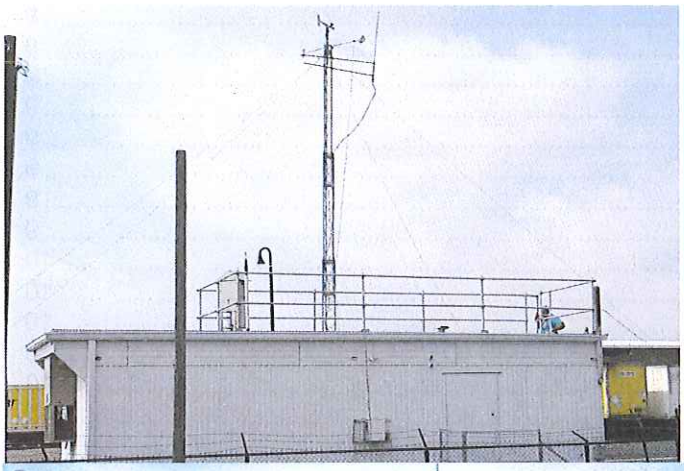
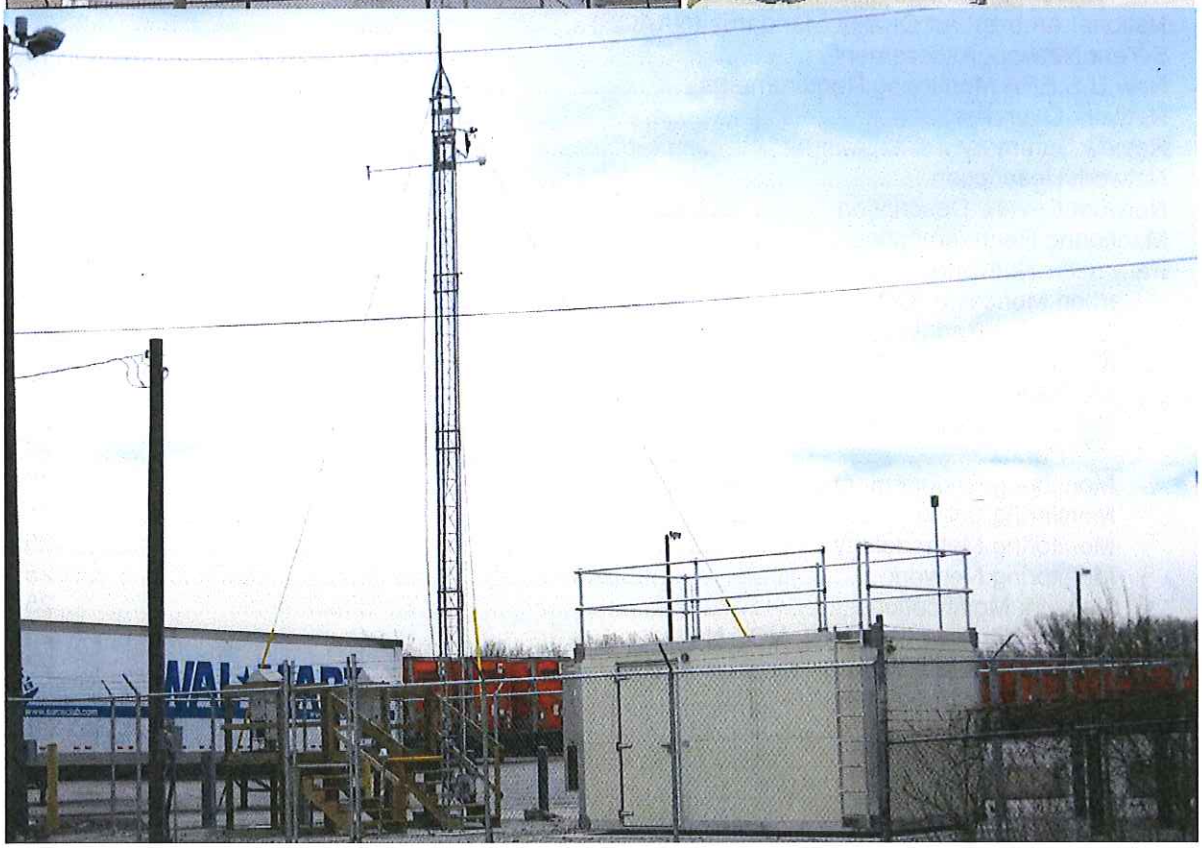
Indiana
2014
Ambient Air Monitoring
Network Plan





