Ohio Environmental Protection Agency

2017-2018 Ohio EPA Air Monitoring Network Plan

Ohio EPA
Division of Air Pollution Control
Monitoring Section
November 2017

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Acronyms, Glossary and Explanations

ANP	Annual Network Plan
AQS	Air Quality System
BAM	Beta Attenuation Monitor
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
CSA	Combined Statistical Area
CSN	Chemical Speciation Network
CO	Carbon Monoxide
DV	Design Value
FDMS	Filter Dynamic Measurement System
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
GC	Gas Chromatograph
GC/MS	Gas Chromatograph / Mass Spectrometry
ICP/MS	Inductive Coupled Plasma / Mass Spectrometry
LAA	Ohio Local Air Agency
MSA	Metropolitan Statistical Area
MTAPCA	Mahoning-Trumbull Air Pollution Control Agency
NAAQS	National Ambient Air Quality Standard
NATTS	National Air Toxics Trends Station
NCore	National Core multi-pollutant monitoring stations
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_X	Oxides of Nitrogen
NOy	Total Reactive Nitrogen Oxides
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
Pb	Lead
$PM_{2.5}$	Particulate matter with a diameter less than or equal to 2.5 micrometers
PM_{10}	Particulate matter with a diameter less than or equal to 10 micrometers
$PM_{10-2.5}$	Particulate matter with a diameter less than or equal to 10 micrometers, and greater than or equal to 2.5 micrometers
ppb	parts per billion
ppm	parts per million
PQAO	Primary Quality Assurance Organization
PWEI	Population Weighted Emissions Index
RAPCA	Regional Air Pollution Control Agency
QA	Quality Assurance
SASS	Speciation Air Sampling System
SHARP	Synchronized Hybrid Ambient Real-time Particulate
SLAMS	State or Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SWOAQA	Southwest Ohio Air Quality Agency
SPM	Special Purpose Monitor
STN CSpec$PM_{2.5}$	Speciation Trends Network
TSP	Total Suspended Particulate
TEOM	Tapered Element Oscillating Microbalance
$\mu g/m^3$	micrograms per cubic meter
U.S. EPA	United States Environmental Protection Agency
UV	Ultraviolet
VOC	Volatile Organic Compounds
VSCC	Very Sharp Cut Cyclone

Notes / Explanations:

AQS is the Air Quality System maintained by U.S. EPA for air quality data. In the AQS ID #, the first 2 digits refers to the state (39 is Ohio). The next 3 digits is the county (ex. '035' Cuyahoga) within Ohio. The last 4 digits designate a specific site within the county.

All $PM_{2.5}$ Sequential FRM sites and single-event FRM sites are comparable to the $PM_{2.5}$ NAAQS. No continuous $PM_{2.5}$ monitors are to be comparable to the $PM_{2.5}$ NAAQS except Cincinnati's Sycamore (39-061-0006), Near Road FEM 39-061-0048, and the Taft (39-061-0040) continuous monitors beginning with their Jan. 1, 2017 data.

All ozone, sulfur dioxide, carbon monoxide and nitrogen dioxide sites are comparable to the NAAQS, unless they are designated for special purposes.

PM is particulate matter. PM_{10} means particulate matter of 10 microns in diameter or smaller. A micron is one millionth of a meter. $PM_{2.5}$ is particulate matter 2.5 millionths of a meter in diameter or smaller. PM_{10} is fine particulate matter and $PM_{2.5}$ is very fine particulate matter.

Monitoring instruments used for comparing to the National Ambient Air Quality Standards are designated as Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM).

$PM_{2.5}$ Seq. FRM samplers test for $PM_{2.5}$ and can hold multiple samples for sequential sampling.

Collocated or "colo" indicates a site with duplicate samplers for quality assurance purposes. Data is statistically compared from the two samplers for the same days. Duplicate samplers may sample at a 1 in 6-day schedule or possibly at a 1 in 12-day schedule.

U.V. Photometric indicates ultra-violet photometric, a method of detection for ozone concentrations.

U.V. Fluorescence indicates ultra-violet fluorescence, a method of detection for sulfur dioxide concentrations.

VOCs are volatile organic compounds. The method of collecting and analyzing whole air samples for VOCs in Ohio is TO-15. The collection utilizes a stainless-steel canister for air sample collection in the field followed by analysis by gas chromatograph-mass spectrometer (GC/MS) in a laboratory. There are approximately 72 compounds scanned for in the analysis.

TSP – metals is the method of collecting total suspended particulate (TSP) by drawing an air sample through a filter media that is analyzed at a laboratory for airborne metals including lead, arsenic, cadmium, chromium, nickel, zinc, manganese and beryllium and sometimes particulate mercury. Analysis is by ICP or Inductively Coupled Plasma Emission Spectroscopy or Graphic Furnace Atomic Absorption.

BAM indicates a Beta Attenuation Monitor, a method of detection for fine particulates.

TEOM indicates a Tapered Element Oscillating Microbalance, a method of detection for fine particulates.

SIP is State Implementation Plan that details how the state will implement controls that will bring the area into attainment status for a National Ambient Air Quality Standard.

1.0 Introduction and Requirements

As required by 40 CFR 58.10, Ohio EPA is providing the 2017-2018 Air Monitoring Network Plan to U.S. EPA Region V. This document addresses the Ohio air monitoring network, as it existed as of July 1, 2017, and as it is expected or anticipated to be modified through December 31, 2018. Ohio's air monitoring network as presented in this report meets all the requirements of Appendices A, C, D, and E of 40 CFR Part 58.

1.1 Guidance and Priorities

Ohio EPA follows the federal general guidance and requirements for air monitoring, including monitoring: 1) areas of expected high concentrations, 2) areas of high population density, 3) areas with significant sources, 4) general background concentration sites and 5) areas of regional transport of a pollutant. Not all air pollutants need to have sites for all of these categories.

The Ohio EPA, Division of Air Pollution Control (DAPC), is responsible for regulating air quality to protect public health and the environment in the State of Ohio. As part of achieving these goals, Ohio EPA DAPC, with four District Offices (DOs) and nine local air agencies (LAAs), operates and maintains an extensive network of monitoring sites that collect air pollution data in each of the numerous metropolitan areas and in many rural areas. The bulk of the monitoring sites are in the urban areas where the majority of the population resides. There are over 130 monitoring sites operating in Ohio with over 300 air monitors sampling on an hourly or intermittent 24-hour basis.

The Ohio EPA monitors six criteria pollutants. They are carbon monoxide (CO), nitrogen dioxide (NO_2), ground-level ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2) and Pb (lead). Other pollutants that are monitored by Ohio EPA which are not associated with air quality standards (NAAQS) include metals, PM coarse ($PM_{10\text{-}2.5}$), toxics (volatile organic compounds, VOCs), carbonyls, $PM_{2.5}$ speciated compounds, and ozone precursors. In addition, meteorological data are collected at some sites to support the monitoring and aid in air quality modeling analysis.

The following designations describe the various types of monitors at the sites within Ohio's air monitoring network:

- SLAMS: State or Local air monitoring stations for parameters (pollutants and/or meteorological data) addressed by 40 CFR Part 58. The SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes.
- Special Purpose Monitors (SPM): Not all monitors and monitoring sites in the air quality surveillance network are included in the SLAMS network. In order to allow the capability of providing monitoring for complaint studies, modeling verification, and compliance status, certain monitors are reserved for short-term studies and designated as Special Purpose Monitors (SPM). These monitors are not necessarily committed to any one location or for any specified time period. They may be located as separate monitoring sites or be included at SLAMS locations. Monitoring data may be reported to U.S. EPA, provided that the monitors and sites conform to all requirements of the SLAMS network. Monitors in this category are included in the network plan, but are not used to determine compliance with the NAAQS.
- Industrial: A monitor that is operated by a private industry entity rather than under the control of a State, Local or Tribal government. The private industry entity may choose to contract with a local government organization for the operation of the monitor.

- NCore: National Core multi-pollutant monitoring station: NCore is a multi-pollutant network that integrates several advanced measurement systems for particles, pollutant gases and meteorology. Most NCore stations have been operating since the formal start of the network on January 1, 2011.
- Near Road: Located near busy roadways, Near Road sites measure the peak hourly concentrations of CO, NO_2 or $PM_{2.5}$ in urban areas with MSA populations greater than 1 million people.
- PAMS: Photochemical Assessment Monitoring Station: PAMS monitoring is enhanced monitoring of ozone, oxides of nitrogen (NOx), volatile organic compounds (VOC), and meteorology to obtain more comprehensive and representative data on ozone air pollution.

1.1.1 Monitoring Objectives

Monitoring objectives describe the various purposes of the monitors within Ohio's air monitoring network:

- General Concentration (Background): These sites are positioned to measure the general background concentration of pollutants in an area.
- Highest Concentration: These sites are located to determine the expected peak concentrations of pollutants in an area.
- Population: Located in areas categorized by high population density, these sites are used to determine the typical pollutant concentrations in a specific area.
- Regional Transport: These sites are located to monitor the level of regional pollution transport from one area to the next.
- Source-Oriented: Monitors that are placed in order to identify the impact of certain sources of air pollution.

A fundamental consideration for all air monitoring projects and sites is that the monitoring locations meet U.S. EPA's requirements as specified in 40 CFR Part 58 Appendices D & E and that the state and local air agencies are available to operate and maintain the sites and equipment, to provide sample analyses, and are available for data collection and reporting.

The Ohio EPA also operates and maintains a Quality Assurance/Quality Control (QA/QC) program in accordance with U.S. EPA requirements and guidelines as specified in 40 CFR 58. The purpose of this program is to assure the quality and validity of the data collected.

The QA/QC program includes but is not limited to the following activities:

- Instrument performance audits;
- Monitor siting evaluations;
- Precision and span checks;
- Instrument bias determinations;
- Flow rate audits;
- Instrument air flow leak checks; and
- Data validation.

To comply with U.S. EPA's independent quality assurance requirements, Ohio EPA, including the DOs and LAAs participates in the National Performance Audit and the Performance Evaluation Programs for criteria pollutant monitoring and performance. Additional inter-laboratory comparisons are performed periodically for air toxics monitoring.

1.2 Air Monitoring Networks - 2017

The minimum number of monitoring sites required for each of the U.S. EPA criteria pollutants is established in the federal regulations in 40 CFR 58, Appendix D. The minimum number of required sites is often dependent on the population count within large and small statistical areas. These areas are referred to as metropolitan statistical areas (MSA), micropolitan-statistical areas, core-based statistical areas (CBSA), and combined statistical areas (CSA). A CBSA associated with at least one urbanized area of 50,000 population or greater is termed a metropolitan statistical area (MSA). A CBSA associated with at least one urbanized cluster of at least 10,000 population or greater is termed a micropolitan statistical area.

The Ohio air monitoring network meets, or in most cases exceeds, the applicable minimum network requirements.

