May 11, 2017

**Figure 79. Comparison of the beta attenuation monitor with the federal reference monitor at Millbrook in Raleigh, North Carolina**

## Appendix H. 2011 Network Plan EPA Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

OCT 20 2011

Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environment and Natural Resources  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

RECEIVED OCT 31 2011

Dear Ms. Holman:

Thank you for submitting the State of North Carolina's 2011 annual ambient air monitoring network plan (Network Plan), dated July 1, 2011. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality and its local agencies.

The U. S. Environmental Protection Agency Region 4 understands that the NC-DAQ provided a 30-day public comment period and did not receive any public comments. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, EPA Region 4 is not required to offer another comment period.

Based upon our review of the Network Plan, EPA Region 4 has determined that the plan satisfies the applicable requirements of 40 CFR part 58. Therefore the Network Plan is approved.

Thank you for working with us to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Doug Neeley at (404) 562-9097 or Katherine Snyder at (404) 562-9840.

Sincerely,

A handwritten signature in black ink, appearing to read "Gwendolyn Keyes Fleming".

Gwendolyn Keyes Fleming  
Regional Administrator

Enclosures

cc: Mr. Donnie Redmond  
Supervisor IV, North Carolina Dept. of Air Quality

Mr. Don R. Willard  
Director, Mecklenburg County Land Use and Environmental Services Agency

Mr. William M. Barnette, Director  
Director, Forsyth County Environmental Affairs Department

Mr. David Brigman  
Director, Western North Carolina Regional Air Quality Agency

FY 2011 State of North Carolina Ambient Air Monitoring Network Plan  
U.S. EPA Region 4 Comments and Recommendations

This document contains U.S. EPA Region 4 comments and recommendations on the State of North Carolina's 2011 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements do not exist for carbon monoxide (CO) unless required by the establishment of a National Core (NCORE) multi-pollutant monitoring station, and/or a state implementation plan. However, new national ambient air quality standards (NAAQS) were promulgated in 2010 for nitrogen dioxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>) with minimum monitoring requirements effective January 1, 2013. Minimum monitoring requirements for nitrogen dioxide (NO<sub>2</sub>) will be addressed in the 2012 network plans. Minimum monitoring requirements are listed in this document for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), and lead (Pb).

The minimum monitoring requirements are based on metropolitan statistical area (MSA) boundaries as defined by the U.S. Office of Management and Budget (OMB), July 1, 2009, population estimates from the U.S. Census Bureau, and historical ambient air monitoring data. OMB currently defines 15 MSAs in the State of North Carolina. These MSAs and the respective July 1, 2009, population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and Populations**

MSA Name	Population
Charlotte-Gastonia-Concord, NC-SC	1,745,524
Virginia Beach-Norfolk-Newport News, VA-NC	1,674,498
Raleigh-Cary, NC	1,125,827
Greensboro-High Point, NC	714,765
Durham-Chapel Hill, NC	501,228
Winston-Salem, NC	484,921
Asheville, NC	412,672
Hickory-Lenoir-Morganton, NC	365,364
Fayetteville, NC	360,355
Wilmington, NC	354,525
Greenville, NC	179,715
Jacksonville, NC	173,064
Burlington, NC	150,358
Rocky Mount, NC	146,536
Goldensboro, NC	113,811

**Minimum Ozone Monitoring Requirements  
40 CFR Part 58, Appendix D, Table D-2**

The network described in the 2011 Network Plan meets the minimum O<sub>3</sub> monitoring requirements specified by 40 CFR Part 58, Appendix D, Table D-2 in all areas except for the Asheville and Hickory MSAs. The Asheville and Hickory MSAs each have the correct number of required ozone monitors

(two), but only one of those is designated as a State and Local Air Monitoring Station (SLAMS) and the second monitor is designated as "other." For a monitor to contribute to the minimum monitoring requirement, it must be classified as a SLAMS monitor in EPA's Air Quality System (AQS), thus the monitor classifications should be updated in AQS.

In addition, a supplemental request to the Network Plan was submitted via email on August 23, 2011 seeking to shutdown the Frying Pan monitor (AQS ID: 37-087-0035) 2-3 weeks prior to October 31. The Frying Pan monitor is operated year round by the National Park Service (NPS) in Great Smoky Mountains National Park. The NPS wants to shutdown the monitor because it needs to replace the monitor's shelter. Replacing the shelter needs to be done before winter weather in the mountainous area makes the task too difficult. Getting this work done in October will help ensure that the monitor is operational by the beginning of the 2012 ozone monitoring season. EPA concurs that this is necessary and any impact to data completeness during this time frame will be noted appropriately by EPA.

#### **Minimum PM<sub>10</sub> Monitoring Requirements**

**40 CFR Part 58, Appendix A, 3.3.1**

**40 CFR Part 58, Appendix D, Table D-4**

The State of North Carolina's current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, 3.3.1 are currently being met. These include the requirement that fifteen percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated.

#### **Minimum PM<sub>2.5</sub> Monitoring Requirements**

**40 CFR Part 58, Appendix A, 3.2.5**

**40 CFR Part 58, Appendix D, Table D-5**

The State of North Carolina's current PM<sub>2.5</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs. Manual PM<sub>2.5</sub> collocation requirements are found in 40 CFR Part 58, Appendix A, 3.2.5. These include the requirement that fifteen percent of each network of manual PM<sub>2.5</sub> methods (at least one site) must be collocated. The manual collocation requirements for PM<sub>2.5</sub> are currently being met in the Network Plan.

#### **PM<sub>2.5</sub> Continuous Monitoring Requirements**

**40 CFR Part 58, Appendix D, 4.7.2**

Regulatory requirements for continuous PM<sub>2.5</sub> monitoring require that "...State, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [Federal Reference Method/Federal Equivalent Method/Approved Regional Method] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies." These minimum continuous PM<sub>2.5</sub> monitoring requirements are currently met in the all of the MSAs in the State. Also, the continuous PM<sub>2.5</sub> collocation requirements are currently met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2011 Network Plan meets all of the design criteria of 40 CFR Part 58.

**PM<sub>2.5</sub> Background and Transport Sites**  
**40 CFR Part 58, Appendix D, 4.7.3**

40 CFR Part 58, Appendix D, 4.7.3 requires that “each State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport.” The 2011 Network Plan identifies seven PM<sub>2.5</sub> sites as regional transport sites that include: Mendenhall (AQS ID: 37-081-0013), Cherry Grove (AQS ID: 37-033-0001), Springfield Road (AQS ID: 37-065-0004), Kenansville (AQS ID: 37-061-0002), Boone (AQS ID: 37-189-0003), Candor (AQS ID: 37-123-0001), and Jamesville (AQS ID: 37-117-0001). The Network Plan identifies three regional transport sites for PM<sub>2.5</sub> identified as: Cherry Grove (AQS ID: 37-033-0001), Jamesville (AQS ID: 37-117-0001), and Bryson City (AQS ID: 37-173-0002). Therefore, NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

**Lead Monitoring Requirements**  
**40 CFR Part 58, Appendix D, 4.5**

EPA recently revised the monitoring requirements for Pb found at 40 CFR Part 58, Appendix D, Section 4.5 (see 75 Federal Register 81126). These revisions reduced the emissions threshold for facilities near which source oriented Pb monitoring is required from 1.0 tons per year (tpy) to 0.5 tpy. The rule also removed population-based monitoring requirements for Pb and replaced them with a requirement to monitor for Pb at urban NCore sites.

40 CFR Part 58, Appendix D, 4.5 requires that “At a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year...”

In its network plan, North Carolina has requested that EPA grant a waiver of source-oriented Pb monitoring requirements for two sources. Section 4.5(a)(ii) of Appendix D to 40 CFR Part 58 provides the following provisions for a waiver of the Pb monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

North Carolina has submitted air modeling indicating that the following sources will not contribute to a maximum Pb concentration in the ambient air in excess of 50% the NAAQS:

Blue Ridge Paper Products, Inc.  
Canton, North Carolina

Saint Gobain Containers  
Wilson, North Carolina

EPA has reviewed this information and concurs that the Pb emissions from each of these sources will not contribute to a maximum Pb concentration in the ambient air in excess of 50% of the NAAQS. Therefore, EPA is granting the waivers of the source-oriented ambient air monitoring requirements at these sources. The waivers must be renewed once every five years as part of the network assessment required under 40 CFR §58.10(d).

North Carolina has also requested that EPA consider revised emissions data related to source-oriented Pb monitoring requirements. North Carolina has submitted information indicating that the actual Pb emissions from the following sources are below 0.50 tpy:

Duke Energy Carolinas, LLC Belews Creek Steam Station Belews Creek, NC	Progress Energy Roxboro Plant Semora, NC
Duke Energy Carolinas, LLC Marshall Steam Station Terrell, NC	Royal Development Co High Point, NC
Duke Energy Carolinas, LLC Allen Steam Station Belmont, NC	U.S. Army Fort Bragg Cumberland County, NC
	U.S. Marine Corps Camp Lejeune Onslow County, NC

EPA has reviewed this information and concurs that the actual Pb emissions from these sources are below 0.50 tpy. Therefore, ambient air monitoring is not required at these sources. Population oriented monitoring is still required at urban NCore sites beginning on December 27, 2011. Based on the 2011 Network Plan, North Carolina will satisfy the minimum monitoring requirements for Pb.

#### **Sulfur Dioxide Monitoring Requirements 40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for SO<sub>2</sub> are found in Section 4.4 of Appendix D to 40 CFR Part 58. This section requires that "The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA)." As a result, the SO<sub>2</sub> monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within the boundaries of the parent CBSA and is one of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO<sub>2</sub> monitor at a NCore station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, 4.4.

The SO<sub>2</sub> network is to be operational beginning January 1, 2013. The Charlotte-Gastonia-Concord CBSA is required to have a total of two SO<sub>2</sub> monitors. Currently, there is only one operating SO<sub>2</sub> monitor in the CBSA, located at the Garinger site (AQS ID: 37-119-0041). In an e-mail dated September 20, 2011, South Carolina Department of Health and Environmental Control committed to establishing a SO<sub>2</sub> monitor at the York site (AQS ID: 45-091-0006) to assist in meeting the minimum monitoring requirements for this CBSA. Once the SO<sub>2</sub> monitor at the York monitoring site in South

Carolina becomes operational, the Charlotte-Gastonia-Concord CBSA will meet the minimum monitoring requirements under 40 CFR Part 58. Similarly, once the additional SO<sub>2</sub> monitor at Mendenhall (AQS ID: 37-081-0013) becomes operational, the Greensboro-High Point CBSA will meet the minimum monitoring requirements under 40 CFR Part 58. All the other CBSAs meet the minimum monitoring requirements based on the information provided in the 2011 Network Plan.

#### **Air Quality Index (AQI) Reporting 40 CFR §58.50**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the State of North Carolina required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh-Cary, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Wilmington. NC-DAQ meets these AQI reporting requirements.

#### **Monitoring Network Changes Proposed by NC-DAQ**

NC-DAQ has proposed several monitoring network changes in its 2011 Network Plan. Monitors proposed for discontinuation are summarized in Table 2.

**Table 2: Monitors proposed for discontinuation/location change**

AQS ID	Pollutant	Type	Comments
37-183-0018	Carbon Monoxide	SLAMS	Will use the FRM CO monitor at the Millbrook site to fulfill the SIP requirements
37-173-0002	PM <sub>2.5</sub>	SLAMS – Regional transport	Monitor will be shut down at completion of 20 month BAM study (5/2011)

EPA has reviewed these requests for discontinuation or monitor relocation and determined that all of the requested monitors, in Table 2, meet the requirements of 40 CFR §58.14(c)(6) for monitor discontinuation. The minimum monitoring requirements for PM<sub>2.5</sub> and O<sub>3</sub> found in Appendix D to 40 CFR Part 58 will continue to be met for the respective MSAs after these monitors are discontinued.

NC-DAQ also requested to change the monitoring frequency at AQS IDs 37-081-0013, 37-071-0016, 37-051-0009, and 37-001-0001 to 1 in 6 day for PM<sub>2.5</sub> sampling. At this proposed frequency, the monitors will meet the PM<sub>2.5</sub> operating schedule requirements under 40 CFR §58.12(d)(1)(i). Therefore, EPA approves the change in monitoring frequency at these sites.

#### **National Core (NCore) Monitoring Network**

Ambient air monitoring network criteria for NCore sites are found in Section 3 of Appendix D to 40 CFR Part 58. NC-DAQ has designated two NCore sites in the 2011 Network Plan. The first site (AQS ID 37-183-0014) is located at the East Millbrook Middle School site in Raleigh, NC. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by the Mecklenburg County Land Use and Environmental Services Agency. Official EPA approval was granted for these sites on October 30, 2009. The 2011 Network Plan meets the minimum monitoring requirements for NCore sites.

### **Air Quality System (AQS)**

During the review of the 2011 Network Plan, there were a few discrepancies identified between information in the Network Plan and in AQS. The State is responsible for updating monitor type classifications in AQS. Based on listings of monitor types in the Network Plan, NC-DAQ has several monitors that are listed as "other." EPA encourages the State to be more specific in their monitor types in AQS. Monitors that are listed as "other" will be treated as a SLAMS monitor for regulatory evaluations. For a monitor to count toward the minimum monitoring requirement (e.g. ozone requirements above), it must be classified as a SLAMS monitor in AQS, thus the monitor classifications should be updated in AQS (Waggin Trail AQS ID: 37-003-0004).

Also, the State should verify that monitor types in AQS match those in the Network Plan. For example, the ozone monitor at Waynesville (AQS ID 37-087-0004) is listed as a SLAMS monitor in the Network Plan, but as "other" in AQS. In addition, there are discrepancies in monitor type in AQS and the Network Plan for the following sites, AQS IDs: 31-159-0021-42101-1, 37-159-0021-44201-1, and 37-179-003-44201-1.

In addition, the State should verify the PM<sub>2.5</sub> background monitor designations in AQS. There are two sites in AQS designated as PM<sub>2.5</sub> background sites that are not designated in the network plan as background sites. These sites include: Pittsboro (AQS ID: 37-037-0004) and West Johnston (AQS ID: 37-101-0002).

## Appendix I. 2013 Network Plan EPA Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

**NOV 25 2013**

Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environment and Natural Resources  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Dear Ms. Holman:

Thank you for submitting the state of North Carolina's 2013 annual ambient air monitoring network plan (Network Plan), dated July 2, 2013. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality (NC-DAQ) and the local air quality agencies in North Carolina.