Indiana Department of Environmental Management
Office of Air Quality
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Acronyms

AADT	Annual Average Daily Traffic
AAMMS	Ambient Monitoring and Methods Subcommittee
APCD	Louisville Metropolitan Air Pollution Control District
AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta Attenuation Monitor
CASAC	Clean Air Science Advisory Committee
CBD	Central Business District
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
CSA	Combined Statistical Area
CO	Carbon Monoxide
DNPH	2,4-Dinitrophenylhydrazine
DV	Design Value
FDMS	Filter Dynamic Measurement System
FE_AADT	Fleet Equivalent Adjusted Annual Average Daily Traffic
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
GC	Gas Chromatograph
GC/MS	Gas Chromatograph / Mass Spectrometry
HPLC	High Pressure Liquid Chromatography
ICP/MS	Inductive Coupled Plasma / Mass Spectrometry
IDEM	Indiana Department of Environmental Management
INDOT	Indiana Department of Transportation
IMPROVE	Interagency Monitoring of Protected Visual Environments
KDEP	Kentucky Department for Environmental Protection
LADCO	Lake Michigan Air Directors Consortium
LEADS	Leading Environmental Analysis and Display System
MSA	Metropolitan Statistical Area
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standard
NAMS	National Air Monitoring Station
NATTS	National Air Toxics Trends Station
NCore	National Core multi-pollutant monitoring stations
nm	Nanometer
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NO_y	Total Reactive Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Administration
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Station
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
PSD	Prevention of Significant Deterioration
PTFE	Polytetrafluoroethylene
PWEI	Population Weighted Emissions Index
QA	Quality Assurance
SWOAQA	Southwest Ohio Air Quality Agency
SASS	Speciation Air Sampling System
SHARP	Synchronized Hybrid Ambient Real-time Particulate
SLAMS	State or Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SPM	Special Purpose Monitor
STN $PM_{2.5}$	Speciation Trends Network
TAD	Technical Assistance Document
TPY	Tons per Year
TSP	Total Suspended Particulate
TEOM	Tapered Element Oscillating Microbalance
ug/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

Introduction

In October 2006, U.S.EPA issued final regulations concerning state and local agency ambient air monitoring networks. These regulations in 40 CFR Part 58.10 require states to submit an annual monitoring network review to U.S.EPA. This network plan is required to provide the framework for establishment and maintenance of an air quality surveillance system and to list any changes that are proposed to take place to the current network during the 2014 season.

Public Review and Comment

The annual monitoring network plan must be made available for public inspection for 30 days prior to submission to U.S.EPA. Information on how to comment on the plan and any comments received are listed in Appendix A.

Indiana's Air Monitoring Network

IDEM regulates air quality to protect public health and the environment in the State of Indiana. Air monitoring data are required by regulation and are used to determine compliance with U.S.EPA's NAAQS. Other important uses of the air monitoring data includes, the production of a daily AQI report, daily air quality forecast report, support of short and long-term health risk assessments, identification of a localized health concern, and tracking long-term trends in air quality. Indiana monitors the six criteria pollutants which have NAAQS identified for them; CO, lead, NO_2, O_3, particulate matter (PM_{10} and $PM_{2.5}$), and SO_2. Other pollutants which do not have an ambient standards established for them are also monitored; toxics (VOCs), metals, carbonyls, $PM_{2.5}$ speciated compounds, and ozone precursors. In addition, meteorological data are also collected to support the monitoring and aid in analysis of the data.

Air Quality Data

IDEM presents two different types of air quality data, intermittent and continuous on IDEM's Internet website http://www.in.gov/idem/airquality/2346.htm. Annual and quarterly summary reports of pollutants collected by manual methods are available as well as hourly values from continuous monitors. LEADS provides on-line access to Indiana's continuous air quality monitoring network. It has been available to the public since July, 2007. LEADS offers access to near real-time data from 60 continuous air monitoring sites across Indiana. This allows anyone to track pollutant and meteorological values throughout the day. In addition, past data back to 1998 are available as raw data and canned summary reports or user specified retrievals. Plans are underway to add intermittent data to LEADS, bringing all data into one system.

Overview of Monitored Parameters

Criteria Pollutants

Carbon Monoxide (CO)

CO is a poisonous gas that, when introduced into the bloodstream, inhibits the delivery of oxygen to body tissue. The health risk is greatest for individuals with cardiovascular disease.

Lead (Pb)

Lead is a metal that is highly toxic when ingested or inhaled. It is a suspected carcinogen of the lungs and kidneys and has adverse effects on cardiovascular, nervous, and renal systems.