A Primary Quality Assurance Organization (PQAO) refers to a monitoring organization that is responsible for a set of stations that monitor the same pollutant and for which data quality assessments can be pooled. Each criteria pollutant sampler/monitor at a monitoring station in the SLAMS and SPM networks must be associated with one PQAO.

In early 2015, the Ohio EPA proposed to consolidate the number of PQAOs in Ohio for site and monitor auditing purposes. These changes were approved by U.S. EPA. Previously in Ohio, there was one PQAO associated with each of Ohio's nine LAAs and five DOs. Each of these LAAs and DOs were operating as independent entities for quality assurance monitoring purposes, which created an unnecessary burden in site QA costs each year. It was proposed to U.S. EPA to streamline these quality assurance operations by consolidating these 14 PQAOs into three PQAOs. This consolidation of PQAOs met the guidelines and requirements of 40 CFR 58, Appendix D and in no way compromised the integrity and quality of ambient air monitoring data collected in Ohio.

The new realignment of Ohio's PQAOs was as follows:

The Northeast Primary Quality Assurance Organization (NEPQAO) consists of these monitoring organizations. AQS PQAO code; 1454

- Akron Regional Air Quality Management District
- Canton City Health Dept., Air Pollution Control Division
- Cleveland Dept. of Public Health Division of Air Quality
- Lake County General Health District, Air Pollution Control
- Mahoning-Trumbull Air Pollution Control Agency (M-TAPCA)
- Ohio EPA, Northeast District Office (NEDO)

The Central Primary Quality Assurance Organization (CPQAO) consists of these monitoring organizations. AQS PQAO code; 1453

- Ohio EPA, Northwest District Office (NWDO)
- Ohio EPA, Central District Office (CDO)
- Ohio EPA, Southeast District Office (SEDO)
- City of Toledo, Division of Environmental Services

The Southwest Primary Quality Assurance Organization (SWPQAO) consists of these monitoring organizations. AQS PQAO code; 1455

- Dept. of Environmental Services, Southwest Ohio Air Quality Agency (SWOAQA)

- Public Health Dayton and Montgomery County, Regional Air Pollution Control Agency (RAPCA)
- Portsmouth City Health Dept., Air Pollution Unit

The Ohio EPA Southwest District Office no longer conducts air quality monitoring. The Bellefontaine lead site was discontinued at the end of 2016 and the Clinton County ozone site (39-027-1002) is now operated by the SWOAQA local air agency.

2.0 Proposed Network Modifications 2017-2018

This report presents the proposed Ohio EPA Air Monitoring Network Plan (ANP) for 2017-2018. A critical component of this report is to identify the network changes that have taken place since Ohio's 2016-2017 ANP report and the changes that are planned or anticipated for the remainder of 2017 and 2018.

It should be noted when proposing what the monitoring network might look like a year from now, unplanned site changes occur to state monitoring networks each year. Changes or temporary interruptions of sampling may occur because of events such as building or roof maintenance, construction, change of ownership of the site, or other changes at the site that require moving the instruments. Some changes that may not be planned could include adding sites to investigate complaints or for a new or proposed facility. Planned network changes may not be implemented due to unforeseen circumstances, such as the inability to secure a new site or because of other constraints.

All proposed site and parameter changes to the approved monitoring network are made in consultation with, and approval of the U.S. EPA Region V air monitoring staff. Ohio EPA retains the right to install, operate and discontinue operation of ambient air quality monitors for special projects that go beyond federal minimum requirements without federal approval.

All monitoring changes that have occurred since Ohio's 2016 ANP and all planned, proposed and potential network changes are summarized in Table 1 below. Proposed monitoring changes are noted. None of these changes involve relocating or deleting a site or monitor where a design value is in violation of any NAAQS.

Table 1. Summary of Network Changes by Pollutant

Pollutant/ Location	AQS Site No.	Site Name or Address	Action Change	When
Ozone				
Proposed in 2016 ANP, Approved and Completed				
Toledo	39-095-0034	LO_SER	Ozone site discontinued	End of ozone season 2016
Toledo	39-095-0035	Cooley	Ozone site replaced 39-095-0034	Began sampling August 2016
Hamilton	39-017-0004	Hamilton Fire House	Ozone was relocated 0.25 miles NNE to new site 39-017-0023	Ended 10/31/2016.
Hamilton	39-017-0023	Crawford Woods	New Ozone site is the relocated Hamilton Fire Station site.	Started 2017 ozone season, 3/1/2017.
Being Proposed, Complete if Approved				
Centerburg	39-083-0002	Centerburg	Site to be relocated.	Terminates 10/31/2017.
Centerburg	39-083-xxxx		Relocation of the 39-083-0002	Begin 2018 ozone season

Pollutant/ Location	AQS Site No.	Site Name or Address	Action Change	When
$PM_{2.5}$				
Proposed in 2016 ANP, Approved and Completed				
Columbus	39-049-0038	Smoky Row	1 $PM_{2.5}$ FRM filter based at Columbus Near Road site started.	January 1, 2017
Cincinnati	39-061-0048	Cinci_NR	Sharp 5030i (184) $PM_{2.5}$ hourly instrument started.	January 1,2017
Cincinnati	39-061-0006	Sycamore	PM2.5 FEM became primary, FRM changes to collocated and sample frequency changed from 1/3 to 1/6	January 1, 2017
Cincinnati	39-061-0040	Taft	PM2.5 FEM NAAQS exclusion ended. and the data from the FEM will be used for design value calculations on days when the FRM does not collect a sample.	January 1, 2017
Cleveland	39-035-0073	Cleveland_NR	1 $PM_{2.5}$ FRM filter based at Cleveland's Near Road site started.	April 1, 2017.
Middletown	39-017-0022	BPG (Middletown Coke)	FRM sampling frequency increased from 1 in 6 to 1 in 3 days.	April 1, 2017
Toledo	39-095-0028	COPK	1 $PM_{2.5}$ FRM filter based site moved to a former Toledo PM_{10} site, 39-095-1003	April 1, 2017
Being Proposed, Complete if Approved				
Cincinnati	39-061-0010	Colerain	Propose to end FRM $PM_{2.5}$ monitors. Will continue with hourly $PM_{2.5}$ monitor for AQI purposes.	December 31, 2017
Cincinnati	39-061-0014	Carthage	PM2.5 method code change from 155 to 142, removed collocated monitor	January 1, 2018
Middletown	39-017-0022	BPG	Discontinue $PM_{2.5}$	December 31, 2017 if Region V approves.
PM_{10}				
Proposed in 2016 ANP, Approved and Completed				
Cincinnati	39-061-0014	Carthage	High-Vol PM10 replaced with Low-Vol PM10	January 1, 2017
Being Proposed, Complete if Approved				
Cincinnati	39-061-5001	Lockland	PM_{10} & collocated monitors - Requesting to disinvest site	December 31, 2017.
SO_2				
Proposed in 2016 ANP, Approved and Completed				
Pomeroy	39-105-0003	Pomeroy	SO_2 relocated to Gain/Kyger site, 39-053-0006 in Gallia Co.	Terminated 7/6/2017.
Cheshire/ Gallia Cty.	39-053-0004 39-053-0005 39-053-0006 54-053-0001	Located near the Gavin/Kyger power plants in Gallia County	4 SO_2 sites located in 2016 and began sampling January 1, 2017	January 1, 2017.
NO_2/CO				
Being Proposed, Complete if Approved				
Cincinnati	39-061-0040	Taft	Add true NO_2 and aethalometer	January 1, 2018.

Pollutant/ Location	AQS Site No.	Site Name or Address	Action Change	When
Pb/Metals/VOCs				
Proposed in 2016 ANP, Approved and Completed				
Cleveland	39-035-0060	GT Craig (NCore site)	Ended Pb/metals monitoring	August 26, 2016
Cleveland	39-035-0072	Century	Ended Pb/metals monitoring	August 7, 2016
Columbus	39-049-0039	Woodrow	VOCs sampling near 2 closed plants	Sampling began 5/6/16
Dayton	39-113-7001	Moraine FS	Pb/metals sampling ended	December 31, 2016
Canton	39-151-0024	Republic Steel	A new special purpose lead monitor, permit required	started June, 2017
Bellefontaine	39-091-0006	Bellefontaine	Pb/Metals site discontinued	12/31/2016
Multi-Pollutant				
Proposed in 2016 ANP, Not Started				
Hopedale	39-067-xxxx	Harrison County	Special purpose monitor to evaluate emissions from mid-stream processing plant.	Will early 2018

3.0 Proposed Networks for 2017

3.1 Ozone Network

Ohio is required to operate 21 ozone monitoring sites to meet the SLAMS ozone requirements. The monitors are operated from March 1 through October 31, in accordance with 40 CFR 58 Appendix D, 4.1(i). However, ozone monitors at Ohio's NCore sites in Cleveland, Cincinnati and in Preble County collect measurements year-round.

Table 2 below identifies the minimum ozone monitoring sites as required under 40 CFR 58, Appendix D. Minimum monitoring requirements for ozone are based on population and whether the design value is less than 85% of the NAAQS, or greater than 85% of the NAAQS. Since the NAAQS for ozone is 0.070 ppm of ozone then 85% of the NAAQS truncated is 0.059 ppm.

Table 2. SLAMS Minimum Ozone Monitoring Requirements

MSA population[1,2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value Concentrations <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4-10 million	3	1
350,000-<4 million	2	1
50,000-<350,000[5]	1	0

1 Minimum monitoring requirements apply to the Metropolitan Statistical Area (MSA)
2 Population based on latest available census figures.
3 The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4 These minimum monitoring requirements apply in the absence of a design value.
5 Metropolitan Statistical Areas (MSA) must contain an urbanized area of 50,000 or more population.

The total number of ozone sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding ozone-related atmospheric processes include more sites than these minimum numbers required.

In 2017, Ohio is operating 48 ozone monitoring sites. This exceeds the minimum number of required ozone sites. The breakdown of ozone sites by MSAs in Ohio operating in 2017 are shown in the Table 3 below.