The U.S. Environmental Protection Agency understands that the NC-DAQ provided a 30-day public comment period and did not receive any public comments. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, the EPA is not required to offer another comment period. The EPA approves North Carolina's 2013 Network Plan.

Thank you for working with us to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,

  
Jeaneanne M. Gettle,  
Acting Director  
Air, Pesticides and Toxics  
Management Division

Enclosure

cc: Mr. Donnie Redmond  
Ambient Monitoring Section Chief, NC-DAQ

Mr. Leslie Rhodes  
Director, Mecklenburg County Land Use and  
Environmental Services Agency

Mr. William M. Barnette, Director  
Forsyth County Environmental Affairs Department

Mr. David Brigman, Director  
Western North Carolina Regional Air Quality Agency

FY 2013 State of North Carolina Ambient Air Monitoring Network Plan  
U.S. EPA Region 4 Comments and Recommendations

This document contains the U.S. EPA comments and recommendations on the state of North Carolina's 2013 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements are listed for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and lead (Pb).

The minimum monitoring requirements are based on core based statistical area (CBSA) boundaries as defined by the U.S. Office of Management and Budget, July 1, 2011, population estimates from the U.S. Census Bureau, and historical ambient air monitoring data. Minimum monitoring requirements for O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, only apply to metropolitan statistical areas (MSAs), which are a subset of CBSAs. OMB currently defines 17 MSAs in the state of North Carolina. On February 1, 2013, OMB redefined the CBSA boundaries based on 2010 census data. In North Carolina, there are two newly defined MSA's: Myrtle Beach-Conway-North Myrtle Beach, SC-NC and New Bern, NC that were previously defined as micropolitan CBSAs. Additionally, some MSA populations changed due to the inclusion and/or exclusion of counties from OMB's February 2013 MSA delineations. The 2009 and 2013 defined MSAs and the respective July 1, 2011, and 2012 population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and Populations**

MSA Name	2011 Population <i>2009 MSA definition</i>	2012 Population <i>2013 MSA definition</i>
Charlotte-Concord-Gastonia, NC-SC	1,795,472	2,296,569
Virginia Beach-Norfolk-Newport News, VA-NC	1,679,894	1,699,925
Raleigh, NC	1,163,515	1,188,564
Greensboro-High Point, NC	730,966	736,065
Winston-Salem, NC	482,025	647,697
Durham-Chapel Hill, NC	512,979	522,826
Asheville, NC	429,017	432,406
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	NA*	394,542
Fayetteville, NC	374,157	374,585
Hickory-Lenoir-Morganton, NC	369,685	363,627
Wilmington, NC	364,567	263,429
Jacksonville, NC	192,690	183,263
Greenville, NC	179,719	172,554
Burlington, NC	153,291	153,920
Rocky Mount, NC	152,157	151,662
New Bern, NC	NA*	128,119
Goldsboro, NC	123,697	124,246

\*previously micropolitan CBSA

**Minimum O<sub>3</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix D, Table D-2**

The state of North Carolina's proposed O<sub>3</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-2 for all MSAs, except the Myrtle Beach-Conway-North Myrtle Beach MSA.

Due to changes that OMB made to MSA boundaries in February of 2013, Brunswick County, North Carolina has been added to the Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA. This change has triggered the requirement for an O<sub>3</sub> monitor in this MSA. The 2013 Network Plan indicates that NC-DAQ has entered into discussions with the SC Department of Health and Environmental Control (SC DHEC) and other stakeholders to identify an appropriate location for a new monitoring site. Once a suitable monitoring location is identified, information regarding the site can be provided either as an amendment to the current Network Plan or in next year's Network Plan.

The Network Plan also proposes to shutdown the O<sub>3</sub> monitor at the Enochville site (AQS ID 37-159-0022). EPA approves the shutdown of this monitor. The EPA reviewed historical data and other information to make this determination. The O<sub>3</sub> monitor at the Rockwell site (AQS ID 37-159-0021) is in the same county and has recorded similar values compared to the Enochville monitor over the last five years. After the Enochville monitor is shutdown, the Charlotte-Concord-Gastonia, NC-SC MSA would still meet the minimum monitoring requirements found in 40 CFR Part 58, Appendix D.

Additionally, the Network Plan proposes to relocate two O<sub>3</sub> monitoring sites: Waggin Trail (AQS ID 37-003-0004) and Bent Creek (AQS ID 37-021-0030). The EPA approved the relocation of the Bent Creek ozone site in a letter to the Western North Carolina Regional Air Quality Agency dated April 29, 2013. The new Bent Creek location is less than a mile from the previous site and has the same AQS ID.

The EPA also approves the relocation of the Waggin Trail site to a new location that will be named Taylorsville 2013 with an AQS ID of 37-003-0005. The EPA has reviewed the North Carolina Division of Air Quality's (NC-DAQ) request to relocate the Waggin Trail O<sub>3</sub> site and determined that this monitor meets the relocation requirements of 40 CFR § 58.14(c)(6). The Taylorsville 2013 site is nearby the Waggin Trail site and should be representative of the same spatial scale as the Waggin Trail site.

**Minimum PM<sub>10</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix A, 3.3.1**  
**40 CFR Part 58, Appendix D, Table D-4**

The state of North Carolina's current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, 3.3.1 are currently being met. These include the requirement that fifteen percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated.

**Minimum PM<sub>2.5</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix A, 3.2.5**  
**40 CFR Part 58, Appendix D, Table D-5**

The state of North Carolina's current PM<sub>2.5</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs. Manual PM<sub>2.5</sub> collocation requirements are

found in 40 CFR Part 58, Appendix A, 3.2.5. These include the requirement that fifteen percent of each network of manual PM<sub>2.5</sub> methods (at least one site) must be collocated. The manual collocation requirements for PM<sub>2.5</sub> are currently being met in the Network Plan.

The Network Plan proposes to shut down three PM<sub>2.5</sub> monitors at the end of 2013: Finely Farm (AQS ID 37-183-0020), Springfield Rd (AQS ID 37-065-0004), and Lenoir Community College (AQS ID 37-107-0004). The design values for all three PM<sub>2.5</sub> monitors have been trending down in recent years and are all well below the NAAQS. The most recent design values (2009-2012) for these monitors are 9.3, 8.9, and 9.0 micrograms per cubic meter, respectively. After the shutdown of these PM<sub>2.5</sub> monitors, the state's network would still meet the minimum monitoring requirements found in 40 CFR Part 58, Appendix D. Therefore, the EPA approves the shutdown of the Finley Farm, Springfield Rd, and Lenoir Community College PM<sub>2.5</sub> monitors.

After submission of the Network Plan, NC-DAQ sent a formal request, dated October 1, 2013 to relocate the Spruce Pine (AQS ID 37-121-0001) PM<sub>2.5</sub> monitor. The EPA has reviewed ND-DAQ's request to relocate the Spruce Pine PM<sub>2.5</sub> monitor and determined that this monitor meets the relocation requirements of 40 CFR § 58.14(c)(6). The proposed BRR Hospital site is nearby the existing Spruce Pine site and should be representative of the same spatial scale as the Spruce Pine site. The EPA approves the relocation of the Spruce Pine PM<sub>2.5</sub> monitor to the proposed BRR Hospital site, which will have the AQS ID of 37-121-0004.

#### **PM<sub>2.5</sub> Continuous Monitoring Requirements 40 CFR Part 58, Appendix D, 4.7.2**

Regulatory requirements for continuous PM<sub>2.5</sub> monitoring require that "...State, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [federal reference method/federal equivalent method/approved regional method] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies." These minimum continuous PM<sub>2.5</sub> monitoring requirements are currently met in the all MSAs in the state. Also, the continuous PM<sub>2.5</sub> collocation requirements are currently met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2013 Network Plan meets all of the design criteria of 40 CFR Part 58.

#### **PM<sub>2.5</sub> Background and Transport Sites 40 CFR Part 58, Appendix D, 4.7.3**

40 CFR Part 58, Appendix D, 4.7.3 requires that "each State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport." The Network Plan identifies six PM<sub>2.5</sub> sites as general background sites that include: Mendenhall (AQS ID: 37-081-0013), Cherry Grove (AQS ID: 37-033-0001), Kenansville (AQS ID: 37-061-0002), Boone (AQS ID: 37-189-0003), Candor (AQS ID: 37-123-0001), and Jamesville (AQS ID: 37-117-0001). The Network Plan identifies three regional transport sites for PM<sub>2.5</sub> identified as: Cherry Grove (AQS ID: 37-033-0001), Jamesville (AQS ID: 37-117-0001), and Bryson City (AQS ID: 37-173-0002). Therefore, NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

**Pb Monitoring Requirements**  
**40 CFR Part 58, Appendix D, 4.5**

40 CFR Part 58, Appendix D, 4.5 requires that “At a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year...”

Section 4.5(a)(ii) of Appendix D to 40 CFR Part 58 provides the following provisions for a waiver of the Pb monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

In its approval of the state’s 2011 Network Plan, pursuant the provisions of the above section, The EPA granted the waivers of the source-oriented ambient air monitoring requirements at two sources: Blue Ridge Paper Products, Inc. in Canton, North Carolina and Saint Gobain Containers in Wilson, North Carolina. The waivers must be renewed every five years as part of the network assessment required under 40 CFR §58.10(d).

40 CFR Part 58, Appendix D, 3(b) requires that “NCore sites in CBSA with a population of 500,000 people (as determined in the latest Census) or greater shall also measure Pb either as Pb-TSP or Pb-PM<sub>10</sub>.” This monitoring was required to begin December 27, 2011. The Network Plan indicates that Pb-PM<sub>10</sub> sampling is ongoing at the Charlotte NCore site (AQS ID: 37-119-0041) and the Raleigh NCore site (AQS ID: 37-183-0014). As a result, the Pb monitoring network described in the Network Plan meets all of the design criteria of 40 CFR Part 58.

**SO<sub>2</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for SO<sub>2</sub> are found in Section 4.4 of Appendix D to 40 CFR Part 58. This section requires that “The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA).” As a result, the SO<sub>2</sub> monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within the boundaries of the parent CBSA and is one of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO<sub>2</sub> monitor at a NCore station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, 4.4.

Table 2 shows the required SO<sub>2</sub> monitors based on the 2012 PWEI. Existing SO<sub>2</sub> monitoring sites described in the Network Plan meet the minimum requirements of 40 CFR Part 58.

**Table 2: PWEI and SO<sub>2</sub> Required Monitors in North Carolina**

CBSA Name	July 2012 PWEI Values	July 2012 PWEI Required Monitors
Virginia Beach-Norfolk-Newport News, VA-NC	78,540	1
Charlotte-Gastonia-Concord, NC-SC	34,426	1
Durham, NC	16,885	1
Wilmington, NC	10,045	1

**NO<sub>2</sub> Monitoring Requirements  
40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for NO<sub>2</sub> are found in Section 4.3 of Appendix D to 40 CFR Part 58. There are three types of required NO<sub>2</sub> monitoring: near-road, area-wide, and Regional Administrator required. These types of NO<sub>2</sub> monitoring are described in sections 4.3.2, 4.3.3, and 4.3.4 respectively.

Any CBSA with a population of 500,000 or more persons is required to have a near-road NO<sub>2</sub> monitoring station that monitors expected maximum hourly concentrations near a major road. Any CBSA with a population of 2,500,000 or more persons or that has one or more roadway segments with a 250,000 or greater annual average daily traffic (AADT) count is required to have an additional near-road NO<sub>2</sub> monitoring station. The *Near-road NO<sub>2</sub> Monitoring Technical Assistance Document (TAD)* provides guidance to state and local agencies in selecting an appropriate near-road NO<sub>2</sub> monitoring location. This document can be found on the internet at <http://www.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf>.

Ambient air monitoring network design criteria for area-wide NO<sub>2</sub> sites are found in Section 4.3.3 of Appendix D to 40 CFR Part 58. Any CBSA with a population of 1,000,000 or more persons is required to monitor a location of expected highest NO<sub>2</sub> concentrations representing the neighborhood or larger spatial scales.

Ambient air monitoring network design criteria for Regional Administrator required NO<sub>2</sub> monitoring, often referred to as RA-40 monitoring, are found in Section 4.3.4 of Appendix D to 40 CFR Part 58. This section states that “the Regional Administrators, in collaboration with States, must require a minimum of forty additional NO<sub>2</sub> monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Regional Administrators, working with States, may also consider additional factors ... to require monitors beyond the minimum network requirement.”

The EPA Region 4 approves the selection of the Triple Oak (AQS ID 37-183-0021) site in fulfillment of the near-road NO<sub>2</sub> requirement for the Raleigh, NC CBSA. In the Network Plan, Mecklenburg County Air Quality (MCAQ) proposed two potential sites to meet the requirement for the near-road NO<sub>2</sub> requirement in the Charlotte-Concord-Gastonia, NC-SC. In July of 2013, the EPA Region 4 staff visited MCAQ’s proposed location on Remount Road. MCAQ communicated that due to site access and siting issues the proposed site near Remount Road would be preferable to the proposed site located on Toomey

Avenue. The EPA approves the selection of the near-road site on Remount Road (AQS ID 37-119-0045) in fulfillment of the near-road NO<sub>2</sub> requirement. As discussed in the Network Plan, the Greensboro-High Point, NC; Winston-Salem, NC; and Durham-Chapel Hill, NC CBSAs will be required to have near-road NO<sub>2</sub> monitoring by January 1, 2017.

The EPA approves the selection of the Garinger (AQS ID: 37-119-0041) and Millbrook (AQS ID: 37-183-0014) sites in fulfillment of the area-wide NO<sub>2</sub> monitoring requirement for the Charlotte-Gastonia-Rock Hill and Raleigh-Cary CBSAs.

The EPA selects the Hattie Avenue site (AQS ID 450-045-0015) operated by Forsyth County Office of Environmental Assistance and Protection as a location for a Regional Administrator required NO<sub>2</sub> monitor to help protect susceptible and vulnerable populations. The full list of NO<sub>2</sub> monitors identified by the EPA's Regional Administrators can be found on the EPA's website at <http://www.epa.gov/ttnamti1/svpop.html>.

**Air Quality Index (AQI) Reporting  
40 CFR §58.50**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the state of North Carolina required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh-Cary, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Wilmington. NC-DAQ meets these AQI reporting requirements.

**Monitoring Network Changes Proposed by NC-DAQ**

NC-DAQ has proposed several monitoring network changes in its 2013 Network Plan. Monitors proposed for discontinuation or relocation are summarized in Table 3.