Nitrogen Dioxide (NO_2)

NO_2 is a highly toxic, reddish brown gas that is created primarily from fuel combustion in industrial sources and vehicles. It creates an odorous haze that causes eye and sinus irritation, blocks natural sunlight, and reduces visibility.

Ozone (O_3)

Ground-level O_3, or photochemical smog, is not emitted into the atmosphere as ozone, but rather is formed by the reactions of other pollutants. The primary pollutants entering into this reaction, VOCs and oxides of nitrogen, create ozone in the presence of sunlight. Ozone is a strong irritant of the upper respiratory system and also causes damage to crops.

Particulate Matter (PM_{10})

Particulate matter with a mean diameter of 10 microns or less is emitted from transportation and industrial sources. Exposure to particle pollution is linked to a variety of significant health problems ranging from aggravated asthma to premature death in people with heart and lung disease.

Fine Particulate Matter ($PM_{2.5}$)

Fine particulate matter with a diameter of 2.5 microns or less is created primarily from industrial processes and fuel combustion. These particles are breathed deeply into the lungs. Exposure to particle pollution is linked to a variety of significant health problems ranging from aggravated asthma to premature death in people with heart and lung disease.

Sulfur Dioxide (SO_2)

SO_2 is a gaseous pollutant that is emitted primarily by industrial furnaces or power plants burning coal or oil containing sulfur. At high concentrations, breathing can be impaired. Damage to vegetation can also result.

Non Criteria Parameters

$PM_{2.5}$ Speciation

U.S.EPA implemented the $PM_{2.5}$ chemical speciation monitoring program. Knowing the chemical composition of the $PM_{2.5}$ mix is important for determining sources of pollution and links between observed health effects. The basic objective of speciation analysis is to develop seasonal and annual chemical characterizations of ambient particulates across the nation. This speciation data will be used to perform source attribution analyses, evaluate emission inventories and air quality models, and support health related research studies and regional haze assessments.

The speciation samplers use different inlet tubes and filters to collect the components of the $PM_{2.5}$ mixture. 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.

Photochemical Assessment Monitoring Station, PAMS (Ozone Precursors)

Of the six criteria pollutants, O_3 is the most encompassing. The most prevalent photochemical oxidant and an important contributor to "smog," O_3 is unique among the criteria pollutants because it is not emitted directly into the air. Instead, it results from complex chemical reactions in the atmosphere between VOCs and NO_x in the presence of sunlight. There are thousands of sources of VOCs and NO_x located across the country. To track and control O_3, U.S.EPA is trying to create an understanding of not only the pollutant itself, but the chemicals, reactions, and conditions that contribute to its formation as well. Because of this, U.S.EPA called for improved monitoring of O_3 and its precursors, VOC and NO_x, to obtain more comprehensive and representative data on O_3 air pollution. U.S.EPA initiated the PAMS program in February 1993. The PAMS program requires the establishment of an enhanced monitoring network in all O_3 nonattainment areas classified as serious, severe, or extreme. Details of what compounds are sampled are found in the Parameter Networks section.

Toxics / Carbonyls / Metals

Toxic air pollutants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer, other serious health effects, or adverse environmental conditions. Air toxics include: semi-volatile and volatile organic compounds (VOC), metals, and carbonyls.

Air toxic compounds are released from many different sources, including mobile sources (vehicles), stationary industrial sources, small area sources, indoor sources (cleaning materials, etc.), and other environmental sources (wildfires, etc.). The lifetime, transportation, and make-up of these pollutants are affected by weather and landscape. They can be transported far away from the original source, or be caught in rain and brought down to waterways or land.

The air toxics, carbonyls, and metals are divided into separate categories due to different sampling and analytical methodologies used for each. With all three categories combined, more than eighty different pollutants are analyzed.

Meteorological Monitoring

Any study of air pollution should include an analysis of the weather patterns (meteorology) of the local area because the fate of air pollutants is influenced by the movement and characteristics of the air mass into which they are emitted.

If the air is calm and pollutants cannot disperse, then the concentration of these pollutants will build up. Conversely, if a strong and turbulent wind is blowing, the pollutant will rapidly disperse into the atmosphere and will result in lower concentrations near the pollution source.

The measurements of wind speed and direction, temperature, humidity, rainfall, barometric pressure, ultraviolet radiation and solar radiation are important parameters used in the study of air quality monitoring results, and to further understand the chemical reactions that occur in the atmosphere. Meteorological monitoring is used to predict air pollution events, high pollutant concentration days and to simulate and predict air quality using computer models.