Table 3. Ohio's Ozone Monitoring Network

CBSA Name	CBSA Type	Population	2017-2018 Monitors	Design Value <85% of NAAQS?	Urban Area with Pop. >= 50,000?	No. Required Monitors	New Monitors needed
Akron, OH	MSA	704,243	2	No	Yes	2	0
Ashtabula, OH	Micropolitan SA	98, 632	1	No	No	0	0
Canton-Massillon, OH	MSA	402,976	3	No	Yes	2	0
Cincinnati OH-KY-IN	MSA	2,151,781	7	No	Yes	2	0
Cleveland-Elyria, OH	MSA	2,060,810	9	No	Yes	2	0
Columbus, OH	MSA	2,021,632	6	No	Yes	2	0
Dayton, OH	MSA	800,909	3	No	Yes	2	0
Huntington-Ashland, WV-KY-OH	MSA	361,580	2	No	Yes	2	0
Lima, OH	MSA	104,425	1	No	Yes	1	0
Mansfield, OH	MSA	121,707	0	No	Yes	0	0
Marietta, OH	Micropolitan SA	61,112	1	No	No	0	0
Mt. Vernon, OH	Micropolitan SA	61,061	1	No	No	0	0
Preble Cty. NCore	Non-MSA	41,586	1	No	No	1	0
Springfield, OH	MSA	135,959	2	No	Yes	1	0
Toledo, OH	MSA	605,956	4	No	Yes	2	0
Weirton-Steubenville, WV-OH	MSA	120,515	1	No	Yes	1	0
Wheeling WV-OH	MSA	144,198	0	No	Yes	0	0
Youngstown-Warren-Boardman, OH-PA	MSA	549,885	3	No	Yes	2	0
Wilmington, OH	Micropolitan SA	41,917	1	No	No	0	0
Site Totals			**48**	**None**		**22**	**0**

3.1.1 Photochemical Assessment Monitoring Stations (PAMS)

PAMS are established to obtain more comprehensive data in areas with high levels of ozone pollution by also monitoring oxides of Nitrogen (NOx) and volatile organic compounds (VOCs). More extensive monitoring of meteorological measurements is also conducted. In October 2015, U.S. EPA promulgated a more stringent air quality standards for ozone. The data requirement rules associated with the 2015 ozone standard required that PAMS stations be set up at all NCore sites located in MSAs whose population is greater than or equal to 1 million people. Since NCore stations are located in Cleveland and Cincinnati, these cities must have a PAMS operational by the monitoring deadline of June 1, 2019. The Cleveland and Cincinnati local air agencies will operate the two sites by June 2019. Early preparation monitoring is proposed in mid-2018. The PAMS monitoring season occurs each year from June through August when the highest ozone levels occur.

3.1.2 Ozone Network Changes

Other than the early start proposed PAMS monitoring in Cleveland and Cincinnati in 2018, only one other change is expected to take place beginning with the 2018 ozone monitoring season. The Columbus MSA ozone monitor at the Centerburg Water Plant site (39-083-0002) is proposed to be relocated to the new Centerburg water treatment facility in 2018 as the current site is being sold. The new location would be 2.5 miles southeast of the present location. The Centerburg site is 30 miles northeast of Columbus. The purpose of the Centerburg ozone site is to capture downwind ozone concentrations resulting from the Columbus metropolitan area. Based on 2014-2016 data, the existing Centerburg site meets the revised ozone standard of 0. 070 ppm.

Two ozone network changes have taken place since Ohio's 2016 annual network plan. These are:

Cincinnati, OH-KY-IN MSA

Cincinnati (SWOAQA)

- With approval through last year's annual network plan, the ozone site at the Hamilton Fire Station (39-017-0004) in Butler county was moved during the ozone off-season to a new site at the Crawford Woods Elementary School. The new ozone site (39-017-0023) began sampling March 1, 2017. The former site was terminated because city of Hamilton vacated this fire station and there were safety and power reliability concerns within the building. The sites are approximately 0.25 miles apart and the data will be combined from the two sites for design value calculations, per U.S. EPA Region 5 approval received April 18, 2017.

Toledo MSA

Toledo

- The Lo Ser ozone site, 39-095-0034, at the Toledo water intake plant was discontinued after the 2016 ozone season due to building renovations and subsequent security concerns at the location. The Cooley Canal site 39-095-0035, approximately a half mile to the southeast of site 39-095-0034, replaced this site as the new NAAQS ozone monitor for the area. The Cooley Canal site started operating in August 2016. Ohio EPA performed a comparative study between the two sites and found it to be an acceptable replacement. U.S. EPA Region V was consulted and is in agreement with this change. Since the new and former locations are so close, the data from these sites can be combined for comparison to the NAAQS.

3.2 $PM_{2.5}$ Monitoring Network

Ohio EPA expects to continue monitoring using $PM_{2.5}$ Federal Reference Methods at the majority of sites as they exist at the beginning of 2017. There are a few sites where only hourly $PM_{2.5}$ concentrations are collected without a collocated FRM instrument. The instruments at these sites are mostly non-FEM (Federal Equivalent Method) instruments.

3.2.1 $PM_{2.5}$ FRM Filter Based Network

Ohio is required to operate 24 FRM $PM_{2.5}$ sites to meet the SLAMS $PM_{2.5}$ requirements.

Table 4 below identifies the minimum FRM monitoring sites required under 40 CFR 58, Appendix D, Table D-5. Minimum monitoring requirements for $PM_{2.5}$ are based on population and whether the design value is less than 85% of the NAAQS, or greater than or equal to 85% of the NAAQS. 85% of the annual and short term NAAQS are 10.2ug/m_3 and 29.7ug/m_3 respectively. Design values are the three-year averages of the calculated annual and the 98th percentile of the 24-hour average concentrations recorded from the highest-reading monitor in each attainment or nonattainment area or state county.

Table 4. SLAMS $PM_{2.5}$ Minimum Monitoring Requirements

MSA population[1,2]	Most recent 3-year design value ≥85% of any PM2.5 NAAQS[3]	Most recent 3-year design value<85% of any PM2.5 NAAQS[3,4]
> 1,000,000	3	2
500,000-1,000,000	2	1
50,000-<500,000[5]	1	0

1 Minimum monitoring requirements apply to the Metropolitan Statistical Area (MSA).
2 Population based on latest available census figures.
3 The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4 These minimum monitoring requirements apply in the absence of a design value.
5 Metropolitan Statistical Areas (MSA) must contain an urbanized area of 50,000 or more populations.

Table 5 shows Ohio in 2017 is operating 46 $PM_{2.5}$ FRM monitoring sites, which exceeds the 22 minimum number of required sites. The breakdown of $PM_{2.5}$ sites operating in Ohio will remain unchanged through 2017.

Table 5. Ohio's $PM_{2.5}$ FRM Filter Based Monitoring Network

CBSA Name	CBSA Type	Population	2017-2018 Monitors	Design Value <85% of NAAQS?	Urban Area with Pop. >= 50,000?	No. Required Monitors	New Monitors needed
Akron, OH	MSA	704,243	3	No	Yes	2	0
Athens, OH	Micropolitan SA	65,886	1	Yes	No	1*	0
Canton-Massillon, OH	MSA	402,976	2	No	Yes	1	0
Cincinnati OH-KY-IN	MSA	2,151,781	10**	No	Yes	3	0
Cleveland-Elyria, OH	MSA	2,060,810	10	No	Yes	3	0
Columbus, OH	MSA	2,021,632	4	Yes	Yes	3	0
Dayton, OH	MSA	800,909	2	Yes	Yes	2	0
Huntington-Ashland, WV-KY-OH	MSA	361,580	1	Yes	Yes	1	0
Lima, OH	MSA	104,425	1	Yes	Yes	1	0
Portsmouth, OH	Micropolitan SA	76,825	1	Yes	No	0	0
Preble County	Non-MSA	41,586	1	No	No	1*	0
Springfield, OH	MSA	135,959	1	Yes	Yes	0	0
Toledo, OH	MSA	605,956	3	No	Yes	1	0
Weirton-Steubenville, WV-OH	MSA	120,515	2	Yes	Yes	1	0
Wheeling, WV-OH	MSA	144,198	1	Yes	Yes	0	0
Youngstown-Warren-Boardman, OH-PA	MSA	549,885	3	No	Yes	2	0
Site Totals			**46**			**22**	**0**

*$PM_{2.5}$ monitors required at background, NCore sites. However, NCore sites can be counted to meeting the minimum requirements. CFR App. D 4.71. ** Colerain and BPG will shut down December 31, 2017.

In addition to the minimum number of required FRM monitors, each state is required to operate a regional background and a regional transport site. In Ohio, our NCore site (39-135-1001) in Preble County near the Indiana border is designated as the state's regional transport site. In Ohio, the regional background site (39-009-0003) is located in Athens County next to Gifford Forest.

In additional, 40 CFR 58 Appendix D specifies that there must be at least one site in each MSA that is considered a neighborhood-measurement scale or larger, and is in an area of expected maximum concentration. Table 6 lists which $PM_{2.5}$ sites meet this requirement in each of Ohio's MSAs. Also, included in this table are the microscale and background sites.

Table 6. $PM_{2.5}$ Neighborhood and Regional Scale Sites

MSAs	AQS Site No.	Site Name	2014-2016 Annual DV	Max. Conc. Site (Y/N)	Measurement Scale
Akron	39-153-0017	East HS	11.0	Y	Neighborhood
Athens (micropolitan)	39-009-0003	Gifford	7.2	N	Background (state)
Canton	39-151-0017	Fire Station # 8	10.8	Y	Neighborhood
Columbus	39-049-0024	Fairgrnds	9.6	Y	Neighborhood
	39-049-0038	Smoky Row	NA	Y	Microscale
Cincinnati, OH-KY-IN	39-061-0042	Carthage	10.7	Y	Neighborhood
Cleveland- Elyria	39-035-0038	St. Theo	11.4	Y	Neighborhood
	39-035-0073	Cleveland_NR	NA	Y	Microscale
	39-103-0004	Chippewa	8.7	N	Regional Background
Dayton	39-113-0038	Sinclair	9.1*	Y	Neighborhood
Non-MSA rural	39-135-1001	Preble NCore	8.4	N	Regional Transport
Lima, OH	39-003-0009	Lima	8.9	N	Neighborhood/regional
Huntington-Ashland WV-KY-OH	39-145-0013	PWTP	8.3	Y	Neighborhood
Springfield	39-023-0005	SFIELD2	9.1	Y	Neighborhood
Toledo	39-095-0024	Erie	9.8	Y	Neighborhood
Weirton-Steubenville	39-081-0017	Steuben	10.1	Y	Neighborhood
Youngstown-Warren OH-PA	39-099-0005	Fire Station #7	9.6	Y	Neighborhood

* Insufficient data to be considered a statistically valid three-year annual design value

3.2.2 $PM_{2.5}$ Collocation

According to 40 CFR 58, Appendix A (3.2.31), for each distinct monitoring method designation (FRM or FEM) used in a PQAO, 15 percent of the primary monitors of each method designation must be collocated with a quality control monitor. This same requirement is also applicable to PM_{10} and Lead/Metals monitoring.

Fifty percent of the collocated quality control monitors should be deployed at sites where sampled pollutant concentrations for $PM_{2.5}$ have historically been plus or minus 20 percent of either the annual or 24-hour NAAQS. The remainder of quality control monitors can be located at the state PQAO's discretion. If a monitoring organization has no sites where annual average or daily concentrations are within plus or minus 20 percent of the annual NAAQS or 24-hour NAAQS, then 50 percent of the collocated quality control monitors should be deployed at those sites where the annual mean concentrations or 24-hour concentrations are among the highest reading sites in the network. The remainder of quality control monitors can be located at the state PQAO's discretion.