**Table 3: Monitors Proposed for Discontinuation/Relocation**

AQS ID	Site Name	Pollutant	Type	Comments
37-159-0022	Enochville	O <sub>3</sub>	SLAMS	Approved: Monitor will be shutdown at the end of the 2013 O <sub>3</sub> season
37-003-0004	Waggin Trail	O <sub>3</sub>	SLAMS	Approved: Monitor will shutdown at the end of the 2013 O <sub>3</sub> season and will be replaced with a nearby O <sub>3</sub> monitor – Taylorsville 2013 (AQS ID 37-003-0005)
37-183-0020	Finley Farm	PM <sub>2.5</sub>	SLAMS	Approved: Monitor will shut down 12/31/2013
37-065-0004	Springfield Rd	PM <sub>2.5</sub>	SLAMS	Approved: Monitor will shut down 12/31/2013
37-107-0004	Lenoir Community College	PM <sub>2.5</sub>	SLAMS	Approved: Monitor will shut down 12/31/2013
37-121-0001	Spruce Pine	PM <sub>2.5</sub>	SLAMS	Approved: Monitor will be relocated less than a mile from the existing site and will have a new AQS ID 37-121-0004

The EPA reviewed these requests for monitor discontinuation or relocation and determined that they all meet the requirements of 40 CFR §58.14(c) for monitor discontinuation and relocation. The minimum monitoring requirements for PM<sub>2.5</sub> and O<sub>3</sub> found in Appendix D to 40 CFR Part 58 will continue to be met for the respective MSAs after these monitors are discontinued or relocated.

The EPA also has reviewed and approves the location for the startup of the all monitors listed in Table 4.

**Table 4: Monitors Proposed for Startup**

AQS ID	Site Name	Pollutant	Type	Comments
37-183-0021	Triple Oak	NO <sub>2</sub>	SLAMS – near-road	Approved: site establishment for near-road NO <sub>2</sub> monitoring
37-119-0045	Remount Road	NO <sub>2</sub>	SLAMS – near-road	Approved: site establishment for near-road NO <sub>2</sub> monitoring
37-003-0005	Taylorville 2013	Ozone	SLAMS	Approved: will replace Waggin Trail site
37-121-0004	BRR Hospital	PM <sub>2.5</sub>	SLAMS	Approved: will replace the Spruce Pine site

#### **National Core (NCore) Monitoring Network**

Ambient air monitoring network criteria for NCore sites are found in Section 3 of Appendix D to 40 CFR Part 58. NC-DAQ designated two NCore sites in the 2013 Network Plan. The first site (AQS ID 37-183-0014) is located at the East Millbrook Middle School site in Raleigh, NC. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by MCAQ. Official The EPA approval was granted for these sites on October 30, 2009. The 2013 Network Plan meets the minimum monitoring requirements for NCore sites.

# Appendix J. Monitoring Agreement between Virginia and North Carolina for the Virginia Beach-Norfolk-New Port News Metropolitan Statistical Area

## MEMORANDUM OF AGREEMENT

### ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR THE VIRGINIA BEACH-NORFOLK-NEWPORT NEWS, VA-NC METROPOLITAN STATISTICAL AREA (MSA)

Date: April 5, 2016

#### Participating Agencies:

North Carolina  
Department of Environmental Quality (NCDEQ)  
Division of Air Quality (NCDAQ)

Virginia  
Department of Environmental Quality (VADEQ)  
Air Division

#### I. PURPOSE/OBJECTIVES/GOALS

The purpose of this Memorandum of Agreement (MOA) is to establish the Virginia Beach-Norfolk-Newport News Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement between NCDEQ and VADEQ (collectively referred to as the “affected agencies”) to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for criteria pollutants deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will establish the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Virginia Beach-Norfolk-Newport News MSA as required by 40 CFR 58 Appendix D, Section 2(e).

#### II. BACKGROUND

The Virginia Beach-Norfolk-Newport News MSA consists of:

<u>Counties</u>	<u>Cities</u>
Currituck County, NC	Chesapeake, VA
Gates County, NC	Hampton, VA
Gloucester County, VA	Newport News, VA
Isle of Wight County, VA	Norfolk, VA
James City County, VA	Poquoson, VA
Mathews County, VA	Portsmouth, VA
York County, VA	Suffolk, VA
	Virginia Beach, VA
	Williamsburg, VA

NCDEQ has jurisdiction over Currituck County and Gates County; VADEQ has jurisdiction over the others.

The NCDEQ and VADEQ are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Virginia Beach-Norfolk-Newport News MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA.

40 CFR 58 Appendix D, Section 2 (e) states (in part):

“... The EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates monitoring with the other air pollution control agencies within the MSA.

### III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDEQ and VADEQ (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA, as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by both affected agencies. The minimum air quality monitoring requirements for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring responsibilities and requirements to achieve an effective network design regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agency. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected party shall inform the other via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to natural disaster, or similar occurrences that result in extended (greater than one quarter) or permanent change in the monitoring network. At least once a year in the second quarter or before June 15<sup>th</sup>, each agency shall deliver to the other agency a copy of its proposed monitoring plan for its jurisdiction within the MSA for the next year.

#### IV. LIMITATIONS

A. All commitments made in this MOA are subject to the availability of funds and each party's budget priorities. Nothing in this MOA, in and of itself, obligates NCDEQ or VADEQ to expend funds or to enter into any contract, assistance agreement, interagency agreement, or other financial obligation. Nothing herein shall be construed as a promise by either party to indemnify or hold harmless the other party.

B. This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements what will be effected in writing by representatives of the parties.

C. Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against NCDEQ or VADEQ, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDEQ or VADEQ.

#### V. PROPRIETARY INFORMATION AND INTELLUCTUAL PROPERTY

No proprietary information or intellectual property is anticipated to arise out of this MOA.

#### VI. POINTS OF CONTACT

The following individuals are designated points of contact for the MOA:

NCDEQ DAQ: Donnie Redmond, Ambient Monitoring Section Chief  
NC DENR Division of Air Quality  
1641 Mail Service Center  
Raleigh, NC 27699-1641

[donnie.redmond@ncdenr.gov](mailto:donnie.redmond@ncdenr.gov)  
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VADEQ: Chuck Turner, Director of Air Quality Monitoring  
VADEQ Air Quality Division  
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Voice: (804) 527-5178

#### VII. MODIFICATION/DURATION/TERMINATION

This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of all parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked

or terminated by an affected party at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

VIII. REFERENCE

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements"

IX. APPROVALS

North Carolina Department of Environmental Quality (NCDEQ)  
Division of Air Quality

BY: Shirley C. Helmer  
TITLE: Director  
DATE: 4/26/2016

Virginia Department of Environmental Quality (VADEQ)  
Air Quality Division

BY: [Signature]  
TITLE: Director, Air Division  
DATE: 5/9/16

# **Appendix K. Monitoring Agreement for the Myrtle Beach-Conway-North Myrtle Beach Metropolitan Statistical Area**

## **MEMORANDUM OF AGREEMENT**

### **ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR THE MYRTLE BEACH-CONWAY-NORTH MYRTLE BEACH METROPOLITAN STATISTICAL AREA (MSA)**

July 1, 2015

#### Participating Agencies:

North Carolina  
Department of Environment and Natural Resources (NCDENR)  
Division of Air Quality (NCDAQ)

South Carolina  
Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

#### **I. PURPOSE/OBJECTIVES/GOALS**

The purpose of this Memorandum of Agreement (MOA) is to establish the Myrtle Beach-Conway-North Myrtle Beach Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement between NCDAQ and SCDHEC (collectively referred to as the “affected agencies”) to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for ozone, as well as other criteria pollutants air quality monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will establish the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Myrtle Beach-Conway-North Myrtle Beach MSA as required by 40 CFR 58 Appendix D, Section 2(e).

#### **II. BACKGROUND**

The Myrtle Beach-Conway-North Myrtle Beach MSA consists of Horry County and Brunswick County. NCDAQ has jurisdiction over Brunswick County and SCDHEC has jurisdiction over Horry County. Brunswick County was previously included in the Wilmington (NC) MSA with New Hanover and Pender Counties. However, the United States Office of Management and Budget revised the geographic delineation in February 2013 to include Brunswick County in the Myrtle Beach-Conway-North Myrtle Beach MSA instead.

The NCDAQ and SCDHEC are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Myrtle Beach-Conway-North Myrtle Beach MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA for ozone.

40 CFR 58 Appendix D, Section 2 (e) states (in part):

“... The EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to

divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates monitoring with the other air pollution control agencies with the MSA.

### III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDQA and SCDHEC (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA; as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for ozone, as well as other criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by both affected agencies. The minimum air quality monitoring requirements for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring responsibilities and requirements to achieve an effective network design regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agency. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected party shall inform the other via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to natural disaster, or similar occurrences that result in extend (greater than one quarter) or permanent change in the monitoring network. At least once a year in the second quarter or before June 15<sup>th</sup>, each agency shall deliver to the other agency a copy of its proposed monitoring plan for its jurisdiction with the MSA for the next year.
- Each party reserves the right to revoke or terminate this MOA at any time for any reason by giving thirty (30) days written notice prior to the date of termination.

### IV. LIMITATIONS

A. All commitments made in this MOA are subject to the availability of funds and each party’s budget priorities. Nothing in this MOA, in and of itself, obligates NCDQA or SCDHEC to expend funds or to enter into any contract, assistance agreement, interagency agreement, or other financial obligation.

B. This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance

with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements what will be effected in writing by representatives of the parties.

C. Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against NCDAQ or SCDHEC, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDAQ or SCDHEC.

#### V. PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY

No proprietary information or intellectual property is anticipated to arise out of this MOA.

#### VI. POINTS OF CONTACT

The following individuals are designated points of contact for the MOA:

NC DENR DAQ: Donnie Redmond  
NC DENR Division of Air Quality  
1641 Mail Service Center  
Raleigh, NC 27699-1641  
  
[donnie.redmond@ncdenr.gov](mailto:donnie.redmond@ncdenr.gov)  
Voice/fax: 919-707-8468

SCDHEC: Scott Reynolds  
SCDHEC Bureau of Air Quality  
2600 Bull Street  
Columbia, SC 29201  
  
[reynolds@dhec.sc.gov](mailto:reynolds@dhec.sc.gov)  
Voice: 803-896-0902

#### VII. MODIFICATION/DURATION/TERMINATION

This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of all parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked or terminated by an affected party at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

#### VIII. REFERENCE

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements"

#### IX. APPROVALS

North Carolina Department of Environment and Natural Resources  
Division of Air Quality (NCDAQ)

BY: Shula Chelmer  
TITLE: Director, Division of Air Quality  
DATE: 6/12/2015

South Carolina Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

BY: Myra A. Gull  
TITLE: Bureau Chief, Bureau of Air Quality  
DATE: 6/22/15

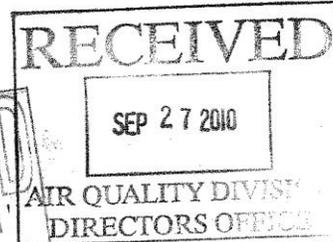
Appendix L. 2010 Network Plan EPA Approval Letter

*Demi*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

SEP 22 2010



Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environment and Natural Resources  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Dear Ms. Holman / *Sheila*:

Thank you for submitting the State of North Carolina's 2010 annual ambient air monitoring network plan (Network Plan), dated July 1, 2010. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality (NC-DAQ) and its local agencies.

The Environmental Protection Agency (EPA) Region 4 understands that the NC-DAQ provided a 30-day public comment period and received comments from PCS Phosphate Company, Inc. and Mr. Clayton Moore. EPA found that NC-DAQ sufficiently considered and responded to the comments. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, the EPA Region 4 is not required to offer another comment period.

Based upon our review of the Network Plan, EPA Region 4 has determined that the document satisfies the applicable requirements of 40 CFR Part 58. The Network Plan is approved. Comments and recommendations are enclosed.

Thank you for your work with us to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Doug Neeley at (404) 562-9097 or Katherine Sciera at (404) 562-9840.

Sincerely,

Gwendolyn Keyes Fleming  
Regional Administrator

Enclosure

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*2233*

cc: Mr. Donnie Redmond  
Supervisor IV, North Carolina Dept. of Air Quality

Mr. Don R. Willard  
Director, Mecklenburg County Land Use and Environmental Services Agency

Mr. Robert R. Fulp  
Director, Forsyth County Environmental Affairs Department

Mr. David Brigman  
Director, Western North Carolina Regional Air Quality Agency

**FY 2010 State of North Carolina Ambient Air Monitoring Network Plan  
U.S. EPA Region 4 Comments and Recommendations**

This document contains U.S. EPA Region 4 comments and recommendations to the State of North Carolina's 2010 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements do not exist for carbon monoxide (CO) unless required by the establishment of a National Core (NCore) multi-pollutant monitoring station, and/or a state implementation plan. However, new national ambient air quality standards (NAAQS) were promulgated this year for nitrogen dioxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>) with minimum monitoring requirements effective January 1, 2013. Minimum monitoring requirements are listed for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), and lead (Pb).

The minimum monitoring requirements are based on metropolitan statistical area (MSA) boundaries as defined by the U.S. Office of Management and Budget (OMB), July 1, 2009, population estimates from the U.S. Census Bureau, and historical ambient air monitoring data. OMB currently defines 15 MSAs in the State of North Carolina. These MSAs and the respective July 1, 2009, population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and Populations**

<b>MSA Name</b>	<b>Population</b>
Charlotte-Gastonia-Concord, NC-SC	1,745,524
Virginia Beach-Norfolk-Newport News, VA-NC	1,674,498
Raleigh-Cary, NC	1,125,827
Greensboro-High Point, NC	714,765
Durham-Chapel Hill, NC	501,228
Winston-Salem, NC	484,921
Asheville, NC	412,672
Hickory-Lenoir-Morganton, NC	365,364
Fayetteville, NC	360,355
Wilmington, NC	354,525
Greenville, NC	179,715
Jacksonville, NC	173,064
Burlington, NC	150,358
Rocky Mount, NC	146,536
Goldsboro, NC	113,811

**Minimum Ozone Monitoring Requirements**  
**40 CFR Part 58, Appendix D, Table D-2**

The network described in the 2010 Network Plan meets the minimum O<sub>3</sub> monitoring requirements specified by 40 CFR Part 58, Appendix D, Table D-2 in all areas.

**Minimum PM<sub>10</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix A 3.3.1**  
**40 CFR Part 58, Appendix D, Table D-4**

The State of North Carolina's current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, 3.3.1 are currently being met. Fifteen percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated. Also, the sites with collocated monitors should be among those measuring annual mean concentrations in the highest 25 percent of the network. These collocation requirements are met in the Network Plan for manual PM<sub>10</sub> sampling.