NCore Monitoring

NCore is a multi-pollutant approach to monitoring. NCore sites are intended to support multiple objectives with a greater emphasis on assessment, research support and accountability than the traditional NAMS/SLAMS networks. NCore provides an opportunity to address new directions in monitoring and begin to fill measurement and technological gaps that have accumulated in the networks. Indiana is required to establish and operate one urban NCore site. These sites are required to measure $PM_{2.5}$, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$, O_3, SO_2, CO, NO, NO_y, Pb, and meteorology.

National Ambient Air Quality Standards (NAAQS)

NAAQS are identified for the criteria pollutants; CO, Pb, NO_2, O_3, particulate matter (PM_{10} and $PM_{2.5}$), and SO_2. Measuring pollutant concentrations in outdoor air and comparing the measured concentrations to corresponding standards determine ambient air quality status of an area; attainment or nonattainment.

The NAAQS are broken down into primary and secondary standards. Primary standards are those established to protect public health. Secondary standards are those established to protect the public welfare from adverse pollution effects on soils, water, vegetation, manmade materials, animals, weather, visibility, climate, property, and economy.

The scientific criteria upon which the standards are based are reviewed periodically by U.S.EPA, which may reestablish or change the standards according to its findings. Note that there are hundreds of compounds that are generally considered pollutants when found in ambient air but whose health and welfare effects are not well enough understood for ambient standards to be defined.

A pollutant measurement that is greater than the ambient air quality standard for its specific averaging time is called an exceedance. This is not necessarily a synonym for a violation; for each pollutant there are specific rules about how many exceedances are allowed in a given time period before a pattern of exceedances is considered a violation of the NAAQS that may result in regulatory actions to further clean up the area's air. This distinction is made to allow for certain limited exceedances of the standard that may occur, for example, during an unusual weather pattern, reserving regulatory action for cases where the exceedances are too large or too frequent.

The design value for a site is the level of pollutant concentration when the rules of the NAAQS calculations are applied to that specific pollutant. For example, the O_3 design value is calculated by taking the three year average of the annual fourth highest daily 8-hour maximums. If this number is above the NAAQS for O_3, then it is a violation or 'nonattainment' of the NAAQS. If the design value is below the

NAAQS then the area is in 'attainment' of the standard. Generally, nonattainment is based on the highest design value reported for a specific geographic area (usually an MSA), and the entire area would be defined by that monitor, and would be classified accordingly. This number basically tells you how polluted an area would be in relation to a NAAQS. A listing of the NAAQS can be found at: http://epa.gov/air/criteria.html

5-Year Network Assessment

U.S.EPA requires a Network Assessment be performed every five (5) years, as per 40 CFR Part 58.10(d). The first Network Assessment has been approved by U.S.EPA. The Lake Michigan Air Directors Consortium, LADCO published "Regional Network Assessment" for the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin, July 1, 2010. The report is available at http://www.ladco.org/reports/general/Regional_Network_Assessment/index.php
Indiana uses the recommendations from the Assessment as an input into the Annual Network Review Process.

New U.S.EPA Monitoring Requirements

Several of the NAAQS and the monitoring requirements for the various pollutants have either been revised recently, are in the final review stages prior to promulgation, or are planning to have proposals within the next year. Even though IDEM is aware of these proposals and how they could possibly affect Indiana's monitoring network, only those requirements which have been approved and are in effect at this time are considered when modifying Indiana's current network.

Network Overview

Indiana has reviewed its current ambient air quality network and developed a proposed network to be implemented during 2014. Current NAAQS, data trends, site redundancy, siting problems, site access concerns, and other identified monitoring issues all contribute to any proposed network revisions.

The number of sites listed in the current monitoring network includes changes planned to have occurred during 2012 and were not, but are planned, or have been completed during 2013. These include the establishment of the Hamilton County site for $PM_{2.5}$, the Bartholomew County site for $PM_{2.5}$, and the Howard County site for $PM_{2.5}$.

Indiana's air monitoring network for 2014 consists of the sites and monitors listed in Table 1. All site changes which have occurred or plan to take place in 2013 are included along with the planned network modifications for 2014. Figure 1 is an overview of Indiana's current monitoring network and shows the locations where some form of monitoring takes place in 2014.

The number of monitoring locations operated by the State is planned to increase by one, from 82 to 83 sites. The number of monitored parameters or monitoring systems will increase from 189 to 195.