Compliance to these $PM_{2.5}$ collocation requirements in Ohio can be seen in the following table.

Table 7. No. of $PM_{2.5}$ Collocation Monitors by PQAO

NE PQAO/RO	No. $PM_{2.5}$ FRM Sites	# Collocated	Collocated AQS Site No.	Site Name	Collection/ Method Code	20% of NAAQS[a] (Yes or No)	Sample frequency
Akron	4	1	39-153-0017	East HS	Partisol[1]	Yes	1/6
Canton	2	1	39-151-0017	Firestation #8	BGIs[2]	Yes	1/6
Cleveland	6	1	39-035-0038	St.Theodos	6 Partisol	Yes	1/3
	1	1	39-035-0060	GT Craig	1 Dicot[3]	Yes	1/6
Lake	1	1	39-085-0007	JFS	Anderson[4]	No	1/6
MTAPCA	3	1	39-099-0005	Firestation #7	BGIs	Yes	1/6
Northeast DO	1	1	39-093-3002	Barr	Anderson[4]	No	1/6
			No. Required	**Meets Colo Req. Y/N)**	**Meets Method**		**Meets SF**
Totals	10	2	2	Y	Partisol		Y
	5	2	1	Y	BGIs		Y
	2	2	1	Y	Anderson		Y
	1	1	1	Y*	Dicot		Y
Central PQAO/RO	**No. $PM_{2.5}$ FRM Sites**	**Collocated**	**Collocated AQS Site No.**	**Site Name**	**Collection/ Method Code**	**20% of NAAQS (Yes or No)**	**Sample frequency**
Northwest DO	1	1	39-003-0009	Lima	BGI	No	1/6
Central DO	4	1	39-049-0039	Woodrow	Partisol	No	1/6
Southeast DO	2	1	39-081-0017	Steuben	Partisol	Yes	1/6
Southeast DO	2	1	39-009-0003	Gifford	BGIs	No	1/6
Toledo	3	1	39-095-0024	Erie	Partisol	No	1/6
			No. Required	**Meets Colo Req. Y/N)**	**Meets Method**		**Meets SF**
Totals	3	2	1	Y	BGIs		Y
	9	3	1	Y	Partisol		Y
Southwest PQAO/RO	**No. $PM_{2.5}$ FRM/FEM Sites**	**# Collocated**	**Collocated AQS Site No.**	**Site Name**	**Collection/ Method Code**	**20% of NAAQS (Yes or No)**	**Sample frequency**
SWOAQA	8	1	39-061-0040	Taft	BGIs	No	1/6
SWOAQA	1	1	39-061-0014	Carthage	T-Anderson	Yes	1/6
SWOAQA	3	1	39-061-0006	Sycamore	Sharp FEM	No	1/6
RAPCA	2	1	39-057-0005	Y_Springs	BGIs	No	1/6
RAPCA	2	1	39-113-0038	Sinclair	Partisol	No	1/6
Portsmouth	2	1	39-143-0013	PWTP	Partisol	No	1/6
			No. Required	**Meets Colo Req. Y/N)**	**Meets Method**		**Meets SF**
Totals	10	2	2	Y	BGI		Y
	4	2	1	Y	Partisol		Y
	1	1	1	Y	T-Anderson		Y
	3	1	1	Y	Sharp FEM		Y (hourly)
Statewide							
Totals	**48**	**18**	**11**				

[a] Are pollutant concentrations within +/- 20% of either the annual or 24-hour NAAQS, yes or no? [1] Partisol is method code '145'; [2] BGI is method code '142'; [3]Dicot is method code '179'; [4] Anderson code '155' VSCC were installed at these sites in past several years

* Collocation requirements for the fine PM2.5 portion of the Dicot sample procedure (method 179) have been met with the addition of a secondary Partisol 2025 plus sampler measuring PM2.5 (method 145) in June 2017.

3.2.3 $PM_{2.5}$ Continuous Network

40 CFR 58, Appendix. D (4.7.2) requires continuous $PM_{2.5}$ analyzers located in the same MSAs be equal to at least one-half of the minimum required FRM monitoring sites as listed in Table 4. Continuous instruments are those that collect one minute readings which are averaged to produce hourly readings. Ohio operates continuous monitors at 27 sites which is more than the 16 required. The table below shows each MSA in Ohio has the sufficient number of required $PM_{2.5}$ continuous monitoring sites.

Table 8. $PM_{2.5}$ Continuous Sites

MSAs	AQS Site No.	County	Site Name	FEM (Y/N)	MSA Monitors Req.	MSA Monitors Operated
Akron-OH	39-153-0017	Summit	East HS	Y	1	1
Canton-OH	39-151-0020	Stark	Canton Health	Y	1	1
Cincinnati, OH-KY-IN	39-017-0019	Butler	Amanda Elem	Y	0	1
	39-017-0020	Butler	Yankee	Y	0	1
	39-025-0022	Clermont	Batavia	N	0	1
	39-061-0006	Hamilton	Sycamore	Y	0	1
	39-061-0010	Hamilton	Colerain	Y	0	1
	39-061-0040	Hamilton	Taft	Y	1	1
	39-061-0048	Hamilton	Cinci_NR	Y	1	1
	39-165-0007	Warren	Lebanon	Y	0	1
				MSA total	**2**	**8**
Cleveland- Elyria OH	39-035-0060	Cuyahoga	GT Craig	Y	1	1
	39-085-0007	Lake	JFS	N		1
	39-093-3002	Lorain	Barr	N	1	1
	39-103-0004	Medina	Chippewa	Y	0	1
				MSA total	**2**	**4**
Columbus-OH	39-049-0029	Franklin	New Albany	Y	1	1
	39-049-0034	Franklin	Fairgrnds	N	1	1
				MSA total	**2**	**2**
Dayton-OH	39-113-0038	Montgomery	Sinclair	Y	1	1
	39-057-0005	Greene	Y_Spring	Y	0	1
				MSA total	**1**	**2**
Huntington-Ashland WV-KY-OH	39-087-0012	Lawrence	ODOT	Y	1	1
Lima-OH	39-003-0009	Allen	Lima	N	1	1
Springfield-OH	39-023-0005	Clark	SFIELD2	Y	1	1
Toledo-OH	39-095-0024	Lucas	Erie	N	1	1
Weirton-Steubenville-WV-OH	39-081-0017	Jefferson	Steuben	Y	1	1
Youngstown-Warren OH-PA	39-099-0014	Mahoning	HSTART	N	1	1
	39-155-0014	Warren	Laird1	N	0	1
Rural	39-001-0001	Adams	West Union	Y	0	1
Rural	39-135-1001	Preble	Preble NCore	Y	1	1
				Network Totals	**16**	**27**

In Ohio, there are 14 continuous monitors that can be operated as a Federal Equivalent Method (FEM) monitors but are not operated as such. All of these are not meeting the statistical test criteria when comparing their hourly data with their collocated FRM filter-based monitor. The data from these hourly instruments are used for Air Quality Index reporting purposes.

State monitoring agencies have the option of not operating a $PM_{2.5}$ hourly instrument as a Federal Equivalent Monitor (FEM). Ohio is not operating these instruments as FEMs because the data collected has not compared well for some years with the filter-based Federal Reference Monitors (FRM) monitors at these sites. U.S. EPA developed a data comparability statistical assessment tool which compares pollutant concentrations collected in any one year between the hourly instrument and the co-located filter-based instruments. This tool has been used for the Ohio sites and the result continued to show poor statistical comparisons. In most cases, the statistical assessments demonstrate that the continuous $PM_{2.5}$ instruments at these sites do not meet the statistical criteria required for NAAQS comparison. At this time, Ohio is not proposing any of these continuous $PM_{2.5}$ monitors be designated by U.S. EPA as approved regional methods (ARMs) or FEMs. Appendix F of this document presents the most recent 2016 statistical results.

The Southwest Ohio Air Quality Agency conducted a special purpose two-year data comparability assessment of a $PM_{2.5}$ FEM hourly monitor and a co-located FRM monitor located at Sycamore (39-061-0006) in Cincinnati. The results of this assessment were favorable, showing the data collected using a federally-approved equivalent method meets the criteria sufficient to compare the $PM_{2.5}$ hourly data with the NAAQS. Because their NCore site, 39-061-0040 employs the same instrument model, the results of the Sycamore study enabled the $PM_{2.5}$ data collected from Cincinnati's NCore site to be eligible for NAAQS comparison. Both sites operate the Thermo Sharp 5030i FEM continuous instrument.

Canton Local Air Agency began operating a Sharp 5030i FEM in May 2016 and is conducting a similar comparability assessment of this monitor to a corresponding FRM monitor at the Health Department site 39-151-0020 in Canton. If the outcome of this assessment is favorable, the FEM monitor may then become comparable to the NAAQS.

Additional U.S. EPA's minimum siting requirements (40 CFR 58 Appendix D 4.7.3) for $PM_{2.5}$ continuous instruments require each state to adequately locate at least one site to monitor transport of $PM_{2.5}$ into the region and one monitor to represent regional background concentrations. Ohio's NCore site 39-135-1001 located in Preble County at the Indiana and Ohio border is designated as our regional transport site and the Lima site in Allen County (39-003-0009) is our regional background monitor.

3.2.4 $PM_{2.5}$ Near Road Network

40 CFR 58, Appendix D (4.3) requires for CBSAs with a population of 1,000,000 or more, at least one $PM_{2.5}$ to be collocated at a Near Road NO_2 station. There are three NO_2 Near Road sites in Ohio, in Cleveland, Columbus and Cincinnati. The Ohio EPA met this requirement by deploying $PM_{2.5}$ monitors at the three Near Road sites. The following table details this monitoring.

Table 9. Ohio $PM_{2.5}$ Near Road Monitoring Sites

AQS Site No.	Site Address	MSA	Instrument	SF	Started
39-035-0073	25609 Emory Rd., Warrensville	Cleveland. OH	Partisol 2025i	1/3	4/1/2017
39-049-0038	7560 Smoky Row, Columbus	Columbus, OH	Partisol 2025i	1/3	1/1/2017
39-061-0048	3428 Colerain Ave., Cincinnati	Cincinnati OH-KY-IN	FEM Thermo Sharp 5030i	hourly	1/1/2017

Black carbon hourly monitors operate at the Cincinnati Near Road (39-061-0048) and Columbus Near Road (39-049-0038) sites.

3.2.5 $PM_{2.5}$ Chemical Speciation Network

U.S. EPA implemented the $PM_{2.5}$ chemical speciation monitoring program in 2000. Knowing the chemical composition of the $PM_{2.5}$ mix is important for determining sources of pollution and potential links between observed health effects. $PM_{2.5}$ speciation samplers are designed to use different inlet tubes and filters to collect the components of the $PM_{2.5}$ mixtures. The process consists of using three different types of filters to separate out such specific compounds as: sulfate, nitrate, organic and elemental carbon, ammonium, metals, and certain ions.