**Minimum PM<sub>2.5</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix A 3.2.5**  
**40 CFR Part 58, Appendix D, Table D-5**

The State of North Carolina's current PM<sub>2.5</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs. Manual PM<sub>2.5</sub> collocation requirements are found in 40 CFR Part 58, Appendix A, section 3.2.5. Fifteen percent of each network of manual PM<sub>2.5</sub> methods (at least one site) must be collocated. The manual collocation requirement for PM<sub>2.5</sub> is currently being met in the Network Plan. In addition, there is a requirement for 80% of these collocated monitors to be at sites that are  $\pm 20\%$  of the NAAQS. Currently, only 20% of the collocated monitors are at sites  $\pm 20\%$  of the NAAQS. EPA recommends that the collocated sites be moved to the appropriate sites to meet this requirement. The following monitoring sites currently have PM<sub>2.5</sub> design values within  $\pm 20$  percent of the NAAQS and are recommended for consideration as collocation monitors: Air Quality System (AQS) ID 37-035-004, AQS ID 37-057-0002, AQS ID 37-063-0001, AQS ID 37-071-0016, AQS ID 37-087-0010, AQS ID 37-119-0041, AQS ID 37-119-0042, AQS-ID 37-119-0043, AQS ID 37-135-0007, and AQS ID 37-159-0021.

**PM<sub>2.5</sub> Continuous Monitoring Requirements**  
**40 CFR Part 58, Appendix D 4.7.2**

Regulatory requirements for continuous PM<sub>2.5</sub> monitoring require that "...State, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required [Federal Reference Method (FRM)/Federal Equivalent Method (FEM)/Approved Regional Method (ARM)] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies." These

minimum continuous PM<sub>2.5</sub> monitoring requirements are currently met in the all of the MSAs in the State. Also, the continuous PM<sub>2.5</sub> collocation requirements are currently met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2010 Network Plan meets all of the design criteria of 40 CFR Part 58.

**PM<sub>2.5</sub> Background and Transport Sites**  
**40 CFR Part 58, Appendix D 4.7.3**

40 CFR Part 58, Appendix D, 4.7.3 requires that “each State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport.” The 2010 Network Plan identifies the PM<sub>2.5</sub> sites at Mendenhall (AQS ID: 37-081-0013), Cherry Grove (AQS ID: 37-033-0001), and Jamesville (AQS ID: 37-117-0001) as background sites and the PM<sub>2.5</sub> sites at Cherry Grove (AQS ID: 37-033-0001), Jamesville (AQS ID: 37-117-0001), and Bryson City (AQS ID: 37-173-0002) as regional transport sites. Therefore, NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

**Lead (Pb) Monitoring Requirements**  
**40 CFR Part 58, Appendix D 4.5**

Ambient air monitoring network design criteria for Pb are found at section 4.5 of Appendix D to 40 CFR Part 58. This section requires that, at a minimum, there must be one source-oriented state and local air monitoring station (SLAMS) located to measure the maximum Pb concentration in ambient air resulting from each Pb source which emits 1.0 or more tons per year (t/yr).

NC-DAQ was not required to conduct ambient air monitoring at three sources (see list below) based upon submitted information in the 2009 and 2010 Network Plans indicating that the following sources will not contribute more than 1.0 t/yr. EPA concurs with this assessment and will not require ambient air monitoring at these sources in the 2010 Network Plan.

International Resistive Company (IRC)  
736 Greenway Road  
Boone, NC 28607

Nucor Steel  
1505 River Road  
Cofield, NC 27922

Carolina Power and Light Company (Progress Energy) Roxboro Steam Station  
1700 Dunnaway Road  
Semora, NC 27343

**Air Quality Index (AQI) Reporting  
40 CFR §58.50**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the State of North Carolina required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh-Cary, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Wilmington. NC-DAQ meets these AQI reporting requirements.

**Monitoring Network Changes Proposed by NC-DAQ**

NC-DAQ has proposed several monitoring network changes in the 2010 Network Plan. Any monitors listed in the Network Plan as possibly being relocated or discontinued are subject to a case-by-case evaluation by a letter request from NC-DAQ when NC-DAQ has a proposed shut-down date for that particular monitor or an approved regional method. Monitors proposed for discontinuation are summarized in Table 2.

**Table 2: Monitors proposed for discontinuation/location change**

AQS ID	Pollutant	Type	Comments
37-173-0002	SO <sub>2</sub>	SLAMS	Monitor was shut down after EPA approval dated June 24, 2010
37-081-0013	PM <sub>2.5</sub>	QA Collocated	Collocated monitor shut down
37-087-0004	Ozone	SLAMS	Evicted from property, moving site across the road to Junaluska Elementary School, keep AQS ID the same for 250 meter location move
37-061-0002	PM <sub>10</sub>	PSD	PSD monitor shut down and convert to special purpose monitor operating every third year
37-107-0004	Ozone	SLAMS	Relocate monitor on property due to structure that obstructs air flow to monitor
37-069-0001	Ozone	SLAMS	Relocate monitor or shut down due to road construction

EPA has reviewed these requests for discontinuation or monitor relocation and determined that all of the requested monitors meet the requirements of 40 CFR §58.14(c)(6) for monitor relocation or are requests to shut down PSD or QA monitors, which are not subject to EPA Region 4 approval. EPA Region 4 encourages NC-DAQ to maintain the AQS ID 37-087-0004 instead of assigning a new AQS ID for this site because the site is only moved 250 meters. By maintaining the AQS ID, the NAAQS design values can be calculated continuously. The minimum monitoring requirements for PM<sub>10</sub>, PM<sub>2.5</sub>, and O<sub>3</sub> found in Appendix D to 40 CFR Part 58 will continue to be met for the respective MSAs after these monitors are discontinued or relocated.

NC-DAQ also requested to change the monitoring frequency at AQS ID 37-081-0013 (primary monitor) to 1-in-3 days. At this proposed frequency, the monitors will meet the PM<sub>2.5</sub> operating schedule requirements under 40 CFR §58.12(d)(1)(i). Therefore, EPA approves the change to 1-in-3 day monitoring at these sites.

#### **National Core (NCore) Monitoring Network**

NC-DAQ has designated two NCore sites, AQS ID 37-183-0014 and AQS ID 37-119-0041, in the 2010 Network Plan. The first site (AQS ID 37-183-0014) is located at the East Millbrook Middle School site in Raleigh, NC. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by the Mecklenburg County Land Use and Environmental Services Agency. Official EPA approval was granted on October 30, 2009. All quality assurance procedures shall be implemented in accordance with 40 CFR Part 58, Appendix A.

#### **Air Quality System (AQS)**

Based on listings of monitor types in the Network Plan, NC-DAQ has several monitors that are listed as "other." EPA encourages the State to be more specific in their monitor types in AQS. Monitors that are listed as "other" will be treated as a SLAMS monitor for regulatory evaluations. Secondly, the State should verify that monitor types in AQS match those in the Network Plan. For example, the SO<sub>2</sub> monitor at AQS ID 37-051-1003 is listed as a special purpose monitor in the Network Plan, but as a SLAMS monitor in AQS. A similar case exists for PM<sub>10</sub> monitor AQS ID 37-081-0013, which is listed as "other" in the Network Plan, but as a SLAMS monitor in AQS. EPA uses the AQS designation for regulatory purposes and will consider both of these monitors SLAMS until approved otherwise. The State is responsible for maintaining current monitor type classifications in AQS.

Appendix M. NCore Monitoring Plan Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
RESEARCH TRIANGLE PARK, NC 27711

*Donnie  
G. Skiles*

OCT 30 2009  
RECEIVED  
NOV 23 2009  
AMBIENT P/L

OFFICE OF  
AIR QUALITY PLANNING  
AND STANDARDS

Mr. Keith Overcash, Director  
Division of Air Quality  
NC Department of Environment & Natural Resources  
1641 Mail Service Center  
Raleigh, NC 27699-1641

RECEIVED  
NOV 6 2009  
AIR QUALITY DIVISION  
DIRECTORS OFFICE

Dear Mr. Overcash:

This letter transmits our approval of North Carolina's proposed NCore station at East Millbrook Middle School in Raleigh, AQS# 37-183-0014, as required by the Ambient Air Monitoring Regulations. According to these rules (see 40 CFR 58.11(c)), NCore network design and changes must be approved by the Environmental Protection Agency's (EPA) Administrator. This authority has been delegated to the Director of the Air Quality Assessment Division in EPA's Office of Air Quality Planning and Standards.

In considering your proposed NCore monitoring station, we worked with your Regional Office on a review of your annual monitoring network plan and an assessment of the proposed location and characteristics of the area to be monitored. After careful consideration of your proposal, we are pleased to approve this station as part of the NCore network.

In your agency's plan for NCore, a request was made to waive measuring NOy, which is a required measurement. After assessing available NOy observations and modeling outputs and to assure consistency across all NCore stations, we are affirming the requirement to measure NOy at all NCore stations. Please make arrangements with your Regional Office on a schedule to implement the measurement of NOy at your NCore station.

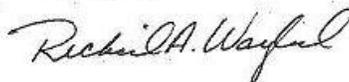
By EPA's rules (see 40 CFR 58.13), an approved NCore station is expected to be operating with all required measurements by January 1, 2011. Enclosure A provides an update on required measurements and Enclosure B provides EPA's Air Quality System instructions on coding for NCore monitors and data. Please share this information with your staff responsible for the NCore station measurements and data submission.

Internet Address (URL) • <http://www.epa.gov>

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Thank you for your program's efforts in developing the NCore station plan and establishing the site. For questions, you may contact Tim Hanley at [hanley.tim@epa.gov](mailto:hanley.tim@epa.gov) and 919-541-4417, or David Shelow at [shelow.david@epa.gov](mailto:shelow.david@epa.gov) and 919-541-3776.

Sincerely,



Richard A. Wayland  
Director  
Air Quality Assessment Division

2 Enclosures

cc: Doug Neeley, EPA Region 4

## Appendix N. 2012 Network Plan EPA Approval Letter



### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
SAM NUNN  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA GEORGIA 30303-8960

Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environment and Natural Resources  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

SEP 21 2012

Dear Ms. Holman:

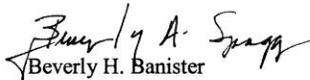
Thank you for submitting the state of North Carolina's 2012 annual ambient air monitoring network plan (Network Plan), dated July 2, 2012. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality and its local agencies.

The U.S. Environmental Protection Agency Region 4 understands that the NC-DAQ provided a 30-day public comment period and did not receive any public comments. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, EPA Region 4 is not required to offer another comment period.

With this letter, EPA Region 4 is approving the North Carolina Network Plan with the exception of the NO<sub>2</sub> monitoring plans. The state will need to provide additional information on NO<sub>2</sub> monitoring as described in the enclosure. Once EPA Region 4 is in agreement with the additional information provided, the state will need to make the information available for public inspection. Upon completion of the public inspection process, EPA Region 4 will submit the NO<sub>2</sub> addendum to the Network Plan to the EPA Administrator for approval per 40 CFR 58.10(a)(5). We have enclosed comments on your network plan and will continue to work with your agency on the remaining portions of the plan that have not been approved with this letter.

Thank you for working with us to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Doug Neeley at (404) 562-9097 or Ryan Brown at (404) 562-9147.

Sincerely,

  
Beverly H. Banister  
Director  
Air, Pesticides and Toxics  
Management Division

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Enclosure

cc: Mr. Donnie Redmond, Supervisor IV  
North Carolina Department of Air Quality

Mr. Don R. Willard, Director  
Mecklenburg County Land Use and Environmental Services Agency

Mr. William M. Barnette, Director  
Forsyth County Environmental Affairs Department

Mr. David Brigman, Director  
Western North Carolina Regional Air Quality Agency

Mr. Mike Peyton  
Director, EPA Region 4 Science and Ecosystems Support Division

CY 2012 State of North Carolina Ambient Air Monitoring Network Plan  
U.S. EPA Region 4 Comments and Recommendations

This document contains U.S. EPA Region 4 comments and recommendations on the state of North Carolina's 2012 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements are listed for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and lead (Pb).

The minimum monitoring requirements are based on core based statistical area (CBSA) boundaries, as defined by the U.S. Office of Management and Budget (OMB); July 1, 2011, population estimates from the U.S. Census Bureau; and historical ambient air monitoring data. Minimum monitoring requirements for O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, only apply to metropolitan statistical areas (MSAs), which are a subset of CBSAs that contain an urban core of 50,000 or more population. OMB currently defines 15 MSAs in the state of North Carolina. These MSAs and the respective July 1, 2011, population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and Populations**

<b>MSA Name</b>	<b>Population</b>
Charlotte-Gastonia-Rock Hill, NC-SC	1,795,472
Virginia Beach-Norfolk-Newport News, VA-NC	1,679,894
Raleigh-Cary, NC	1,163,515
Greensboro-High Point, NC	730,966
Durham-Chapel Hill, NC	512,979
Winston-Salem, NC	482,025
Asheville, NC	429,017
Fayetteville, NC	374,157
Wilmington, NC	369,685
Hickory-Lenoir-Morganton, NC	364,567
Greenville, NC	192,690
Jacksonville, NC	179,719
Burlington, NC	153,291
Rocky Mount, NC	152,157
Goldensboro, NC	123,697

**Minimum O<sub>3</sub> Monitoring Requirements  
40 CFR Part 58, Appendix D, Table D-2**

The state of North Carolina's proposed O<sub>3</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-2 for all MSAs. Additionally, the proposed O<sub>3</sub> monitoring network described in the Network Plan meets all of the design criteria of 40 CFR Part 58.

The Network Plan discusses that NC-DAQ may consider, depending on available resources, shutting down three O<sub>3</sub> monitors that are in excess of the required minimum monitoring. If NC-DAQ decides it would like to shutdown the monitors it will need to send a formal request to EPA.

**Minimum PM<sub>10</sub> Monitoring Requirements**

**40 CFR Part 58, Appendix A, 3.3.1**

**40 CFR Part 58, Appendix D, Table D-4**

The state of North Carolina's current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, 3.3.1 are currently being met. These include the requirement that fifteen percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated.