Table 1 – State Air Monitoring Network

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
170230001	Clark, IL	West Union, IL	West Union	416 S. Hwy 1	X															X
180030002	Allen	Leo	Leo	Leo HS, 14600 Amstutz Rd.	X															
180030004	Allen	Fort Wayne	Fort Wayne - Beacon St.	2022 N. Beacon St	X						X	X								X
180030011	Allen	Fort Wayne	Fort Wayne - Career Cntr.	Career Center, 203 E. Douglas St.			Discontinue													
18005___	Bartholomew	Columbus									Add	Add								
180050007	Bartholomew		Hope	Hauser Jr-Sr HS, 9404 N775 E.	X	X		X												
180110001	Boone		Whitestown	Perry-Worth Elem Sch., 3900 E. 300 S, Lebanon	X															
180150002	Carroll		Flora	Flora Airport, 481 S. 150 W, Flora	X															X
180190006	Clark	Jeffersonville	Jeffersonville - Walnut St	PFAU, 719 Walnut St.					X		X		X							
180190008	Clark		Charlestown St. Park	Charlestown State Park, 12500 Highway 62, Charlestown	X						X									X
180190009	Clark	Clarksville	Clarksville	Falls of the Ohio State Park, 201 W. Riverside Dr.												X				
180350006	Delaware	Muncie	Muncie - Central HS	801 N. Walnut St.							X									
180350009	Delaware	Muncie	Muncie - Mt. Pleasant Blvd.	2601 W. Mt. Pleasant Blvd.											X					
180350010	Delaware	Albany	Albany	Albany Elem. Sch., 700 W. State St.	X															
180370004	Dubois	Jasper	Jasper - Sport	1401 12th Ave.																X
180372001	Dubois	Jasper	Jasper - Post Office	Post Office, 206 E. 6th St.					X		X		X							
180390007	Elkhart	Bristol	Bristol	Bristol Elem. Sch. 705 Indiana Ave.	X															
180390008	Elkhart	Elkhart	Elkhart - Prairie St.	2745 Prairie St.							X	X	X	B. Carbon						
180431004	Floyd	New Albany	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	X	X					X	X								
180550001	Greene		Plummer	2500 S. 275 W	X						X					Add				X
180570006	Hamilton	Noblesville	Noblesville - 191st St.	Our Lady of Grace Catholic Church, 9900 E. 191st St.	X															
180570007	Hamilton	Fishers									Add	Add								
180590003	Hancock	Fortville	Fortville	Fortville Municipal Bldg.	X															
180630004	Hendricks	Avon	Avon	7203 E. US Highway 36	X															
180650003	Henry		Mechanicsburg	Shenandoah HS, 7354 W. Hwy. 36, Middletown							X		X							X
18067___	Howard	Kokomo									Relocation	Add								
180690002	Huntington	Roanoke	Roanoke	Roanoke Elem. Sch., 423 W. Vine St.	X															
180710001	Jackson		Brownstown	225 W & 300 N, Brownstown	X															X