In 2014, a nationwide assessment was conducted of the Chemical Speciation Network (CSN) to create an optimized network that meets primary monitoring objectives. Historically, the CSN had consisted of a core set of 52 speciation-trends analysis sites, as well as a variable number of supplemental sites. The recommendations from the CSN assessment were implemented in September 2014 - January 2015. In Ohio, this resulted in U.S. EPA terminating funding for the speciation sites in Columbus, Toledo, Youngstown and Portsmouth.

Funding continues for the remainder of Ohio speciation sites and monitoring continues in 2017. U.S. EPA has committed to financial support for two additional speciation monitors that are being added in Cleveland. At the existing Harvard Yard site, 39-035-0065 sampling began January 1, 2017 but was interrupted due to the lack of availability of $PM_{2.5}$ filter cartridges from U.S. EPA. Monitoring has resumed in June 2017. A new site chemical speciation site started in August 2017 is located at the Southerly Water Treatment plant in Cleveland.

Ohio EPA operates 10 $PM_{2.5}$ chemical speciation monitors with an eleventh site beginning sometime later in the summer of 2017, as listed in the table below:

There are no additional changes anticipated going into 2018.

Table 10. Ohio's PM2.5 Chemical Speciation Network

CBSA Name or non-MSA	CBSA Type	Population	AQS Site No.	Site Name	Sampling Began	Collocated (Y/N)
Akron, OH	MSA	704,243	39-153-0023	5 Points	11/21/2001	N
Canton-Massillon, OH	MSA	402,976	39-151-0017	Firestation #8	1/6/2005	N
Cincinnati, OH-KY-IN	MSA	2,151,781	39-061-0040	Taft	12/12/2003	N
Cleveland-Elyria, OH	MSA	2,060,810	39-035-0038	St.Theodos	1/8/2002	Y
Cleveland-Elyria, OH	MSA	2,060,810	39-035-0060	GT Craig	12/26/2000	Y
Cleveland-Elyria, OH	MSA	2,060,810	39-093-3002	Barr	1/1/2006	N
Cleveland-Elyria, OH	MSA	2,060,810	39-035-0065	Harvard Yards	1/1/2017	N
Cleveland-Elyria, OH	MSA	2,060,810	39-035-0076	Southerly WTP	8/5/2017	N
Dayton, OH	MSA	800,909	39-113-0038	Sinclair	1/1/2007	N
Preble County	Non-MSA	41,329	39-135-1001	Preble NCore	1/1/2011	N
Weirton-Steubenville	MSA	120,512	39-081-0017	Steuben	12/1/2013	N
State Totals			**11 sites**			**2 collocated**

3.2.6 $PM_{2.5}$ Network Modifications

Of the changes that have occurred since the 2016 ANP (and/or for the next 18 months), none involve moving or deleting a $PM_{2.5}$ monitor that has recorded violations of the $PM_{2.5}$ NAAQS.

The biggest change to the network was the deployment of $PM_{2.5}$ monitors to Near Road sites at Cleveland, Columbus and Cincinnati. Except for the Cleveland site, these monitors began sampling on January 1, 2017. The Cleveland monitor did not began sampling until April 1, 2017. The Cincinnati site employs the Thermo-Sharp 5030i to collect hourly concentrations at its Near Road site (39-061-0048). Both Columbus (39-049-0038) and Cleveland (39-035-0073) are using the Partisol 2025i to collect 24-hour samples every three days. A black carbon monitor was added at the Columbus Near Road site. It began operating on May 26, 2017.

Other planned $PM_{2.5}$ network changes for 2017 and 2018 are listed here.

Cincinnati, OH-KY-IN MSA

Cincinnati (SWOAQA)

- The Middle scale Yankee Road site in Butler County: SWOAQA is requesting to end the NAAQS exclusion for the $PM_{2.5}$ FRM monitors at the Yankee Road site (39-017-0020), parameter 88101, Method 142, POCs 1 & 4. The end date requested will be December 31, 2017 so that a three-year design value can be calculated at the end of the 2017 monitoring year for the three-year period 2015-2017. The current year 3-year design values for 2015 and 2016 are 11.8ug/m^3 and 11.6ug/m^3 respectively. This request is being made to optimize the $PM_{2.5}$ sampling network in the Middletown area. A letter detailing this request will be submitted to U.S. EPA Region 5, and will include a related request to end $PM_{2.5}$ sampling at the nearby BPG site, 39-017-0022.
- The BPG (39-017-0022) filter based $PM_{2.5}$ monitor increased sampling collection frequency from 1:6 to 1:3 days on April 1, 2017. Pending approval, this site will be discontinued as of December 31, 2017 in an effort to optimize $PM_{2.5}$ sampling in the Middletown area. If the Yankee Road site NAAQS exclusion is ended (see information above), Yankee Road will become the design value site for the area and the BPG site may not be necessary. The Yankee Road and BPG monitors $PM_{2.5}$ FRM monitors are 0.45 miles apart. A letter detailing this request will be submitted to USEPA Region 5.
- Batavia site in Clermont County: The Batavia (39-025-0022) non-FEM continuous $PM_{2.5}$ AQI monitor, (parameter 88502, method 761) is currently a Thermo TEOM 1400ab w/FDMS. This monitor will be replaced due to age with a new MET One BAM non-FEM w/SCC or VSCC (method 731 or 733) in late 2017 or early 2018.
- Carthage site in Cincinnati: The Carthage (39-061-0014) $PM_{2.5}$ monitor will change from an Anderson (method 155) to a BGI (method 142) beginning January 1, 2018. The collocated sampler will no longer be needed at this site to meet QA collocation requirements in the Southwest PQAO and the collocated sampler will be removed. There is currently a BGI collocated site at the Taft site in the SWOAQA network and another at a Yellow Springs site (39-057-0006) in Greene County. This request was approved in last year's ANP, but could not be implemented in 2017 due to other equipment needs.
- Colerain site in Cincinnati: The Colerain (39-061-0010) $PM_{2.5}$ filter based FRM monitors (method 142, POCs 1 & 4) will be discontinued on December 31, 2017. These monitors are not needed for network completeness and meet the CFR criteria for termination. A letter detailing this request will be submitted to U.S. EPA Region 5. The non-FEM continuous $PM_{2.5}$ BAM monitor will continue operating for AQI purposes.
- SWOAQA is considering purchasing and installing a Teledyne API 640X FEM continuous $PM_{2.5}$ instrument (method 238) at their Lower Price Hill site in Cincinnati (39-061-0042) depending on the availability of funds. The purpose would be to begin an FEM/FRM two-year comparability study on January 1, 2018 for this new continuous method. The existing 1:3 intermittent $PM_{2.5}$ FRM samplers at this site would be used in the study. A NAAQS

exclusion for the $PM_{2.5}$ data from the FEM monitor would be requested for the duration of the two-year study.

- A new $PM_{2.5}$ continuous monitor (Thermo Sharp 5030i) was installed at the Cincinnati Near Road site, 39-061-0048, and began sampling January 1, 2017.
- The Sycamore (39-061-0006) FEM/FRM two -year comparability study is complete. The results were favorable allowing the FEM to become the primary monitor beginning January 1, 2017. The FEM $PM_{2.5}$ data will be used for design value calculations as of that date. The FRM sampling frequency was changed from 1:3 to 1:6 and the FRM became the QA collocated monitor at the site, and will be maintained as the required collocated FRM for this FEM method in the network.
- The NAAQS exclusion for the Taft NCore site (39-061-0040) FEM hourly $PM_{2.5}$ monitor was ended as of December 31, 2016. This FEM was not the primary monitor for this site, but the data will be used for NAAQS compliance purposes beginning in January 1, 2017 for days when the filter-based FRM $PM_{2.5}$ monitor does not sample.

Toledo, OH MSA

Toledo

- The Toledo Collins Park $PM_{2.5}$ site (39-095-0028) was relocated at the end of March. The new location is the Toledo Eastside Water Pump station at a former PM_{10} site, 39-095-1003. The new location is 1-mile due north of the Collins Park site. Sampling began on April 1, 2017. Monitoring data from old and new sites can be combined for NAAQS comparison and $PM_{2.5}$ design value determinations. The move was necessitated by new construction on the Collins Park water treatment plant.

3.3 PM_{10} Network

PM_{10} monitors sample particulates that are less than 10 microns in diameter. The particle size collected in the instruments contrast the much smaller particle size collected in $PM_{2.5}$ instruments. 40 CFR 58 Appendix D requires Ohio operate PM_{10} sites in accordance with the following requirements.

Table 11. PM_{10} Minimum Requirements (Number of Stations per MSA)[1]

Population category	High concentrations[2]	Medium concentrations[3]	Low concentrations[4,5]
>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	0-1	0-1	0

1 Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by U.S. EPA and the State Agency.
2 High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM_{10} NAAQS by 20 percent or more.
3 Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS.
4 4 Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS.
5 These minimum monitoring requirements apply in the absence of a design value.

The number of PM10 sites is based on population counts in urban areas and the level of concentrations that historically or currently being measured in these areas. 80% of the annual PM_{10} and short term NAAQS are 40 and 120 ug/m^3 respectively. Based on the three categories pollutant levels defined in the table above, Ohio is required to operate between 11 to 23 PM_{10} sites.

Ohio operates 29 sites exceeding this requirement. The breakdown of sites by MSAs is shown in the table below.

Table 12. Ohio's PM_{10} Monitoring Network

CBSA Name	CBSA Type	Population	2017-2018 Monitors	Design Value <80% of NAAQS?	No. Required Monitors	New Monitors needed
Akron, OH*	MSA	704,243	0	Yes	1-2	0*
Canton-Massillon, OH	MSA	402,976	0	Yes	0-1	0
Cincinnati OH-KY-IN	MSA	2,151,781	6	Yes	2-4	0
Cleveland-Elyria, OH	MSA	2,060,810	7	Yes	2-4	0
Columbus, OH*	MSA	2,021,632	1	Yes	2-4	0*
Dayton, OH	MSA	800,909	2	Yes	1-2	0
Lima, OH	MSA	104,425	0	Yes	0	0
Huntington-Ashland, WV-KY-OH	MSA	361,580	1	Yes	0-1	0
Portsmouth, OH	Micropolitan SA	76,825	2	Yes	0	0
E. Liverpool-Salem, OH	Micropolitan SA	104,806	2	Yes	0	0
Springfield, OH	MSA	135,959	0	Yes	0	0
Toledo, OH*	MSA	605,956	0	Yes	1-2	0*
Weirton-Steubenville, WV-OH	MSA	120,515	2	Yes	0	0
Wheeling, WV-OH	MSA	144,198	1	Yes	0	0
Youngstown-Warren-Boardman, OH-PA	MSA	549,885	4	Yes	1-2	0
Preble Cnty. NCore	Non-MSA	41,586	1	Yes	1	0
State Totals			**29**		**11-23**	**0**

*waivers granted by U.S. EPA; table does not include 3 PM_{10} sites at Haverhill Sun Coke plant in Scioto County and proposed site in Harrison County.