**Minimum PM<sub>2.5</sub> Monitoring Requirements**

**40 CFR Part 58, Appendix A, 3.2.5**

**40 CFR Part 58, Appendix D, Table D-5**

The state of North Carolina's current PM<sub>2.5</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs. Manual PM<sub>2.5</sub> collocation requirements are found in 40 CFR Part 58, Appendix A, 3.2.5. These include the requirement that fifteen percent of each network of manual PM<sub>2.5</sub> methods (at least one site) must be collocated. The manual collocation requirements for PM<sub>2.5</sub> are currently being met in the Network Plan.

The Network Plan discusses that NC-DAQ may consider, depending on available resources, shutting down two PM<sub>2.5</sub> monitors. If NC-DAQ decides it would like to shutdown the monitors it will need to send a formal request to EPA.

**PM<sub>2.5</sub> Continuous Monitoring Requirements**

**40 CFR Part 58, Appendix D, 4.7.2**

Regulatory requirements for continuous PM<sub>2.5</sub> monitoring require that "...State, or where appropriate, local agencies must operate continuous PM<sub>2.5</sub> analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [federal reference method/federal equivalent method/approved regional method] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies." These minimum continuous PM<sub>2.5</sub> monitoring requirements are currently met in the all MSAs in the state. Also, the continuous PM<sub>2.5</sub> collocation requirements are currently met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2012 Network Plan meets all of the design criteria of 40 CFR Part 58.

**PM<sub>2.5</sub> Background and Transport Sites**

**40 CFR Part 58, Appendix D, 4.7.3**

Forty (40) CFR Part 58, Appendix D, 4.7.3 requires that "each state shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport." The Network Plan identifies seven PM<sub>2.5</sub> sites as general background sites that include: Mendenhall (AQS ID: 37-081-0013), Cherry Grove (AQS ID: 37-033-0001), Springfield Road (AQS ID: 37-065-0004), Kenansville (AQS ID: 37-061-0002), Boone (AQS ID: 37-189-0003), Candor (AQS

ID: 37-123-0001), and Jamesville (AQS ID: 37-117-0001). The Network Plan identifies three regional transport sites for PM<sub>2.5</sub> identified as: Cherry Grove (AQS ID: 37-033-0001), Jamesville (AQS ID: 37-117-0001), and Bryson City (AQS ID: 37-173-0002). Therefore, NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

The Network Plan discusses that NC-DAQ may consider, depending on available resources, shutting down two regional transport/general background PM<sub>2.5</sub> monitors and replacing them with BAMs. NC-DAQ will need to send a formal request to shut down these monitors to EPA, when it has finalized its decision. EPA will then consider the request.

**Lead Monitoring Requirements  
40 CFR Part 58, Appendix D, 4.5**

Forty (40) CFR Part 58, Appendix D, 4.5 requires that “At a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year...”

Section 4.5(a)(ii) of Appendix D to 40 CFR Part 58 provides the following provisions for a waiver of the Pb monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the state or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50 percent of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

In approving the state’s 2011 Network Plan, pursuant to the provisions of the above section, EPA granted waivers of the source-oriented ambient air monitoring requirements at two sources: Blue Ridge Paper Products, Inc. in Canton, North Carolina and Saint Gobain Containers in Wilson, North Carolina. The waivers must be renewed every five years as part of the network assessment required under 40 CFR §58.10(d). There are no sources in North Carolina that are required to have source-oriented Pb monitoring at this time.

Forty (40) CFR Part 58, Appendix D, 3(b) requires that “NCORE sites in CBSAs with a population of 500,000 people (as determined in the latest Census) or greater shall also measure Pb either as Pb-TSP or Pb-PM<sub>10</sub>.” This monitoring was required to begin December 27, 2011. The Network Plan indicates that Pb-PM<sub>10</sub> sampling is ongoing at the Charlotte NCore site (AQS ID: 37-119-0041) and the Raleigh NCore site (AQS ID: 37-183-0014). The Pb monitoring network described in the Network Plan meets all of the design criteria of 40 CFR Part 58.

**Sulfur Dioxide Monitoring Requirements  
40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for SO<sub>2</sub> are found in Section 4.4 of Appendix D to 40 CFR Part 58. This section requires that “The population weighted emissions index (PWEI) shall be calculated by states for each core based statistical area (CBSA).” As a result, the SO<sub>2</sub> monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within

the boundaries of the parent CBSA and is one of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO<sub>2</sub> monitor at a NCore station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, 4.4.

EPA's Office of Air Quality Planning and Standards (OAQPS) have updated the PWEI calculations using the latest available emissions inventory data and population estimates. Several areas in Region 4 have decreased monitoring requirements as a result of these new calculations, including four CBSAs in North Carolina. The Virginia Beach-Norfolk-Newport News and Charlotte-Gastonia-Concorde CBSAs will be required to operate one monitor instead of two. The Greensboro-High Point and Winston-Salem CBSAs will be required to operate minimally no monitors instead of one. The requirements did not change for the Durham or Wilmington CBSAs. The SO<sub>2</sub> requirements and discussed monitoring requirement changes are shown in Table 2 below.

**Table 2: PWEI and SO<sub>2</sub> Required Monitors in North Carolina**

CBSA Name	Sept 2011 PWEI Values	Sept 2011 PWEI Required Monitors	July 2012 PWEI Values	July 2011 PWEI Required Monitors	Change in Monitors Required
Virginia Beach-Norfolk-Newport News, VA-NC	100,711	2	78,540	1	-1
Charlotte-Gastonia-Concord, NC-SC	127,397	2	34,428	1	-1
Durham, NC	28,837	1	18,885	1	0
Wilmington, NC	12,246	1	10,045	1	0
Greensboro-High Point, NC	6,576	1	2,897	0	-1
Winston-Salem, NC	8,894	1	2,691	0	-1

The SO<sub>2</sub> network is to be operational beginning January 1, 2013. Existing SO<sub>2</sub> monitoring sites described in the Network Plan meet the minimum requirements of 40 CFR Part 58, in all areas except the Durham CBSA. North Carolina has proposed to install a new SO<sub>2</sub> monitor at the Durham Armory site (AQS ID: 37-063-0015) to meet the PWEI requirement in this area. EPA approves this request.

**Nitrogen Dioxide (NO<sub>2</sub>) Monitoring Requirements  
40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for NO<sub>2</sub> are found in Section 4.3 of Appendix D to 40 CFR Part 58. There are three types of required NO<sub>2</sub> monitoring: near-road, area-wide, and Regional Administrator required. These types of NO<sub>2</sub> monitoring are described in sections 4.3.2, 4.3.3, and 4.3.4, respectively.

Any CBSA with a population of 500,000 or more persons is required to have a near-road NO<sub>2</sub> monitoring station that monitors expected maximum hourly concentrations near a major road. Any CBSA with a population of 2,500,000 or more persons or that has one or more roadway segments with a 250,000 or greater annual average daily traffic (AADT) count is required to have an additional near-road NO<sub>2</sub> monitoring station. The *Near-road NO<sub>2</sub> Monitoring Technical Assistance Document (TAD)* provides guidance to state and local agencies in selecting an appropriate near-road NO<sub>2</sub> monitoring location. This document can be found on the internet at <http://www.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf>.

Ambient air monitoring network design criteria for area-wide NO<sub>2</sub> sites are found in Section 4.3.3 of Appendix D to 40 CFR Part 58. Any CBSA with a population of 1,000,000 or more persons is required to monitor a location of expected highest NO<sub>2</sub> concentrations representing the neighborhood or larger spatial scales.

Ambient air monitoring network design criteria for Regional Administrator required NO<sub>2</sub> monitoring, often referred to as RA-40 monitoring, are found in Section 4.3.4 of Appendix D to 40 CFR Part 58. This section states, “the Regional Administrators, in collaboration with states, must require a minimum of forty additional NO<sub>2</sub> monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Regional Administrators, working with states, may also consider additional factors ... to require monitors beyond the minimum network requirement.”

Pending action by the EPA Administrator, EPA Region 4 supports the selection of the Garinger (AQS ID: 37-119-0041) and Millbrook (AQS ID: 37-183-0014) sites in fulfillment of the area-wide NO<sub>2</sub> monitoring requirement for the Charlotte-Gastonia-Rock Hill and Raleigh-Cary CBSAs. We note your acknowledgement that the Hattie Avenue site (AQS ID: 37-067-0022) should be considered among the NO<sub>2</sub> monitors intended to help protect susceptible and vulnerable populations. EPA Region 4 also supports the proposed near-road NO<sub>2</sub> site located at Triple Oak Road in the Raleigh-Cary CBSA and required by 40 CFR 58, Appendix D, 4.3.2.

The state will need to provide EPA with an addendum to its Network Plan containing additional information on its near-road NO<sub>2</sub> monitoring plans in the Charlotte-Gastonia-Rock Hill CBSA.

The addendum should also include additional information about the proposed near-road monitoring site. Section 13.5 of the near-road NO<sub>2</sub> TAD and Table 13.1 of the TAD discuss important site and road parameters when evaluating a near-road site. Using the TAD as a reference, additional information provided on near-road NO<sub>2</sub> monitoring should include; at minimum, the following information for each site:

- Proposed AQS ID
- Street address and site geographical coordinates (longitude and latitude)
- Target road segment description including type of road
- Site pictures facing 4-8 directions – N, S, E, W, NE, NW, SE, SW
- Probable distance between the inlet probe and the outside nearest edge of the target road
- Site property description including property owner and feasibility of site access
- Roadway design and configuration
- Presence of any roadside structures
- Nearest windrose representative of the site and orientation of the site with respect to the predominate wind direction
- Traffic data and ranking information (see Table 6-3 of the Technical Assistance Document), as well as the source and vintage of the data
- Sampling and analysis method(s) for each measured parameter
- Operating schedules for each monitor at the site.

- Monitoring objective and spatial scale of representativeness for each monitor at the site.
- MSA, CBSA, CSA or other area represented by the monitor
- Discussion of other siting criteria

Once EPA Region 4 is in agreement with the proposed near-road site, the state will need to make the information available for public inspection. Upon completion of the public inspection process, EPA Region 4 will submit the NO<sub>2</sub> addendum to the Network Plan to the EPA Administrator for approval per 40 CFR 58.10(a)(5). We will continue to work with your agency as needed to get the near-road NO<sub>2</sub> site operational as expeditiously as possible.

**Air Quality Index (AQI) Reporting**  
**40 CFR §58.50**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the state of North Carolina required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh-Cary, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Wilmington. NC-DAQ meets these AQI reporting requirements.

**Monitoring Network Changes Proposed by NC-DAQ**

In the Network Plan, NC-DAQ has proposed to discontinue monitoring for CO at the Rockwell site (AQS ID: 37-159-0021). EPA has reviewed this request for discontinuation and determined that it meets the requirements of 40 CFR §58.14(c)(6) for monitor discontinuation.

**National Core (NCore) Monitoring Network**

Ambient air monitoring network criteria for NCore sites are found in Section 3 of Appendix D to 40 CFR Part 58. NC-DAQ designated two NCore sites in the Network Plan. The first site (AQS ID 37-183-0014) is located at the East Millbrook Middle School site in Raleigh, NC. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by the Mecklenburg County Land Use and Environmental Services Agency. Official EPA approval was granted for these sites on October 30, 2009. The 2012 Network Plan meets the minimum monitoring requirements for NCore sites.

## Appendix O. 2015-2016 Network Plan Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

NOV 19 2015

Ms. Sheila C. Holman  
Director  
Division of Air Quality  
North Carolina Department of  
Environmental Quality  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Dear Ms. Holman:

Thank you for submitting the state of North Carolina's 2015 annual ambient air monitoring network plan (Network Plan), dated July 23, 2015. The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10. The Network Plan covers the ambient air monitoring network for the North Carolina Division of Air Quality (NC-DAQ) and the local air quality agencies in North Carolina.

The U.S. Environmental Protection Agency Region 4 understands that the NC-DAQ provided the public a 30-day review period for its draft Network Plan. Comments on the draft plan were submitted by several stakeholders and the final Network Plan includes the NC-DAQ responses to these comments. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, the EPA is not required to offer another comment period.

The EPA approves North Carolina's 2015 Network Plan. The Network Plan requested the permanent discontinuation of fifteen regulatory monitors: nine fine particulate monitors, five ozone monitors, and one carbon monoxide monitor. The EPA approves the discontinuation of all of the proposed monitors in the Network Plan. Details regarding the EPA's review of the Network Plan are provided in the enclosed comments.

Thank you for working with us to monitor air pollution and promote healthy air quality in North Carolina and the nation. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,

A handwritten signature in blue ink, appearing to read "Beverly H. Banister".

Beverly H. Banister  
Director  
Air, Pesticides and Toxics Management Division

Enclosure

cc: Mr. Donnie Redmond  
Ambient Monitoring Section Chief, NC-DAQ

Ms. Leslie Rhodes, Director  
Mecklenburg County Land Use and  
Environmental Services Agency

Mr. William M. Barnette, Director  
Forsyth County Environmental Affairs Department

Mr. David Brigman, Director  
Western North Carolina Regional Air Quality Agency

## 2015 State of North Carolina Ambient Air Monitoring Network Plan The U. S. EPA Region 4 Comments and Recommendations

This document contains the U. S. EPA comments and recommendations on the state of North Carolina's 2015 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements are listed for ozone (O<sub>3</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and lead (Pb).

The minimum monitoring requirements are based on core based statistical area (CBSA) boundaries as defined by the U.S. Office of Management and Budget (OMB), July 1, 2014, population estimates from the U.S. Census Bureau, and historical ambient air monitoring data. Minimum monitoring requirements for O<sub>3</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>, only apply to metropolitan statistical areas (MSAs), which are a subset of CBSAs. OMB currently defines 17 MSAs in the state of North Carolina. On February 1, 2013, OMB redefined the CBSA boundaries based on 2010 census data. In North Carolina, there are two recently defined MSA's: Myrtle Beach-Conway-North Myrtle Beach, SC-NC and New Bern, NC that were previously defined as micropolitan CBSAs. Additionally, the composition of some MSA populations changed due to the inclusion and/or exclusion of counties from OMB's February 2013 MSA delineations. The July 1, 2014 population estimates from the U.S. Census Bureau are shown in Table 1.