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
180810002	Johnson	Trafalgar	Trafalgar	200 W. Pearl St.	X															
180890006	Lake	East Chicago	East Chicago - Franklin Sch.	Franklin Elem. Sch, Alder & 142nd St.					X		X									
180890015	Lake	East Chicago	East Chicago - Post Office.	East Chicago Post Office, 901 E. Chicago Ave.			X													
180890022	Lake	Gary	Gary - IITRI	IITRI Bunker, 201 Mississippi St.	X	X		X	X		X	X	X	B. Carbon		X	X	X		X
180890034	Lake	East Chicago	East Chicago - Marina	East Chicago Marina, 3301 Aldis St.					X						X	X			X	
180890026	Lake	Gary	Gary - Burr St.	25th Ave. and Burr St.							X									
180890028	Lake	Whiting	Whiting - HS	Whiting High School, 1751 Oliver St.	X											X				
180890031	Lake	Gary	Gary - Madison St.	Indiana American Water Co. 650 Madison St.					X		X									
180890032	Lake	Gary	Gary - 4th Ave.	Gary SouthShore RailCats, One Stadium Plaza											X				X	
180890033	Lake	East Chicago	East Chicago - E. 135th St.	Abraham Lincoln Elem. Sch., E. 135th St.											X				X	
180892004	Lake	Hammond	Hammond - Purdue	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.							Relocate	Relocate								
18089___	Lake	Hammond									Relocation	Relocation								
180892008	Lake	Hammond	Hammond - 141st St.	1300 E. 141st St.	X	X									X	X			X	X
180910005	LaPorte	Michigan City	Michigan City - 4th St.	NIPSCO Gas Station, 341 W. 4th St.	X															
180910010	LaPorte	LaPorte	LaPorte - E. Lincolnway	2011 E. Lincolnway	X															
180910011	LaPorte	Michigan City	Michigan City - Marsh Elem. Sch.	400 E. Homer St.							X									
180950011	Madison	Anderson	Anderson - Eastside Elem.	Eastside Elem. Sch., 844 N. Scatterfield Rd.							X	X								
180950010	Madison		Emporia	East Elem. Sch., 893 E. US 36, Pendleton	X															
180970043	Marion	Indianapolis	Indpls - West St.	1735 S. West St.					X		X									
180970050	Marion	Indianapolis	Indpls - Ft. Harrison	Ft. Harrison St. Park, 5753 Glenn Rd.	X															
180970057	Marion	Indianapolis	Indpls - Harding St.	1321 S. Harding St.	X	X														X
180970063	Marion	Indianapolis	Indpls - Rockville Rd.	7601 Rockville Rd											X					
180970072	Marion	Indianapolis	Indpls - N. Illinois St	50 N. Illinois St.			X													
180970073	Marion	Indianapolis	Indpls - E. 16th St	6125 E. 16th St.	X	X	X	X												X
180970078	Marion	Indianapolis	Indpls - Washington Park	Washington Park, 3120 E. 30th St,	X	X	X	X	X	X	X	X	X	B. Carbon Sulfate	X	X	X	X	X	X
180970081	Marion	Indianapolis	Indpls - W. 18th St	School 90, 3351 W. 18th St.							X	X								
180970083	Marion	Indianapolis	Indpls - E. Michigan St	School 15, 2302 E. Michigan St.							X									
180970084	Marion	Indianapolis	Indpls - School 21	School 21, 2815 English Ave.					Discontinue		X									
180970086	Marion	Indianapolis	Indpls - Southport	Southport Advanced Wastewater Treatment Plant, 3800 W. Southport Rd																X
180970087	Marion	Indianapolis	Indpls - I-70 E	1650 Ludlow Ave.	Add		Add	Add			Add			Add B. Carbon						Add
181050003	Monroe	Bloomington	Bloomington - Binford	Binford Elem. Sch., 2300 E. 2nd St.							X	X								
18105___	Monroe	Bloomington			Add															
181090005	Morgan	Monrovia	Monrovia	Monrovia HS, 135 S Chestnut St	X															
181230009	Perry		Leopold	Perry Central HS, 19856 Old St. Rd 37, Leopold	X															

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
181270023	Porter	Portage	Portage - Hwy 12	Bethlehem Steel Waste Lagoon, Hwy. 12					X											
181270027	Porter		Burns Harbor - Port of Indiana	E. Boundary Rd											X				X	
181270024	Porter	Ogden Dunes	Ogden Dunes	Water Treatment Plant, 84 Diana Rd.	X				X		X	X				X				
181270026	Porter	Valparaiso	Valparaiso	Valparaiso Water Dept., 1000 Wesly St.	X															
181290003	Posey		St. Philips	2027 St. Phillips Rd., Evansville	X															X
181410010	St. Joseph		Potato Creek St. Park	Potato Creek St. Park, 25601 St. Rd. 4, N. Liberty	X															
181410015	St. Joseph	South Bend	S. Bend - Shields Dr.	2335 Shields Dr.	X			X			X	X								X
181410016	St. Joseph	Granger	Granger - Beckley St.	12441 Beckley St., Granger	X															
181450001	Shelby		Fairland	Triton Central MS, 4740 W. 600N, Fairland	X															
181470009	Spencer	Dale	Dale	David Turnham School, Dunn & Locust							X									
181570008	Tippecanoe	Lafayette	Lafayette - Greenbush St.	Cinergy Substation, 3401 Greenbush St.							X	X								
181630013	Vanderburgh		Inglefield	Scott Elem. School, 14940 Old State Rd.	X															
181630016	Vanderburgh	Evansville	Evansville - U. of E.	University of Evansville - Carson Center							X					X				
181630023	Vanderburgh	Evansville	Evansville - E. Walnut	Rescue Mission, 500 E. Walnut St.							X									
181630021	Vanderburgh	Evansville	Evansville - Buena Vista	1110 W. Buena Vista Rd.	X	X		X	X		X	X	X	B. Carbon						
181630022	Vanderburgh	Evansville	Evansville - Lloyd	10 S. 11th Ave.			X													
181670018	Vigo	Terre Haute	Terre Haute - Lafayette Ave.	961 N. Lafayette Ave.	X	X			X		X	X								
18167___	Vigo	Terre Haute														Relocation				
181670024	Vigo		Sandcut	7597 Stevenson Rd., Terre Haute	X															
181730008	Warrick	Boonville	Boonville	Boonville HS, 300 N. 1st St.	Relocate															
181730009	Warrick		Lynnville	Tecumseh HS, 5244 State Road 68, Lynnville	X															
181730011	Warrick		Dayville	3488 Eble Rd., Newburgh	X															X
181830003	Whitley		Larwill	Whitko Middle School, 710 N. State Rd. 5		X		X			X	X								X