The three metropolitan areas of Columbus, Akron, and Toledo MSAs could require additional PM_{10} monitoring sites. Additional MSAs where PM_{10} monitoring could be require include Canton, Lima, Mansfield and Springfield. However, monitoring waivers were granted by U.S. EPA Region V in the late 1990s and early 2000s. At that time, the emphasis of the national monitoring strategy was to re-allocate limited monitoring resources to emerging areas of more critical air pollution concerns. Because PM_{10} concentrations had been low for many years at many locations nationwide, including Ohio, U.S. EPA Region V approved discontinuation of a number of PM_{10} sites. This reduction of PM_{10} sites in Ohio involved removing one site in Columbus, Akron, Canton and Toledo. Columbus does maintain one PM_{10} site at the Ohio State Fairgrounds (39-049-0024) which continues to measure attainment of the standard. Additional MSAs in Ohio where approval was granted for ending PM_{10} monitoring were Canton, Lima and Mansfield.

3.3.1 PM_{10} Network Modifications

Pending approval, the Lockland (39-061-5001) site with high-volume PM_{10} designated and collocated monitors in Cincinnati will be discontinued December 31, 2017. This site is not needed for network completeness and the collocated monitor is no longer needed since SWOAQA will not operate any high-volume PM_{10} samplers in its network beginning in 2018. A letter detailing this request will be submitted to U.S. EPA Region 5. In addition, the Carthage in Cincinnati Hi-Volume PM10 will be switched to low volume sampler.

3.3.2 PM_{10} Monitor Collocation Network

Like the federal regulations for $PM_{2.5}$, the number of PM_{10} monitors that must be collocated with the same measurement method must be at least 15% of the total number of PM_{10} sites operating within any PQAO. The following table demonstrates that Ohio meets this monitor collocation requirement.

Table 13. No. of PM_{10} Collocated Monitors by PQAO

NE PQAO	No. PM_{10} FRM Sites	# Collocated	Collocated AQS Site No.	Site Name	Same Method/Code Designation	SF
Cleveland	5	1	39-035-0045	Fire Station #13	Yes (063)	1/6
Lake	1	1	39-085-1001	Fairport Harbor	Yes (063)	1/6
MTAPCA	4	1	39-099-0006	Fire Station #5	Yes (063)	1/6
		1	39-155-0014	Laird1	Yes (062)	1/6
NEDO	3	1	39-029-0023	Eastside School	Yes (062)	1/6
			No. Required	**Meets Colo Req. Y/N)**	**Meets Method**	**Meets SF**
Totals	13	5	2	Yes	Yes	Yes
Central PQAO						
CDO	1	1	39-049-0024	Fairgrnds PM	Yes (063)	1/6
SEDO	3	1	39-081-0017	Steuben	Yes (063)	1/6
		1	39-013-0006	Shadyside PSD	Yes (125)	1/6
			No. Required	**Meets Colo Req. Y/N)**	**Meets Method**	**Meets SF**
Totals	4	3	1	Yes	Yes	Yes
Southwest PQAO						
SWOAQA	6	1	39-061-5001	Lockland	Yes (063)	1/6
		1	39-061-0040	Taft	Yes (125)	1/3
RAPCA	3	1	39-113-7001	Moraine FS	Yes (063)	1/6
		1	39-135-1001	Preble NCore	Yes (125)	1/3
Portsmouth	3	1	39-145-0013	PWTP	Yes (062)	1/6
			No. Required	**Meets Colo Req. Y/N)**	**Meets Method**	**Meets SF**
Totals	12	5	2	Yes	Yes	Yes
State Total	**29**	**14**				

3.4 SO_2 Monitoring Network

Population Weighted Emissions Index

40 CFR 58 Appendix D. (4.4), requires that each state calculate the population weighted emissions index (PWEI) for each Core Based Statistical Area (CBSA) within the state, or shared with another state, for use in the implementation of, or adjustment to the state's existing SO_2 monitoring network. This new requirement was part of U.S. EPA's revision to the SO_2 NAAQS promulgated in 2010. These PWEI must be calculated and re-evaluated each year using the latest available population census and emission inventories.

The minimum PWEI monitoring requirements can be satisfied by an existing or new SO_2 site that is sited within the boundaries of the parent CBSA provided the site is one of the following station types: population exposure, highest concentration, source impacts, general background, or regional

transport. SO_2 monitors at NCore stations can be counted towards satisfying the minimum monitoring requirements if that monitor is located within a CBSA. Any monitor that is sited outside of a CBSA to assess the highest concentration resulting from the impact of significant sources or source categories existing within that CBSA shall be allowed to count towards minimum monitoring requirements for that CBSA.

Ohio is required to operate 9 SO_2 monitors. Ohio operates 28 qualifying SO_2 sites exceeding the requirement of the PWEI requirement, as specified above. All of these sites measure hourly and 5-minute maximum averages. The table below shows this breakdown by MSAs.

Table 14. Ohio's SO_2 Monitoring Network

Micro/MSA/CBSA/non-MSA Name	CBSA Type	No. Required Monitors based on PWEI value	No. of qualifying monitors in CBSA	New Monitors needed
Adams County	Non-MSA	0	1	0
Ashtabula, OH	Micropolitan SA	0	1	0
Akron, OH	MSA	0	2	0
Canton-Massillon, OH	MSA	0	0	0
Cincinnati OH-KY-IN	MSA	2	5	0
Cleveland-Elyria, OH	MSA	2	6	0
Columbus, OH	MSA	1	1	0
Dayton, OH	MSA	0	0	0
Huntington-Ashland, WV-KY-OH	MSA	0	1	0
Lima, OH	MSA	0	1	0
Marietta, OH	Micropolitan SA	1*	1*	0
Point Pleasant, WV-OH	Micropolitan SA	1	1	0
Portsmouth, OH	Micropolitan SA	0	1	0
Preble County	Non-MSA	0	1	0
Salem-E. Liverpool OH	Micropolitan SA	0	1	0
Springfield, OH	MSA	0	1	0
Toledo, OH	MSA	1	1	0
Weirton-Steubenville WV-OH	MSA	0	1	0
Wheeling, OH	MSA	0	1	0
Youngstown-Warren-Boardman, OH-PA	MSA	1	1	0
Statewide Totals		**9**	**28**	**0**

*The SO_2 monitor is located in adjacent Morgan County next to the border of Washington County. It was located there to monitor emissions from the Muskingum River Power Plant (whose emissions dominate the 2011 inventory for Washington County)

3.4.1 Data Requirement Rule- SO_2 Gavin/Kyger Network

On August 21, 2015, U.S. EPA promulgated the Data Requirement Rule (DRR) (80 FR 51052). Under the DRR, states are required to characterize concentrations of SO_2 from emission sources with actual annual emissions of 2000 tons or more. The state can accomplish this either through air monitoring or air quality modeling. The results of any monitoring or modeling may be used in future determinations of attainment status. Ohio EPA elected to use ambient air quality monitoring to characterize air quality around two power plant sources that emit more than 2000 tons a year. These are Lightstone Generation LLC's General James M. Gavin and the Ohio Valley Electric Corporation (OVEC) Kyger Creek power plants. A DRR monitoring network was installed in late 2016 and began operating January 1, 2017. The network consists of 3 sites each equipped with SO_2 monitors and two sites with 10-meter meteorological sampling towers. These three SO_2 sites are operated by OVEC and their contractor, Shell Engineering. The Ohio EPA established a fourth site in Cheshire near the Gavin Power Plant. This site was a relocation of the SLAMS Pomeroy site that

was discontinued in July 2016. All four sites are designated as a SLAMS sites. The entire network is located along the Ohio River in Gallia County.

3.4.2 SO_2 Network Modifications

Based on the requirements in 40 CFR 58 Appendix. D, (4.4), and after this year's analysis of the DRR rule to determine any new sources that would require monitoring, there will be no additional SO_2 sites required or anticipated in Ohio's network. A list of changes in Ohio that have occurred since our last annual network plan are:

Meigs County, Pomeroy

SEDO

- SO_2 site 39-105-0003 in Pomeroy was discontinued and relocated to the Guiding Hand School building Cheshire, Ohio in Gallia County. The new site is part of the Gavin/Kyger SO_2 monitoring being conducted around these power plants in Gallia county. Sampling began January 1, 2017.

Point Pleasant Micropolitan Statistical Area

SEDO-Gallia County

- As part of the SO_2 Data Requirements Rule, an SO_2 monitoring network comprising of three sites were established around the Gavin and Kyger Creek power plants near Cheshire, Ohio in Gallia county. One additional SO_2 site using the monitor from the former Pomeroy has also been located near the Gavin Power Plant. All four sites began operating January 1, 2017. A separate monitoring plan and QAPP have been submitted to U.S. EPA Region V which describes the sampling and quality assurance operations in detail. The Gavin/Kyger monitoring network plan report can be seen on Ohio EPA's website http://epa.ohio.gov/dapc/ams/amsmain.aspx#126983982-air-monitoring-plan

3.5 Nitrogen Dioxide Network

Nitrogen dioxide (NO_2) sampling sites in Ohio will remain at the current number of 7 sites and meets the number of NO_2 monitors that are required.

40 CFR 58 Appendix D. (4.3) specifies minimum area-wide and Near Road NO_2 monitoring requirements. Area-wide monitoring must be conducted in CBSAs with populations of one million or more. In these areas, a minimum of one monitor is required and should be sited to capture the highest concentrations at a neighborhood or larger spatial scale. Ohio operates area-wide NO_2 monitors at the NCore sites in Cleveland (GT Craig, 39-035-0060)) and Cincinnati (Taft, 39-061-0040). In Columbus, to meet this requirement, a NO_2 monitor is operated near downtown at the Franklin Park Conservatory site (39-049-0037).

In addition, Ohio is required to operate three Near Road sites. Near Road NO_2 monitoring requirements are based on population of CBSAs and Annual Average Daily Traffic counts (AADT) of road segments within the CBSAs. One monitor is required in CBSAs with 500,000 or more people near a road with high AADT counts. Near Road monitors are to be located to capture maximum one hour concentrations at a micro-spatial scale. The Near Road sites in Ohio are: Cleveland, 39-035-0073, Columbus 39-049-0038 and Cincinnati, 39-061-0048. The AADT at these sites are 168,200, 142,361 and 131,242 respectively.

A seventh CO monitor is operated as a result of PSD requirements in Shadyside, Ohio.
Table 15 presents Ohio's NO_2 network in 2017.