**Table 1: Metropolitan Statistical Areas and Populations**

<b>MSA Name</b>	<b>2014 Population</b>
Charlotte-Concord-Gastonia, NC-SC	2,380,314
Virginia Beach-Norfolk-Newport News, VA-NC	1,716,624
Raleigh, NC	1,242,974
Greensboro-High Point, NC	746,593
Winston-Salem, NC	655,015
Durham-Chapel Hill, NC	542,710
Asheville, NC	442,316
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	417,668
Fayetteville, NC	377,939
Hickory-Lenoir-Morganton, NC	362,896
Wilmington, NC	272,548
Jacksonville, NC	187,589
Greenville, NC	175,354
Burlington, NC	155,792
Rocky Mount, NC	149,290
New Bern, NC	134,760
Goldsboro, NC	124,456

### Monitoring Network Changes Proposed by NC-DAQ

The NC-DAQ received internal comments on the Network Plan as well as from six commenters including the Southern Environmental Law Center on behalf of the North Carolina League of Conservation Voters, the Sierra Club, the Southern Alliance for Clean Energy, and the Western North

Carolina Alliance. The NC-DAQ provided a response to the comments as part of its final Network Plan. The public comments expressed concern over the numerous monitor shutdown requests in the Network Plan and the number of monitor shutdowns in recent years. The EPA conducted its own analysis of North Carolina’s ambient air monitoring network including historical design values (DVs), annual PM<sub>2.5</sub> and O<sub>3</sub> trends, nearby monitor correlations, meteorology, and spatial coverage when evaluating the requests to discontinue the requested regulatory monitors.

Since 2012, PM<sub>2.5</sub> concentrations in North Carolina have decreased. Because the PM<sub>2.5</sub> levels have remained lower for the last four years, the EPA is approving a significantly reduced PM<sub>2.5</sub> monitoring network. Many of the PM<sub>2.5</sub> monitors to be shutdown are not located in CBSAs and were sited to measure general background or regional transport. Also, the EPA is approving the shutdown of several monitors located in CBSAs where the network exceeds the minimum requirements. These “over minimum requirement” monitors that are approved for shutdown read similarly to other nearby monitors or have consistently recorded concentrations lower than nearby monitors.

Ozone levels across the state have also been lower in the last three years. The EPA is approving reductions in the O<sub>3</sub> ambient air monitoring network for monitors that have consistently been below the standard and consistently measured lower concentrations than nearby monitors.

Further rationale for the EPA’s approval of specific network changes can be found below in the pollutant sections of this document. Monitors proposed for discontinuation or relocation and the EPA’s determination are summarized in Table 2.

**Table 2: Monitors Proposed for Discontinuation**

AQS ID	Site Name	Pollutant	Type	Comments
37-119-1005	Arrowood	O <sub>3</sub>	SLAMS	Approved
37-069-0001	Franklinton	O <sub>3</sub>	SLAMS	Approved
37-183-0016	Fuquay	O <sub>3</sub>	SLAMS	Approved
37-037-0004	Pittsboro	O <sub>3</sub>	SLAMS	Approved
37-067-0028	Shiloh Church	O <sub>3</sub>	SLAMS	Approved
37-189-0003	Boone	PM <sub>2.5</sub>	SLAMS	Approved
37-033-0001	Cherry Grove	PM <sub>2.5</sub>	SLAMS	Approved
37-191-0005	Dillard School	PM <sub>2.5</sub>	SLAMS	Approved in 2014 Network Plan
37-117-0001	Jamesville	PM <sub>2.5</sub>	SLAMS	Approved
37-061-0002	Kenansville	PM <sub>2.5</sub>	SLAMS	Approved
37-111-0004	Marion	PM <sub>2.5</sub>	SLAMS	Approved
37-159-0021	Rockwell	PM <sub>2.5</sub>	SLAMS	Approved
37-087-0012	Waynesville	PM <sub>2.5</sub>	SLAMS	Approved
37-067-0030	Clemmons Middle	PM <sub>2.5</sub>	SLAMS	Approved
37-067-0023	Peter’s Creek	CO	SLAMS	Approved

On October 23, 2015, NC-DAQ submitted a letter to the EPA to move the Pitt County Ag Center monitoring site (AQS ID 37-147-0006) a distance of 350 meters to a location on the same property. The EPA reviewed this request and approves the relocation of the Pitt County Ag Center Site (see Table 3).

**Table 3: Monitors Proposed for Relocation/Startup**

AQS ID	Site Name	Pollutant	Type	Comments
37-147-0006	Pitt Ag. Center	PM <sub>2.5</sub> and O <sub>3</sub>	SLAMS	Approved – relocation of monitoring site ~350 meters from existing site

The EPA reviewed these requests for monitor discontinuation or relocation and determined that they meet the requirements of 40 CFR §58.14(c) for monitor discontinuation and relocation. The minimum monitoring requirements for PM<sub>2.5</sub>, CO, and O<sub>3</sub> found in 40 CFR Part 58, Appendix D will continue to be met for the respective CBSAs, if the monitors are located in CBSAs, after the monitors are discontinued or relocated.

#### **Air Quality Index (AQI) Reporting 40 CFR §58.50**

AQI reporting is required in MSAs with populations over 350,000. There are 10 MSAs in the state required to report an AQI: Charlotte-Gastonia-Concord, Virginia Beach-Norfolk-Newport News, Raleigh-Cary, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory-Lenoir-Morganton, Fayetteville, and Wilmington. NC-DAQ meets these AQI reporting requirements.

#### **National Core (NCore) Monitoring Network 40 CFR Part 58, Appendix D, 3.0**

Ambient air monitoring network criteria for NCore sites are found in 40 CFR Part 58, Appendix D, 3. NC-DAQ lists two NCore sites in the Network Plan. The first site (AQS ID 37-183-0014) is located at the East Millbrook Middle School site in Raleigh, NC and is operated by NC-DAQ. The second site (AQS ID 37-119-0041) is located at the Garinger site in Charlotte, NC and is operated by the Mecklenburg County Air Quality (MCAQ) agency. The EPA approval of these sites was granted on October 30, 2009. The 2015 Network Plan meets the minimum monitoring requirements for NCore sites.

#### **Minimum O<sub>3</sub> Monitoring Requirements 40 CFR Part 58, Appendix D, Table D-2**

The state of North Carolina’s proposed O<sub>3</sub> monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-2 for all MSAs, except the Myrtle Beach-Conway-North Myrtle Beach MSA (see discussion below).

OMB changed the composition of several MSA boundaries in February of 2013, including adding Brunswick County, North Carolina to the Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA. This change has triggered the requirement to establish an O<sub>3</sub> monitor in this MSA. NC-DAQ provided a memorandum of agreement with South Carolina Department of Health and Environmental Control (SC DHEC) to collectively meet the O<sub>3</sub> monitoring requirements for this MSA. The SC DHEC 2015 Annual Monitoring Network Plan identifies a location for a new O<sub>3</sub> monitor to meet this requirement. However, SC DHEC did not provide adequate and sufficient information for the EPA to approve its proposed location. The EPA has requested that SC DHEC provide an addendum to its Network Plan with additional information on the proposed O<sub>3</sub> monitoring location in the Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA.

The Network Plan also proposes to shutdown five O<sub>3</sub> monitors: Franklinton (AQS ID 37-069-0001), Pittsboro (AQS ID 37-037-0004), Fuquay (AQS ID 37-183-0016), Arrowood (AQS ID 37-119-1005), and Shiloh Church (AQS ID 37-067-0028) (listed in Table 2 above).

The EPA approves the shutdown of the Pittsboro, Franklinton, and Fuquay monitors in the Raleigh and Durham areas of North Carolina. The EPA looked at historical comparisons of O<sub>3</sub> concentrations, meteorology, and the spatial distribution of O<sub>3</sub> monitors in the Durham-Chapel Hill and Raleigh MSAs to make this determination. O<sub>3</sub> levels have been below the new standard of 70 ppb for the last three years (2013, 2014, and 2015) for this entire region. The Pittsboro monitor is upwind of the Durham MSA and has read consistently lower than the other O<sub>3</sub> monitors in the MSA. The Franklinton O<sub>3</sub> monitor is located downwind of the Raleigh urban core, however concentrations at the Franklinton monitor have consistently been similar or lower than the O<sub>3</sub> concentrations measured at the Millbrook monitor in Raleigh. The Fuquay monitor is the upwind monitor for the Raleigh MSA. This monitor has consistently measured O<sub>3</sub> concentrations similar to and slightly lower than the Millbrook O<sub>3</sub> monitor. When these monitors are shutdown, the Durham-Chapel Hill and the Raleigh MSAs will still meet the minimum O<sub>3</sub> monitoring requirements found in 40 CFR Part 58, Appendix D.

The EPA also approves the shutdown of the Arrowood O<sub>3</sub> monitor, operated by the MCAQ. In 2014, the property for the Arrowood site was sold and the MCAQ's lease was not renewed. The EPA previously approved the temporary shutdown of the Arrowood O<sub>3</sub> monitor for the 2015 O<sub>3</sub> season, while the MCAQ evaluated whether to replace/relocate the Arrowood O<sub>3</sub> monitor. The MCAQ ultimately decided not to replace this monitor and proposed the permanent shutdown of Arrowood instead of relocating the monitor to a nearby area. The EPA reviewed meteorology and historical O<sub>3</sub> concentrations in the Charlotte area. The Arrowood site is typically upwind of the Charlotte urban area and has recorded lower O<sub>3</sub> values than the other O<sub>3</sub> monitors in the area. Without the Arrowood O<sub>3</sub> monitor operating, the Charlotte-Concord-Gastonia MSA still meets the minimum O<sub>3</sub> monitoring requirements found in 40 CFR Part 58, Appendix D.

The EPA also approves the permanent shutdown of the Shiloh Church O<sub>3</sub> monitor, operated by the Forsyth County Office of Environmental Assistance and Protection (OEAP). This monitor has consistently measured the lowest concentrations in the Winston-Salem MSA. When this monitor is shutdown, the Winston-Salem MSA will still meet the minimum O<sub>3</sub> monitoring requirements found in 40 CFR Part 58, Appendix D.

#### **CO Monitoring Requirements 40 CFR Part 58, Appendix D, 4.2**

Ambient air monitoring network design criteria for CO are found in 40 CFR Part 58, Appendix D, 4.2. CBSAs with populations over one million are required to operate one CO monitor collocated with a near-road NO<sub>2</sub> site. For both the Raleigh CBSA and the Charlotte CBSA, CO monitors are required to operate by January 1, 2017 as indicated in 40 CFR §58.13(e)(2). This requirement will apply to the Triple Oak near-road site (AQS ID 37-183-0021) in the Raleigh CBSA and the Remount Road near-road site (AQS ID 37-119-0045) in the Charlotte CBSA.

The Forsyth County OEAP requested in an appendix to the Network Plan to shutdown the Peter's Creek CO monitoring site (AQS ID 37-067-0023). This monitor has been required to operate as part of a CO maintenance plan, which expired November 7, 2015. The highest DV measured at the Peter's Creek site

in the last five year was 26% of the NAAQS. This monitor meets the requirements of 40 CFR §58.14(c)(1) for shutdown eligibility and the CO monitoring requirements found in 40 CFR Part 58, Appendix D will continue to be met in the Winston-Salem CBSA. EPA approves the shutdown of the Peter's Creek CO monitor, once it is no longer required by the maintenance plan.

#### **NO<sub>2</sub> Monitoring Requirements 40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for NO<sub>2</sub> are found in 40 CFR Part 58, Appendix D, 4.3. There are three types of required NO<sub>2</sub> monitoring: near-road, area-wide, and Regional Administrator required. These types of NO<sub>2</sub> monitoring are described in Sections 4.3.2, 4.3.3, and 4.3.4, respectively.

The EPA previously approved the Triple Oak site (AQS ID 37-183-0021) and the Remount Road site (AQS ID 37-119-0045) in fulfillment of the near-road NO<sub>2</sub> requirements for the Raleigh CBSA and the Charlotte-Concord-Gastonia CBSA.

The Greensboro-High Point, NC; Winston-Salem, NC; and Durham-Chapel Hill, NC CBSAs are required to have near-road NO<sub>2</sub> monitoring by January 1, 2017. A new NO<sub>2</sub> monitoring rule is expected to be promulgated in 2016. The new rule may change the NO<sub>2</sub> near-road monitoring requirements for CBSAs with populations between 500,000 and 1,000,000 people, such as the Greensboro-High Point; Winston-Salem; and Durham-Chapel Hill CBSAs.

The EPA previously approved the selection of the Garinger (AQS ID 37-119-0041) and Millbrook (AQS ID 37-183-0014) sites in fulfillment of the area-wide NO<sub>2</sub> monitoring requirement for the Charlotte-Concord-Gastonia and Raleigh CBSAs.

The EPA also previously selected the Hattie Avenue site (AQS ID 37-067-0022) operated by Forsyth County OEAP as a location for a Regional Administrator required NO<sub>2</sub> monitor to help protect susceptible and vulnerable populations. The full list of NO<sub>2</sub> monitors identified by the EPA's Regional Administrators can be found on the EPA's website at <http://www.the EPA.gov/ttnamti1/svpop.html>.

#### **SO<sub>2</sub> Monitoring Requirements 40 CFR Part 58, Appendix D, 4.4**

Ambient air monitoring network design criteria for SO<sub>2</sub> are found in 40 CFR Part 58, Appendix D, 4.4. This section requires that "The population weighted emissions index (PWEI) shall be calculated by states for each core based statistical area (CBSA)." As a result, the SO<sub>2</sub> monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within the boundaries of the parent CBSA and is one of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO<sub>2</sub> monitor at an NC Core station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, 4.4.

Table 4 shows the location on required SO<sub>2</sub> monitors based on the 2012 PWEI. Existing SO<sub>2</sub> monitoring sites described in the Network Plan meet the minimum requirements of 40 CFR Part 58. The NC-DAQ operates regulatory SO<sub>2</sub> monitors in the Charlotte-Gastonia-Concord, NC-SC; Durham, NC; and Wilmington, NC CBSAs to meet the PWEI requirements. The Virginia Department of Environmental Quality operates a regulatory SO<sub>2</sub> monitor in the Virginia Beach-Norfolk-Newport News, VA-NC

CBSA. The EPA recommends that North Carolina update its MSA agreement with Virginia to include sharing the SO<sub>2</sub> minimum monitoring requirements for the Virginia Beach-Norfolk CBSA and include this update in its 2016 Network Plan.