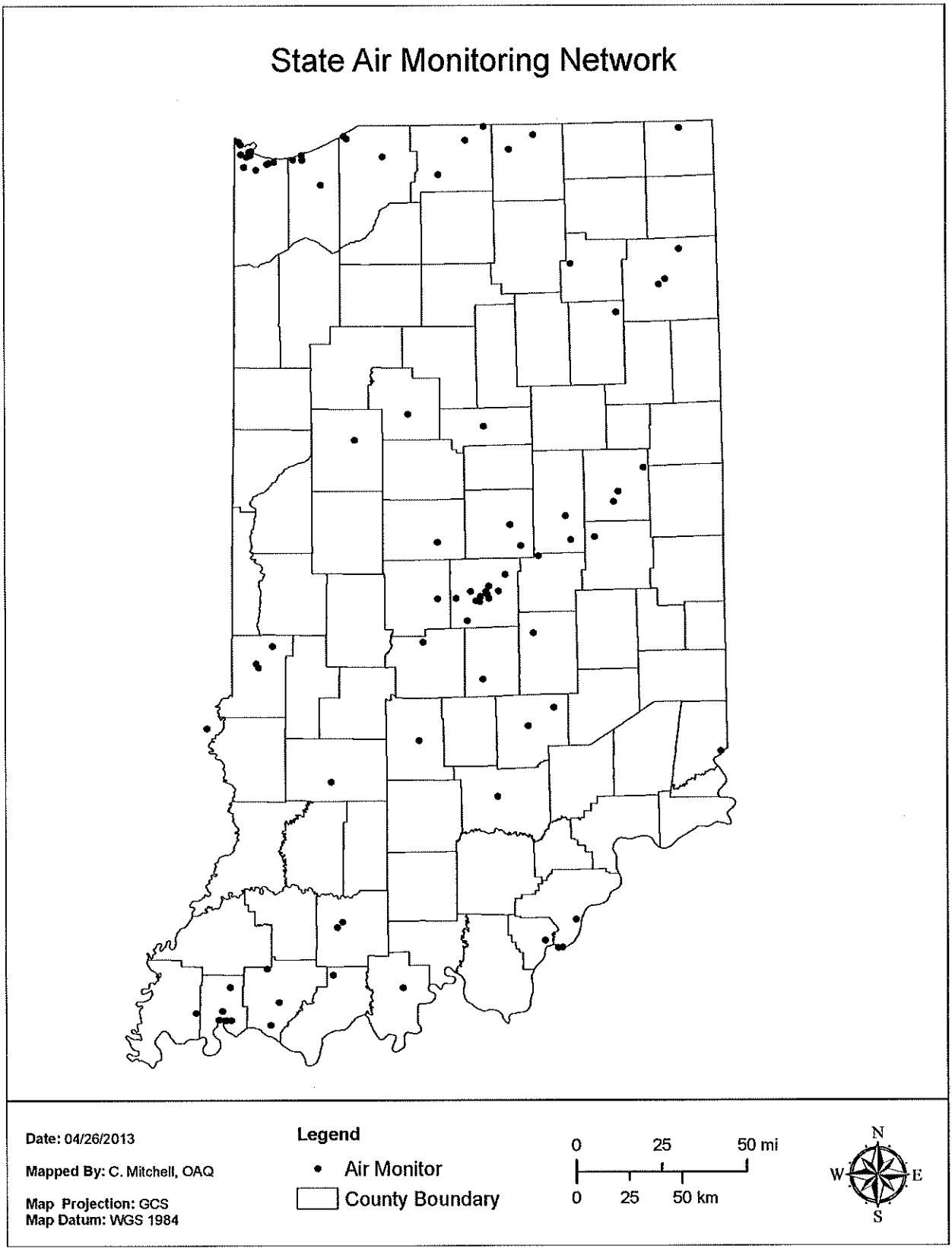
Number of Parameters

	Number of Monitoring Sites	Number of Monitored Parameters	O_3	SO_2	CO	NO_Y	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$ (Spec	LEAD	TOXICS	O_3 PREC	CAR-	METALS	MET
Current Monitoring Network (2013)	82	189	43	10	6	7	13	1	34	18	7	5	8	9	2	2	6	18
Proposed Monitoring Network (2014)	83	195	45	10	6	8	12	1	35	18	7	6	8	10	2	2	6	19

Indicates a site where a change is to occur or occurred in 2013

Indicates a site where a change is planned for 2014

Figure 1 – State Air Monitoring Network 2014



Review Summary

Proposed changes to the 2013 Monitoring Network that were not approved were:

- Discontinuation of Boonville O_3.