Table 15. 2017 Ohio NO2 Network

CBSA Name/Site No.	CBSA Type/ Site Name	Population	NO_2 Monitor Purpose	No. Required Monitors	No. of Monitors
Cincinnati OH-KY-IN	MSA	2,151,781			
39-061-0040	Taft		NCore	1	1
39-061-0048	Cinci_NR		Near Road	1	1
Cleveland-Elyria, OH	MSA	2,060,810			
39-035-0060	GT Craig		NCore	1	1
39-035-0073	Cleveland NR		Near Road	1	1
Columbus, OH	MSA	2,021,632			
39-049-0037	Franklin		Area Wide Urban	1	1
39-049-0038	Smoky Row		Near Rd.	1	1
Wheeling, WV-OH					
39-013-0006	Shadyside PSD	144,198	PSD	1	1
Site Totals				**7**	**7**

3.6 Carbon Monoxide Network

In 2017, Ohio is operating CO monitors at 14 sites. This exceeds the 6 minimum sites required. Table 16 below shows the current network in Ohio.

Table 16. Ohio's CO Monitoring Network

MSAs	AQS Site No.	Site Name	MSA Population	Monitoring Location/Obj.	Measurement Scale
Akron	39-153-0020	Patt_Park	704,243	Highest concentration	Neighborhood
	39-153-0025	NIHF STEM		Population Exposure	Microscale
Canton	39-151-0020	Canton Health	402,976	Population Exposure	Microscale
Columbus	39-049-0005	Morse Rd	2,021,632	Highest concentration	Microscale
	39-049-0038*	Smoky Row	2,021,632	NO_2 Near Road	Microscale
Cincinnati, OH-KY-IN	39-061-0040*	Taft	2,151,781	NCore	Neighborhood
	39-061-0048*	Cinci_NR	2,151,781	Near Road	Neighborhood
Cleveland- Elyria	39-035-0051	Galleria	2,060,810	Population Exposure	Microscale
	39-035-0060*	GT Craig	2,060,810	NCore	Neighborhood
	39-035-0073*	Cleveland_NR	2,060,810	NO_2 Near Road	Microscale
	39-085-0006	Mentor		Highest concentration	Microscale
Dayton	39-113-0034	Reibold	800,909	Population Exposure	Microscale
	39-135-1001*	Preble NCore	Non-MSA	NCore	Regional Transport
Wheeling WV-OH	39-013-0006	Shadyside PSD	144,198	PSD pre-construction	Neighborhood
Statewide Totals	**14 operated *Six required**				**8 Microscale 5 Neighborhood 1 Regional Transport**

40CFR 58, Appendix D (4.2.1) requires one CO monitor to be co-located with any required NO_2 Near Road monitor in CBSAs having a population of 1,000,000 or more persons. There is one CO monitor at each of Ohio's three Near Road sites. These sites are located in Cleveland, Columbus and Cincinnati.

- 39-035-0073 Station is along I-495 in the Cleveland area. Traffic count: 168,200/day.
- 39-049-0038 Station is along I-270 Columbus north outer-belt. Traffic count: 142,361/day.
- 39-061-0048 Station is along I-75 Cincinnati. Traffic count: 131,242/day.

40 CFR Part 58, Appendix D 3(b) also requires a CO monitor at each NCore site in a state. The following NCore sites each include one CO monitor:

- 39-035-0060 The GT Craig site near downtown Cleveland.
- 39-061-0040 The Taft site located in urban Cincinnati off William-Howard Taft Road.
- 39-135-1000. The Preble county site which is near the Indiana border. This is a regional transport site monitoring air from states west of Ohio.

3.6.1 Carbon Monoxide Network Modifications

No changes have taken place to date in 2017 and none are expected for the remainder of 2017 and 2018.

3.7 Lead (Pb) Network

40 CFR 58 Appendix D. 4.5(a) requires state and local agencies to conduct ambient air Pb monitoring near lead sources which are expected to or have been shown to contribute to a maximum lead concentration exceeding the NAAQS, taking into account the logistics and potential for population exposure. Ohio is required to operate source-oriented monitors near facilities emitting 0.5 tons/yr. of lead that also have maximum lead concentrations in excess of 50 percent of the NAAQS.

Table 17 shows Ohio's lead and metals network that operated in 2017. There are 13 sites collecting filters for lead and metals analysis. The newest site started sampling in June and is in Canton across the street from Republic Steel.

Table 17. Ohio's Lead/Metals Monitoring Network

AQS	Monitoring Objective Notes	City	County	Address
39-029-0019	Near WTI incinerator; source-oriented Population Exposure, neighborhood	E. Liverpool	Columbiana	1250 St. George St.
39-029-0020	Near WTI incinerator; Source-oriented, neighborhood	E. Liverpool	Columbiana	2220 Michigan Ave.
39-029-022 became -0023*	Near WTI incinerator; collocated Source-oriented, middle-scale Location moved 100 meters,	E. Liverpool	Columbiana	500 Maryland Ave.
39-035-0049*	Source oriented (Ferro), middle scale Collocated; active in PEP program.	Cleveland	Cuyahoga	4150 East 56th St.
39-035-0061	Near permanently shut down facility (Master Metals) source oriented, neighborhood scale	Cleveland	Cuyahoga	West 3rd. St.

AQS	Monitoring Objective Notes	City	County	Address
39-051-0001*	Source oriented (Bunting Bearing), middle scale, active in PEP program.	Delta	Fulton	200 Van Buren St.
39-101-0003	Source oriented; Required under 2008 Pb NAAQS (Nucor Steel), middle scale	Marion	Marion	Hawthorne Ave.
39-101-0004	Source oriented; Nucor Steel recycling Population Exposure, middle scale	Marion	Marion	640 Bellefontaine
39-167-0008*	Dominant source-point Population Exposure, neighborhood	Marietta	Washington	Lancaster Rd.
39-151-0024	New special purpose monitor, source oriented (Republic Steel) starting 6/17.	Canton	Stark	3150 Georgetown Rd NE
39-035-0038	Population Exposure, neighborhood, non-source oriented	Cleveland	Cuyahoga	2547 Tikhon Ave.
39-035-0042*	Population Exposure, middle scale Collocated, non-source oriented	Cleveland	Cuyahoga	3136 Lorain Ave.
39-049-0039*	Highest conc., neighborhood, sampling in area of closed glass and steel plants.	Columbus	Franklin	580 E. Woodrow Ave.

*collocated monitor

3.7.1 Lead Collocation Network

The collocation monitoring sites required is a minimum of 15 percent of required lead monitors in a PQAO. Both the primary and collocated sampler must be the same federal reference method. Ohio operates six collocated monitors as noted in Table 18 and exceeds the 15% requirement.

Table 18. Pb Collocation Network*

NE PQAO	No. Pb Sites	# Collocated	AQS Site No.	Site Name	Same Method/Code Designation	SF
Canton	1	0	39-151-0024	Republic Steel	Yes (192)	1/3
Cleveland	4	1	39-035-0042	Firestation #4	Yes (192)	1/6
		1	39-035-0049	Ferro	Yes (192)	1/6
NEDO	3	1	39-029-0023	Eastside School	Yes (192)	1/6
			No. Required	Meets Colo Req. Y/N)	Meets Method	Meets SF
Totals	**8**	**3**	**1**	**Y**	**Y**	**Y**
Central PQAO	**No. Pb Sites**	**# Collocated**	**Collocated AQS Site No.**	**Site Name**	**Same Method/Code Designation**	**SF**
CDO	1	1	39-049-0039	Woodrow	Yes (192)	1/6
SEDO	1	1	39-167-0008	Washington Career_ C	Yes (192)	1/6
			39-013-0006	Shadyside PSD	Yes (192)	1/6
NWDO	1	1	39-051-0001	Delta	Yes (192)	1/6
	1	0	39-101-0003	Marion Hawthorne	Yes (192)	1/6
	1	0	39-101-0004	Marion Bellefontaine	Yes (192)	1/6
			No. Required	Meets Colo Req. Y/N)	Meets Method	Meets SF
Totals	**5**	**3**	**1**	**Y**	**Y**	**Yes**
State Totals	**13**	**6**			**Y**	**Yes**

* The entire network is presented here as well as those sites that have a collocated lead monitor.

3.7.2 Lead/Metals Monitoring Network Modifications

Ohio EPA has the following plans for the 2017-2018 Pb monitoring network which includes several sites that were terminated at the end of 2016 with U.S. EPA Region V approval:

- Ohio EPA discontinued lead/metals monitoring at the former Daido plant, now shut down, in Bellefontaine in Logan County (39-091-0006). Monitoring data analysis shows Pb concentrations well below the NAAQS. This facility permanently shut-down years ago. This monitor existed prior to the 2008 revision of the Pb NAAQS and had shown exceedances of the NAAQS prior to the facility closure. Ohio EPA received concurrence from U.S. EPA Region V.
- Ohio EPA ended sampling at Dayton's NCore site (39-113-7001) for lead and metals on Dec. 31, 2016. This site was considered the alternate lead monitoring location for the NCore site, 39-135-1001 in Preble County. Moraine is just south of Dayton. Approval was received from U.S. EPA Region V.
- Ohio EPA ended sampling at the Cleveland NCore site (39-035-0060) for lead and metals on Aug 26, 2016.
- A new Pb monitoring site was installed across the street from the Canton Republic Steel complex in Stark County. This special purpose monitoring is required by permit.

3.7.3 Annual Lead Emissions Review

On an annual basis, Ohio EPA works with U.S. EPA in reviewing the latest emissions inventories to determine if additional sources warrant monitoring in accordance with the 2008 Pb NAAQS source-oriented monitoring requirements. These inventories include the most recent versions of the National Emissions Inventory (NEI), Toxics Release Inventory (TRI) and Ohio's annual emissions reporting system. Ohio EPA reviewed current emissions inventories and determined no new sources exceeds the 0.5 ton per year threshold and therefore, no new Pb monitoring is required.

3.7.4 Lead Monitoring Waiver Review

In 2008, U.S. EPA revised the NAAQS for lead (Pb). The Pb standard was lowered from 1.5ug/m^3 quarterly average to 0.15 ug/m^3 based on the highest 3-month rolling average during a three-year period.

In the 2008 rulemaking (referred to as "first round"), U.S. EPA set minimum monitoring requirements for source-oriented and population-oriented sampling. Beginning in 2010, facilities with actual emissions of Pb greater than one ton per year were required to be monitored. Facilities with actual emissions of Pb greater than 0.7 ton per year were required to be modeled to determine if they would exceed more than 50% of the new Pb standard. States could request a waiver for monitoring sources over one ton per year if it was shown through modeling there was less than a 50% impact of the new Pb standard. Once a source was determined to require monitoring, Ohio EPA used dispersion modeling to determine the appropriate location for siting. Where CBSAs were greater than 500,000 people, selecting a specific site would depend on there being a population cluster near the emitter.