**Table 4: PWEI and SO<sub>2</sub> Required Monitors in North Carolina**

CBSA Name	July 2012 PWEI Values	July 2012 PWEI Required Monitors
Virginia Beach-Norfolk-Newport News, VA-NC	78,540	1
Charlotte-Gastonia-Concord, NC-SC	34,426	1
Durham, NC	16,885	1
Wilmington, NC	10,045	1

The EPA finalized the SO<sub>2</sub> Data Requirements Rule (DRR) on August 10, 2015. This rule will require characterization of the air quality near sources with SO<sub>2</sub> emissions greater than 2,000 tons per year (tpy) by conducting ambient air monitoring or modeling. We encourage your agency to begin having conversations with affected sources in the state of North Carolina to determine an agreed upon approach for meeting the DRR requirements. By January 15, 2016, NC-DAQ must submit a final list of sources to the EPA Region 4 identifying the sources in the state around which SO<sub>2</sub> air quality must be characterized. For sources that NC-DAQ decides to evaluate using ambient air monitoring, new site proposals must be included in the 2016 Network Plan. The location of these monitoring sites should be selected using the process outlined in the SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document<sup>1</sup>.

The Network Plan requests a waiver of the requirement for a PWEI SO<sub>2</sub> monitor in the Asheville CBSA, due to an increase in Asheville’s population. The PWEI calculated by NC-DAQ is 5,074. Forty CFR Part 58, Appendix D, 4.4 states that “For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO<sub>2</sub> monitor is required within that CBSA.” The EPA’s previous calculations show the Asheville PWEI to be below the PWEI threshold for requiring an SO<sub>2</sub> monitor. NC-DAQ may elect to conduct SO<sub>2</sub> monitoring in the Asheville CBSA beginning in 2017 under the DRR. The EPA will work with NC-DAQ to determine the appropriate requirements for this CBSA. The EPA grants a waiver of this SO<sub>2</sub> monitoring requirement for 2016, so that the NC-DAQ, the Western North Carolina Regional Air Quality Agency (WNCRAQA), and the EPA can determine the appropriate requirements for this CBSA. NC-DAQ should address SO<sub>2</sub> monitoring requirements for the Asheville CBSA in the 2016 Network Plan

**Pb Monitoring Requirements**  
**40 CFR Part 58, Appendix D, 4.5**

40 CFR Part 58, Appendix D, 4.5 requires that “At a minimum, there must be one source-oriented SLAMS [state and local air monitoring station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and

<sup>1</sup> SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document. U.S. EPA Office of Air Quality Planning and Standards Air Quality Assessment Division, Draft December 2013.  
<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf>

from each airport which emits 1.0 or more tons per year...” Section 4.5(a)(ii) provides the following provisions for a waiver of the Pb monitoring requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

In its approval of the state’s 2011 Network Plan, pursuant the provisions of the above section, the EPA granted waivers of the source-oriented ambient air monitoring requirements at two sources: Blue Ridge Paper Products, Inc. in Canton, NC and Saint Gobain Containers in Wilson, NC. The waivers must be renewed every five years as part of the network assessment required under 40 CFR §58.10(d).

The Saint Gobain Containers facility is the only facility in North Carolina with 2011 NEI Pb emissions over 0.5 tpy. This facility is estimated to emit 0.53 tpy. The 2011 modeling of this facility used Pb emissions of 1.3 tpy. The EPA believes that the previously submitted modeling is sufficiently conservative and is approving the renewal of the source-oriented ambient air Pb monitoring requirements at Saint Gobain Containers in Wilson, NC for five years, until 2020.

Based on the 2011 NEI, Blue Ridge Paper Products, Inc. in Canton, NC emitted less than 0.5 tpy of Pb. Thus, Blue Ridge Paper Products is not subject to the Pb monitoring requirements. A waiver of the source-oriented ambient air Pb monitoring requirements is no longer required for this facility. If in the future this facility is estimated to emit more than 0.5 tpy, then NC-DAQ will need to submit a new waiver request or monitor for Pb near the facility. At this time, no other facilities in North Carolina emit more than 0.5 tpy of Pb and are subject to required Pb source-oriented monitoring.

Forty CFR Part 58, Appendix D, 3(b) requires that “NCORE sites in CBSAs with a population of 500,000 people (as determined in the latest census) or greater shall also measure Pb either as Pb-TSP or Pb-PM<sub>10</sub>.” This monitoring was required to begin December 27, 2011. The Network Plan indicates that Pb-PM<sub>10</sub> sampling is ongoing at the Charlotte NCORE site (AQS ID 37-119-0041) and the Raleigh NCORE site (AQS ID 37-183-0014). As a result, the Pb monitoring network described in the Network Plan meets the design criteria of 40 CFR Part 58.

#### **Minimum PM<sub>10</sub> Monitoring Requirements**

##### **40 CFR Part 58, Appendix A, 3.3.1**

##### **40 CFR Part 58, Appendix D, Table D-4**

The state of North Carolina’s current PM<sub>10</sub> primary monitoring network meets the minimum requirements for all areas. All PM<sub>10</sub> collocation requirements for manual methods found in 40 CFR Part 58, Appendix A, 3.3.1 are being met. These include the requirement that 15 percent of each network of manual PM<sub>10</sub> methods (at least one site) must be collocated. The Network Plan requested a waiver of the requirements to operate a second PM<sub>10</sub> monitor in Raleigh. Since PM<sub>10</sub> levels have been significantly lower than the NAAQS for the last decade, the EPA grants a waiver of the requirement for a second PM<sub>10</sub> monitor in the Raleigh MSA.

**Minimum PM<sub>2.5</sub> Monitoring Requirements**  
**40 CFR Part 58, Appendix A, 3.2.5**  
**40 CFR Part 58, Appendix D, Table D-5**

The state proposed to shutdown nine PM<sub>2.5</sub> monitors. These monitors are listed in the Table 5 below.

**Table 5: PM<sub>2.5</sub> Monitors Proposed for Discontinuation**

AQS ID	Site Name	County	MSA
37-033-0001	Cherry Grove	Caswell	Not in a MSA
37-061-0002	Kenansville	Duplin	Not in a MSA
37-087-0012	Waynesville	Haywood	Asheville, NC
37-111-0004	Marion	McDowell	Not in a MSA
37-117-0001	Jamesville	Martin	Not in a MSA
37-159-0021	Rockwell	Rowan	Charlotte-Concord-Gastonia, NC-SC
37-189-0003	Boone	Watauga	Boone, NC
37-191-0005	Dillard School	Wayne	Goldboro, NC
37-067-0030	Clemmons	Forsyth	Winston-Salem, NC

The EPA reviewed historical DVs, annual PM<sub>2.5</sub> trends, nearby monitor correlations, meteorology, and spatial coverage when evaluating the requests to shutdown these monitors. The PM<sub>2.5</sub> levels have continued to remain low for the last four years, thus allowing the EPA to approve a reduced PM<sub>2.5</sub> monitoring network in North Carolina.

The Network Plan demonstrates that Cherry Grove, Kenansville, Jamesville, and Boone PM<sub>2.5</sub> sites meet EPA's guidance for determining shutdown eligibility and the requirements of 40 CFR 58.14(c)(1). Thus, EPA approves the discontinuation of these four monitors.

The Rockwell monitor is downwind of Charlotte, however it has consistently recorded lower PM<sub>2.5</sub> concentrations than the other monitors in the Charlotte-Concord-Gastonia MSA. Additionally, the Rockwell monitor has measured PM<sub>2.5</sub> annual average concentrations about 9 µg/m<sup>3</sup> since 2012. This is 3 µg/m<sup>3</sup> below the annual standard. With the shutdown of the Rockwell monitor, the Charlotte CBSA will continue to meet the minimum monitoring requirements in 40 CFR Part 58, Appendix D. The EPA approves the discontinuation of the Rockwell PM<sub>2.5</sub> monitor.

The Marion PM<sub>2.5</sub> monitor is not in a MSA with minimum monitoring requirements and has measured annual average PM<sub>2.5</sub> values well below the annual standard for the last five years. The EPA approves the discontinuation of PM<sub>2.5</sub> measurement at the Marion site. Because the EPA previously approved the shutdown of the Dillard PM<sub>2.5</sub> monitor, no additional approval is needed.

The Waynesville PM<sub>2.5</sub> monitor operated by the NC-DAQ is located in Haywood County in the Asheville MSA. The WNCRAQA operates PM<sub>2.5</sub> monitors at the Board of Education site (AQS ID 37-087-0012) in Buncombe County, NC, also in the Asheville MSA. The Waynesville monitor has consistently measured both higher annual average PM<sub>2.5</sub> concentrations and daily average concentrations than the Board of Education site. The daily average measurements at each site do not correlate well, indicating that they measure different airsheds, and different local air pollution sources and events. This might be expected since the Waynesville and Board of Education sites are located in separate valleys of the regional mountainous terrain.

The most recent DV for the Waynesville site is 8.7  $\mu\text{g}/\text{m}^3$ . Previously, the Asheville MSA had been required to operate one  $\text{PM}_{2.5}$  monitor (per 40 CFR Part 58, Appendix D, Table D-5), but now it does not have a minimum monitoring requirement since the most recent DV is less than 85% of the NAAQS and the MSA's population is under 500,000 people. The Waynesville  $\text{PM}_{2.5}$  DV has been less than 85% of the 2012  $\text{PM}_{2.5}$  NAAQS (12  $\mu\text{g}/\text{m}^3$ ) since 2011. The EPA approves the shutdown of the Waynesville monitor. However, the EPA recommends that NC-DAQ consider operating a  $\text{PM}_{2.5}$  monitor in Waynesville, even if it is non-regulatory.

The EPA compared  $\text{PM}_{2.5}$  concentrations at the Clemmons site operated by the Forsyth County OEAP, with the nearby Hattie Avenue  $\text{PM}_{2.5}$  site, also operated by the Forsyth County OEAP. The measurements at the two sites correlate well, indicating that they measure very similar airsheds. Also, the Clemmons  $\text{PM}_{2.5}$  site has typically measured slightly lower  $\text{PM}_{2.5}$  daily average concentrations than the Hattie Avenue  $\text{PM}_{2.5}$  monitor measured. Thus, the EPA approves shutting down the  $\text{PM}_{2.5}$  monitoring at the Clemmons site.

Forty CFR Part 58, Appendix D, Table D-5 requires MSAs with over one million people, like Raleigh, to operate three  $\text{PM}_{2.5}$  monitors, if the most recent DV is greater than or equal to 85% of the NAAQS. The 2012-2014  $\text{PM}_{2.5}$  DV at the Millbrook site is 86% of the NAAQS. There are currently two  $\text{PM}_{2.5}$  monitoring sites operating in the Raleigh MSA: Millbrook (AQS ID 37-183-0014) and West Johnson Co. (AQS ID 37-101-0002). By 2017, the NC-DAQ is required to operate a  $\text{PM}_{2.5}$  monitor at the Triple Oak (AQS ID 37-183-0021) near-road site (see the next section). Once operating, the  $\text{PM}_{2.5}$  monitor at the Triple Oak site will be the third  $\text{PM}_{2.5}$  site in the Raleigh MSA and the MSA will meet the minimum monitoring requirements found in 40 CFR Part 58, Appendix D.

The state of North Carolina's current  $\text{PM}_{2.5}$  monitoring network meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs, except the Raleigh MSA. Manual  $\text{PM}_{2.5}$  collocation requirements are found in 40 CFR Part 58, Appendix A, 3.2.5. These include the requirement that 15 percent of each network of manual  $\text{PM}_{2.5}$  methods (at least one site) must be collocated. The manual collocation requirements for  $\text{PM}_{2.5}$  are currently being met in the Network Plan.

#### **$\text{PM}_{2.5}$ Near-road Monitoring Requirements** **40 CFR Part 58, Appendix D, 4.7.1(b)(2)**

Regulatory requirements in 40 CFR Part 58, Appendix D, Section 4.7.1(b)(2) require that "CBSAs with a population of 1,000,000 or more persons, at least one  $\text{PM}_{2.5}$  monitor is to be collocated at a near-road  $\text{NO}_2$  station."  $\text{PM}_{2.5}$  near-road monitoring is required in the Charlotte-Concord-Gastonia, NC-SC and Raleigh, NC CBSAs, by January 1, 2017.

#### **$\text{PM}_{2.5}$ Continuous Monitoring Requirements** **40 CFR Part 58, Appendix D, 4.7.2**

Regulatory requirements for continuous  $\text{PM}_{2.5}$  monitoring require that "...State, or where appropriate, local agencies must operate continuous  $\text{PM}_{2.5}$  analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [federal reference method/federal equivalent method/approved regional method] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies." These minimum continuous  $\text{PM}_{2.5}$  monitoring requirements are met in

all MSAs in the state. Also, the continuous PM<sub>2.5</sub> collocation requirements are met in all MSAs. Therefore, the continuous PM<sub>2.5</sub> monitoring network described in the 2015 Network Plan meets all of the design criteria of 40 CFR Part 58.

#### **PM<sub>2.5</sub> Continuous Federal Equivalent Methods 40 CFR § 58.10(e)**

EPA regulations contain provisions for handling data collected using continuous PM<sub>2.5</sub> FEMs. These procedures are found at 40 CFR § 58.10(e). If an agency can demonstrate that the FEM data are not of sufficient comparability to a collocated FRM, then the monitoring agency may request that the FEM data not be used in comparison to the NAAQS.

In response to the 2014 Network Plan, the EPA approved five FEM monitors which are not considered comparable to the PM<sub>2.5</sub> NAAQS at the following sites: Kenansville (AQS ID 37-061-0002); Jamesville (AQS ID 37-117-0001); Castle Hayne (AQS ID 37-129-0002); Dillard School (AQS ID 37-191-0005); and Blackstone (AQS ID 37-105-0002). NC-DAQ currently reports the data from these monitors to the AQS parameter code 88502.

#### **PM<sub>2.5</sub> Background and Transport Sites 40 CFR Part 58, Appendix D, 4.7.3**

Forty CFR Part 58, Appendix D, 4.7.3 requires that “each State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor for regional transport.” The Network Plan identifies two PM<sub>2.5</sub> sites as general background sites: Mendenhall (AQS ID 37-081-0013), and Candor (AQS ID 37-123-0001). The Network Plan identifies the Bryson City site (AQS ID 37-173-0002) as a regional transport site for PM<sub>2.5</sub>. Therefore, the NC-DAQ has satisfied the requirements of 40 CFR Part 58 for background and transport sites.

#### **PM<sub>2.5</sub> Chemical Speciation Network (CSN) 40 CFR Part 58, Appendix D, 4.7.4**

The EPA conducted an assessment of the PM<sub>2.5</sub> CSN in an effort to optimize the network and to create a network that is sustainable going forward. As a result of this assessment, the EPA has defunded a number of monitoring sites, eliminated the CSN PM<sub>2.5</sub> mass measurement, reduced the frequency of carbon blanks, reduced sample frequency at some monitoring sites, and reduced the number of the packs in shipment during the cooler months of the year.