With respect to source-oriented monitoring for the first round of Pb monitoring, Ohio EPA reviewed current emissions inventories and found several sources with actual emissions greater than one ton per year. The following sources were modeled for monitor placement and monitoring commenced in 2010: American Spring Wire in Cuyahoga County (39-035-0072), Ellwood

Engineering Castings in Trumbull County (39-155-0012[1]), Nucor Marion Steel in Marion County (39-101-0003[2]), and Timken Steel in Stark County (39-151-0017[3]). Two sources were identified with actual emissions of Pb greater than 0.7 ton per year but less than one ton per year. These sources, Lightstone Generation LLC-Gavin Power Plant in Gallia County and Bunting Bearings in Fulton County, were modeled and their impacts were less than 50% of the NAAQS. However, Bunting Bearings was already a monitored source with exceedances of the revised Pb NAAQS. Therefore, monitoring continues at this site (39-051-0001) although not required by the Pb monitoring rule.

Subsequently, in December 2010, U.S. EPA strengthened the Pb monitoring rule ("round two") to require source-oriented monitors for sources greater than 0.5 ton per year. Again, states could request a waiver for monitoring sources over 0.5 ton per year if it was shown through modeling there would be less than a 50% impact of the new Pb standard. For this round, Ohio EPA reviewed current emissions inventories and found the following three facilities with Pb emissions exceeding 0.5 ton per year, not currently being monitored: Lightstone Generation LLC- Gavin Power Plant in Gallia County and I. Schumann in Cuyahoga County. Both facilities were determined to have less than a 50% impact of the new Pb standard and waivers were requested, and granted, for each facility. These were presented in Ohio's 2011-2012 Annual Monitoring Network Plan.

These waivers were granted based upon modeling of actual emissions. Ohio EPA reviewed actual emissions from the TRI, Ohio's annual emission reporting system, and the NEI for years 2005 to 2009 when performing the original modeling. The highest reported emissions from that period for each facility was used in the waiver modeling in order to be conservative. The following presents the actual emissions which produced the following modeling results to compare to half of the Pb NAAQS (0.075 ug/m3):

- Gavin –modeled 0.8 tons per year (TPY) of Pb emissions and obtained a result of 0.00742 ug/m3 inclusive of background.
- I.Schumann - modeled 0.79 TPY of Pb emissions and obtained a result of 0.0270 ug/m3 inclusive of background.

As a part of a 5-year review of the approved waivers, Ohio EPA analyzed reported emissions from 2010 to 2015 to determine if additional modeling would be necessary to continue the waiver process. The following is the highest emissions reported between 2010 and 2015 for each facility:

- Gavin – 0.40 TPY
- I.Schumann – 0.75 TPY

Therefore, emissions levels have remained below those thresholds already modeled for the waiver requests and updates to those requests are not warranted. Ohio EPA requests the waivers remain approved. In addition, no new waivers are being proposed.

3.8 Ohio's Toxics Network

Within its air quality monitoring program, Ohio EPA, Division of Air Pollution Control (DAPC) operates a network of air toxics monitors as part of a state-wide Air Toxics Monitoring Program (ATMP). This ATMP sampling network is modeled after programs and methodologies recommended by U.S. EPA. The emphasis has been on urban toxics monitoring for volatile organic

[1] Due to low monitoring concentrations this site was approved by U.S. EPA for discontinuance as part of Ohio's 2014-2015 Monitoring Network Plan.
[2] Site 39-101-0004 also monitors lead at Nucor; however, this monitor is not a required monitor for the 2008 Pb NAAQS.
[3] Due to low monitoring concentrations this site was approved by U.S. EPA for discontinuance as part of Ohio's 2014-2015 Monitoring Network Plan.

compounds and heavy metals. This network has been mapped and is shown in Appendix D along with maps depicting all of Ohio's pollutant networks.

The main focus of the ATMP is on urban monitoring, looking for major risk areas where people live. In this effort sampling has concentrated on groups of compounds. Volatile Organic Compounds (VOC) such as benzene, chloroform, styrene and toluene. The monitored metals are: arsenic, beryllium cadmium, chromium, iron, lead, manganese, nickel and zinc.

The majority of the sampling has been conducted at semi-permanent monitoring sites where monitoring extended beyond a six-month period. The intermittent sampling stations at these types of sites have been dedicated to VOCs and heavy metals monitoring.

3.8.1 Toxics Network Modification

Canister sampling began every twelve days in October 2015 at a Center City site in southeast Columbus on E. Woodrow Avenue. This site (39-049-0039) is an existing $PM_{2.5}$ and lead/metals site. In the Cincinnati area, the VOC monitor at Kibby Lane site 39-061-0047 will have a sample collection frequency change from 1/6 to 1/12 days later in 2017. This monitor was required under a U.S. EPA/Ohio EPA consent decree with Ineos Corp. a plastics and polymers production facility. The consent decree has expired and all parties are in agreement to continue sampling, however, at a reduced frequency.

3.8.2 Volatile Organic Compound Sampling and Analysis

A major component of the Air Toxics Monitoring Program is ambient sampling for volatile organic compounds (VOCs); compounds that are generally found in the vapor state. VOC samples are collected using a whole air sampling system that pumps ambient air into a stainless steel canister. The canister allows an air sample to be maintained virtually unchanged until it is analyzed. In addition to the pumped-sampling method, a number of samples were collected using only the vacuum of the canister to draw in an air sample. These vacuum-filled "grab" samples usually take only a few minutes to collect and are useful for collecting transient odors or potentially high concentration samples. DAPC is now capable of collecting specific samples for 1, 3, 8 and 24-hours using this grab sampling method.

Ohio EPA will continue to conduct, except where otherwise indicated, canister sampling and analysis in 2017-2018 at the 10 permanent and semi-permanent monitoring sites listed in Table 19.

Table 19. Ohio's VOC Monitoring Network

AQS Site No.	City	County	Address	Monitoring objective
39-035-0038	Cleveland	Cuyahoga	2547 St. Tikhon Ave.	Source-oriented/Industrial valley
39-035-1002	Cleveland	Cuyahoga	16900 Holland Rd.	Urban
39-049-0034	Columbus	Franklin	Korbel Ave.	Urban
39-049-0039*	Columbus	Franklin	580 W. Woodrow	source-oriented/Columbus Castings*
39-081-0017	Steubenville	Jefferson	618 Logan St.	Ohio River Valley industrial air-shed
39-017-0019	Middletown	Butler	1300 Oxford State Rd	Source-oriented/AK Steel & Sun-Coke
39-017-0020	Middletown	Butler	3350 Yankee Rd.	Source-oriented/AK Steel & Coke
39-061-0014	Cincinnati	Hamilton	Seymour & Vine Sts	Urban
39-061-0047	Cincinnati	Hamilton	7529 Gracely Ave.	Source-oriented/Ineos Corp.
NA/Semi-permanent	Carrollton	Carroll	5629 Cobbler Rd.	Source-oriented/ fracking operation
Statewide Totals	**10**			

*Columbus Castings is no longer in operation.

4.0 NCore Monitoring Network

NCore is a multi-pollutant approach to air monitoring that provides support to integrating air quality management data needs. NCore sites are intended to support multiple objectives, with a greater emphasis on assessment of the impact-abatement control measures on improving air quality. Air pollution data from the national NCore network can be used to supplement data collected by researchers working on health-effect assessments and atmospheric processes, or for monitoring methods-development work.

Each state is required to operate at least one NCore site. States with many MSAs, like Ohio, often have multiple air sheds with unique characteristics. Therefore, states like Ohio were required to establish 1-2 additional sites in order to account for unique situations. Ohio operates one urban NCore site in Cleveland and Cincinnati and one rural NCore site as a regional transport site in Preble County near the Ohio-Indiana border.

NCore sites are required under 40 CFR 58, Appendix D to measure the following pollutants; $PM_{2.5}$ particle mass using continuous and integrated filter base samplers, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$ particle mass, ozone, SO_2, CO, nitrogen oxides (NO/NO2), total reactive nitrogen oxides (NOy), and meteorological monitoring. Ozone is to be measured year-round and many of the other monitoring instruments are to be trace-level units designed to reliably measure much lower pollutant concentrations. Ohio meets all these requirements. Three NCore sites in Ohio began operating in 2011. In 2015, as part of U.S. EPA's air monitoring modifications, lead monitoring at most NCore sites nationwide was permitted to end (very low concentrations were collected since the inception of the NCore program in 2011). The lead monitors at Ohio's three NCore sites were terminated by the end of 2016.

Table 20. Ohio's NCore Monitoring Sites

AQS Site No.	Site Address	Site Name	MSA	Measurement Scale
39-035-0060	2650 E. 14th Ave., Cleveland	GT Craig	Cleveland-Elyria	Neighborhood
39-061-0040	250 Wm. Howard Taft Rd, Cincinnati	Taft	Cincinnati, OH-KY-IN	Neighborhood
39-135-1001	6940 Oxford Gettysburg Rd. New Paris	Preble NCore	Non-MSA	Regional

5.0 SEDO Community Scale Grant Project

Ohio EPA received funding from U.S. EPA to conduct a Community-Scale Air Toxics monitoring project near Hopedale in Harrison County. The purpose of the project is to characterize near-source concentrations of criteria and toxic pollutants from Ohio's oil and gas industry. This will allow Ohio EPA to assess the need for emission reduction measures, and to characterize risk for the most highly impacted populations.

Both ambient pollutant and meteorological monitoring will be conducted for approximately two and a half years. The monitoring program consists of $PM_{2.5}$, PM_{10}, operation of a gas chromatograph for collection of hydrocarbons, hydrogen sulfide, and fielding stainless steel canisters for sampling various VOCs and hydrocarbons. The gas chromatograph is expected to start sampling by January 2018. The remaining portion of the proposed monitoring is expected to also begin by January 2018.

6.0 Black Carbon

Black Carbon (BC) is a solid form of mostly pure carbon which absorbs solar radiation (light) at all wavelengths. It is formed by incomplete combustion of fossil fuels, biofuels, or biomass.
BC is one of the types of particles which constitute particulate matter (PM), and is one of the key components of soot.

Ohio EPA currently operates two black carbon monitors, and a third monitor is scheduled to begin sampling on January 1, 2018.

Table 21. Ohio Black Carbon Monitors

AQS Site No.	Site Address	MSA	SF	Started
39-049-0038	7560 Smoky Row, Columbus	Columbus, OH	Continuous	5/26/2017
39-061-0048	3428 Colerain Ave., Cincinnati	Cincinnati OH-KY-IN	Continuous	1/1/2016
39-061-0040	250 Wm. Howard Taft Rd. Cincinnati	Cincinnati OH-KY-IN	Continuous	To begin 1/1/2018

7.0 Public Review and Comment

The annual monitoring network plan must be made available for public inspection for thirty days prior to submission to U.S. EPA. For the July 2017 submittal, this document was placed on Ohio EPA's website on June 9, 2017 to begin the 30-day public review period.

This document can be accessed at the following link:
http://epa.ohio.gov/dapc/ams/amsmain

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