The EPA defunded four CSN monitors at sites in North Carolina: Rockwell (AQS ID 37-159-0021); Lexington Water Tower (AQS ID 37-057-0002); Asheville’s Board of Education (AQS ID 37-021-0034); and Hickory Water Tower (AQS ID 37-035-0004). CSN monitors at these sites were shutdown on December 31, 2014. EPA continues to fund three CSN monitors in North Carolina: Garinger (AQS ID 37-119-0041), operated by MCAQ; Hattie Avenue (AQS ID 37-067-0022), operated by Forsyth County OEAP; and Millbrook (AQS ID 37-183-0014), operated by NC-DAQ.

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**Photochemical Assessment Monitoring Station (PAMS)  
40 CFR Part 58, Appendix D, 5.0**

With the recent passage of a new ozone NAAQS on October 1, 2015, the EPA also finalized changes to the PAMS program. By June 1, 2019, the NCore sites in Raleigh and Charlotte will be required to implement PAMS monitoring. The EPA recognizes there are several implementation challenges to work through and we commit to working closely with NC-DAQ and MCAQ to minimize the burden of implementing this new monitoring program. At this time, however, the PAMS requirement is being met in the state of North Carolina.

**Appendix P. Monitoring Agreement for the Charlotte-Concord-Gastonia  
Metropolitan Statistical Area**

**MEMORANDUM OF AGREEMENT**

**ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR**

**THE CHARLOTTE-CONCORD-GASTONIA**

**METROPOLITAN STATISTICAL AREA (MSA)**

July 1, 2016

Participating Agencies:

North Carolina  
Department of Environmental Quality (NCDEQ)  
Division of Air Quality (NCDAQ)

South Carolina  
Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

Mecklenburg County, North Carolina  
Land Use and Environmental Services Agency  
Air Quality (MCAQ)

**RECEIVED**  
JUL 01 2016  
BUREAU OF AIR QUALITY

**I. PURPOSE/OBJECTIVES/GOALS**

The purpose of this Memorandum of Agreement (MOA) is to establish the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement among NCDAQ, SCDHEC, and the MCAQ (collectively referred to as the “affected agencies”) to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for criteria pollutants deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will renew the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Charlotte-Concord-Gastonia MSA as required by 40 CFR 58 Appendix D, Section 2(e).

**II. BACKGROUND**

The Charlotte-Concord-Gastonia MSA consists of

Cabarrus County, NC  
Gaston County, NC  
Iredell County, NC  
Lincoln County, NC  
Mecklenburg County, NC  
Rowan County, NC  
Union County, NC  
Chester County, SC  
Lancaster County, SC

York County, SC

NCDAQ has jurisdiction over Cabarrus, Gaston, Iredell, Lincoln, Rowan, and Union Counties; SCDHEC has jurisdiction over Chester, Lancaster, and York Counties; MCAQ has jurisdiction over Mecklenburg County.

The NCDAQ, SCDHEC, and MCAQ are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Charlotte-Concord-Gastonia MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA.

40 CFR 58 Appendix D, Section 2 (e) states (in part):

“... The EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates monitoring with the other air pollution control agencies within the MSA.

### III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDAQ, SCDHEC, and MCAQ (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA; as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all affected agencies. The minimum air quality monitoring requirements for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring responsibilities and requirements to achieve an effective network design regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agencies. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected party shall inform the others via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to

natural disaster, or similar occurrences that result in extended change (greater than one quarter) or permanent change in the monitoring network. At least once a year in the second quarter or before June 15<sup>th</sup>, each agency shall make available to the other agency a copy of its proposed monitoring plan for its jurisdiction with the MSA for the next year.

- Each party reserves the right to revoke or terminate this MOA at any time for any reason by giving thirty (30) days written notice prior to the date of termination.

#### IV. LIMITATIONS

A. All commitments made in this MOA are subject to the availability of funds and each party's budget priorities. Nothing in this MOA, in and of itself, obligates NCDAQ, SCDHEC, or MCAQ to expend funds or to enter into any contract, assistance agreement, interagency agreement, or other financial obligation.

B. This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements what will be effected in writing by representatives of the parties.

C. Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against NCDAQ, SCDHEC, or MCAQ, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDAQ, SCDHEC, or MCAQ.

#### V. PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY

No proprietary information or intellectual property is anticipated to arise out of this MOA.

#### VI. POINTS OF CONTACT

The following individuals are designated points of contact for the MOA:

NCDEQ DAQ: Joette Steger  
NC DENR Division of Air Quality  
1641 Mail Service Center  
Raleigh, NC 27699-1641

[joette.steger@ncdenr.gov](mailto:joette.steger@ncdenr.gov)  
Voice/fax: 919-707-8449

SCDHEC: Scott Reynolds  
SCDHEC Bureau of Environmental Health Services  
2600 Bull Street  
Columbia, SC 29201

[reynolds@dhec.sc.gov](mailto:reynolds@dhec.sc.gov)  
Voice: 803-896-0902

MCAQ: Jeff Francis  
Mecklenburg County Land Use and Environmental Services Agency –  
Air Quality  
2145 Suttle Avenue  
Charlotte, NC 28208-5237

[Jeff.Francis@mecklenburgcountync.gov](mailto:Jeff.Francis@mecklenburgcountync.gov)  
Phone 704-336-5430  
Fax 704-336-4391

In the event that a point of contact needs to be changed, notification may be made via email to the other parties.

#### VII. MODIFICATION/DURATION/TERMINATION

This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of all parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked or terminated by an affected party at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

#### VIII. REFERENCE

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements"

#### IX. APPROVALS

North Carolina Department of Environmental Quality  
Division of Air Quality (NCDAQ)

BY: Shirley C. Helman  
TITLE: Director, Division of Air Quality  
DATE: 6/27/2016

South Carolina Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

BY: Richard Dyer  
TITLE: Chief, Bureau of Air Quality

DATE: 07/05/2016

Mecklenburg County Land Use and Environmental Services Agency – Air Quality (MCAQ)  
Mecklenburg County Air Quality

BY: Kevin H. Phocan

TITLE: Director, Air Quality

DATE: 6/29/2014



Catherine E. Heigel, Director

*Promoting and protecting the health of the public and the environment*

**MEMORANDUM**

July 5, 2016

**Subject:** Change of Point of Contact for South Carolina

Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA)

**From:** Rhonda B. Thompson, SC DHEC  
Chief, Bureau of Air Quality

As of July 5, 2016, the Point of Contact for South Carolina will be Micheal Mattocks, instead of Scott Reynolds.

Micheal's contact information is below:

Micheal Mattocks  
SC DHEC – Bureau of Environmental Health Services  
2600 Bull Street  
Columbia, SC 29201  
(803)896-0856  
[mattock@dhec.sc.gov](mailto:mattock@dhec.sc.gov)

## Appendix Q. Public Notice of Availability of Network Plan

Public notice of availability of the network plan was provided on the North Carolina Division of Air Quality website from May 26 through June 26, 2017. In addition, notification was sent out via public e-mail distribution lists maintained for permitting, rules, ambient monitoring and air toxics.

**From:** Burleson, Joelle <joelle.burleson@ncdenr.gov>  
**Sent:** Friday, May 26, 2017 4:49 PM  
**To:** NCDENR.DENR.DAQ.Managers\_Supervisors  
**Subject:** NC DAQ's Annual Ambient Monitoring Network Plan Update Available for Public Comment  
**Attachments:** ATT00001.txt

*Note: This message has been formatted such that replies will go to, Joette Steger in the Ambient Monitoring Section.*

Hello Air Quality Stakeholders:

NC DAQ's annual monitoring network plan update is posted on the website and is open for public comment through June 26, 2017. Below are links to the public notice and the summary page.

<https://deq.nc.gov/2017-2018-annual-monitoring-network-plan>

<http://deq.nc.gov/about/divisions/air-quality/air-quality-data/annual-network-plan/2017-2018-annual-monitoring-network-plan-for-north-carolina-air-quality>

If you have any questions, please contact John Evans at 919 707 8474 or [John.c.evans@ncdenr.gov](mailto:John.c.evans@ncdenr.gov) or Joette Steger at 919 707 8449 or [Joette.steger@ncdenr.gov](mailto:Joette.steger@ncdenr.gov)

Thanks,

**Joette Steger**  
Environmental Program Supervisor  
Division of Air Quality, Ambient Monitoring Section  
Department of Environmental Quality

919 707 8449 office  
919 707 8449 fax  
[Joette.Steger@ncdenr.gov](mailto:Joette.Steger@ncdenr.gov)

217 W. Jones Street  
1641 Mail Service Center  
Raleigh, NC 27699-1641

**Joelle Burleson, EIT, CPM**  
Rules Development Branch Supervisor  
Division of Air Quality, Planning Section  
North Carolina Department of Environmental Quality

919 707 8720 office  
[joelle.burleson@ncdenr.gov](mailto:joelle.burleson@ncdenr.gov)

217 West Jones Street  
1641 Mail Service Center  
Raleigh, NC 27699-1641

**From:** Gatano, Betty <betty.gatano@ncdenr.gov>  
**Sent:** Friday, May 26, 2017 3:24 PM  
**To:** NCDENR.DENR.DAQ.Stakeholders.Outside\_Involvement\_Committee  
**Subject:** NC DAQ's Annual Monitoring Network Plan Update  
**Attachments:** ATT00001.txt; ATT00002.txt

NC DAQ's annual monitoring network plan update is posted on the website and is open for public comment through June 26, 2017.

Below are links to the public notice and the summary page:

<https://deq.nc.gov/2017-2018-annual-monitoring-network-plan>

<http://deq.nc.gov/about/divisions/air-quality/air-quality-data/annual-network-plan/2017-2018-annual-monitoring-network-plan-for-north-carolina-air-quality>

If you have any questions, please contact John Evans at 919 707 8474 or [John.c.evans@ncdenr.gov](mailto:John.c.evans@ncdenr.gov) or Joette Steger at 919 707 8449 or [Joette.steger@ncdenr.gov](mailto:Joette.steger@ncdenr.gov)

Thanks,

Betty

**Betty Gatano, P.E.**  
Advanced Engineer  
Division of Air Quality  
North Carolina Department of Environmental Quality

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1641 Mail Service Center  
Raleigh, NC 27699-1641



*Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties.*

**From:** Steger, Joette  
**Sent:** Friday, May 26, 2017 3:38 PM  
**To:** Steger, Joette  
**Subject:** NC Ambient Monitoring Network Plan available for public comment

Joette.Steger@ncdenr.gov

Dear Sir or Madam,

NC DAQ's annual monitoring network plan update is posted on the website and is open for public comment through June 26, 2017. Here are links to the public notice and the summary page"

<https://deq.nc.gov/2017-2018-annual-monitoring-network-plan>

<http://deq.nc.gov/about/divisions/air-quality/air-quality-data/annual-network-plan/2017-2018-annual-monitoring-network-plan-for-north-carolina-air-quality>

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 2017-2018 Annual Monitoring Network Plan

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## 2017-2018 Annual Monitoring Network Plan

### Event Description

North Carolina Department of Environmental Quality

North Carolina Division of Air Quality

#### Public Notice

Changes to the division's Ambient Air Quality Monitoring Network planned during 2017 and 2018 will be available for public comments from May 26 to June 26, 2017. The proposed changes are required to be submitted to the U.S. Environmental Protection Agency (EPA) annually.

**INFORMATION:** The Ambient Air Monitoring Annual Network Monitoring Plan will be posted for 30 days on the division's website at <http://deq.nc.gov/about/divisions/air-quality/air-quality-data/annual-ne...> (<http://deq.nc.gov/about/divisions/air-quality/air-quality-data/annual-network-plan>) starting on Friday, May 26, 2017. It will also be available for review at the Division of Air Quality Raleigh Central Office located at 217 West Jones Street, Raleigh, North Carolina. Copies may also be obtained from John C. Evans at the address below.

**COMMENT PROCEDURES:** All persons interested in these matters are invited to comment. Email comments to: [DENR.DAQ.Ask\\_Ambient@lists.ncmail.net](mailto:DENR.DAQ.Ask_Ambient@lists.ncmail.net) ([mailto:DENR.DAQ.Ask\\_Ambient@lists.ncmail.net](mailto:DENR.DAQ.Ask_Ambient@lists.ncmail.net)) or mailed to:

John C. Evans

NC Division of Air Quality

1641 Mail Service Center

## **Appendix R. Public Comments Received**

No public comments were received. No changes were made to the monitoring plan after it went out for public comment.

## **Glossary**

AERMOD – American Meteorology/Environmental Protection Agency Regulatory Model

AMS – Ambient Monitoring Section

AQS - air quality system

AQI - air quality index

ARM - approved regional method

BAM - beta attenuation method

CSS - continuous speciation site

CO - carbon monoxide

CFR - Code of Federal Regulations

DHEC – Department of Health and Environmental Concerns

DRR – Data Requirements Rule

ECB – Electronics and Calibration Branch

EPA – United States Environmental Protection Agency

F - Fahrenheit

FEM – federal equivalent method

FRM - federal reference method

GSMNP – Great Smokey Mountains National Park

IMPROVE - Interagency Monitoring of Protected Visual Environments

MMIF – Mesoscale Model Interface

MSA - metropolitan statistical area

NAAQS - national ambient air quality standards

DAQ - North Carolina Division of Air Quality

NCORE - national core ambient monitoring network station

NO<sub>2</sub> - nitrogen dioxide

NO<sub>y</sub> – reactive oxides of nitrogen

O<sub>3</sub> - ozone

Pb - lead

PM - particulate matter

PM 2.5 - fine particulate or particles with aerodynamic diameters of 2.5 microns and below

PM 10 - particles with aerodynamic diameters of 10 microns and below

PSD - prevention of significant deterioration

PWEI – population weighted emission index

QA – Quality Assurance

RRO – Raleigh Regional Office

SASS<sup>TM</sup> – Speciation Air Sampling System

SEMAP – Southeastern Modeling, Analysis and Planning

SIP – state implementation plan

SLAMs - state and local air monitoring station

SO<sub>2</sub> - sulfur dioxide

SPM - special purpose monitor

TECO - Thermo Environmental, Incorporated

TEOM - tapered element oscillating microbalance

TLE - trace level enhanced (monitor)

TSP – total suspended particulate  
UCI – Upper Confidence Interval  
URG – University Research Glass  
VDEQ - Virginia Department of Environmental Quality  
WINS - well impactor ninety-six, a type of PM 2.5 separator  
WRF - Weather Research and Forecasting  
ZAG – zero air generator  
ZAS – zero air supply