Unanticipated changes made to the 2013 Monitoring Network are:

- Discontinuation of Evansville – Buena Vista continuous sulfate.
- Addition of NO_2, NO, NO_x at Indpls – Washington Park.
- Addition of continuous PM_{10} standard conditions at Indpls – Washington Park.
- Relocation of ultraviolet radiation, and solar radiation from Indpls – E. 16th St. to Indpls – Washington Park.

The changes proposed for the 2014 Monitoring Network are:

- Discontinuation of Indpls – School 21 PM_{10}.
- Discontinuation of Fort Wayne - Career Center CO.
- Add O_3 at Bloomington.
- Add BP sensor to Mechanicsburg.
- Add OT/RH sensor to Plummer.
- Add Toxics (VOC) canister sampler to Plummer.
- Relocation of Boonville O_3 to a shelter.
- Relocation of Hammond – Purdue $PM_{2.5}$ to a shelter.

Network Description

As per 40 CFR Part 58.10, an annual monitoring network plan which provides for the establishment and maintenance of an air quality surveillance system consisting of the air quality monitors in the state, is required to be submitted by all states to U.S.EPA.

Specifically §58.10 (a) requires for each existing and proposed monitoring site:

1. A statement of purpose for each monitor.
2. Evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of 40 CFR Part 58, where applicable.
3. Proposals for any State and Local Air Monitoring station (SLAMS) network modifications.

§58.10 (b) requires the plan must contain the following information for each existing and proposed site:

1. The Air Quality System (AQS) site identification number.
2. The location, including street address and geographical coordinates.
3. The sampling and analysis method(s) for each measured parameter.
4. The operating schedules for each monitor.
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.
6. The monitoring objective and spatial scale of representativeness for each monitor.
7. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in §58.30.
8. The Metropolitan Statistical Area (MSA), Core Based Statistical Area (CBSA), Combined Statistical Area (CSA) or other area represented by the monitor.
9. The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58.
10. Any source-oriented monitors for which a waiver has been requested or granted by the U.S.EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

11. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the U.S.EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

Network Review Description

The following definitions represent some of the categories found in the Network Review:

Monitor Type – The name of the designated network:

° PAMS – *Photochemical Assessment Monitoring Station*: Sites established to obtain more comprehensive data of areas with high levels of ozone pollution by also monitoring NO_x and VOCs.
° SLAMS - *State or Local Ambient Monitoring Station*: The SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons. U.S.EPA must approve all SLAMS sites.
° STN – *$PM_{2.5}$ Speciation Trends Network*: A $PM_{2.5}$ speciation station designated to be part of the speciation trends network. This network provides chemical species data of fine particulates.
° Supplemental Speciation - Any $PM_{2.5}$ speciation station that is used to gain supplemental data and is not dedicated as part of the speciation trends network.
° SPM – *Special Purpose Monitor*: Any monitor included in the agency's network that does not count when showing compliance with the minimum requirements of this subpart and for siting monitors of various types.
° NCore – *National Core multi-pollutant monitoring station*: Sites that measure multiple pollutants at trace levels in order to provide support to integrated air quality management data needs. There is currently one NCore site for Indiana located in Indianapolis.
° Non-regulatory – Monitors that are measuring criteria pollutants that are not intended to provide data for regulatory purposes.
° Near-Road – Monitors that measure near road peak hourly NO_2 or CO concentrations in larger urban areas.

Operating Schedule - specifies how often a sample is taken.

° Continuous - operates 24/7; applies mainly to gaseous analyzers, although some particulate samplers (TEOM/FDMS, SHARP, and BAMs) operate continuously.
° Daily – a sample is taken every day; applies to manual method particulate samplers.
° 3 - Day - Manual method particulate samplers that run every third day.
° 6 - Day - Manual method particulate samplers that run every sixth day.

Sampling Method – Each ambient air monitor is classified by a specific method number. This method combines both the collection procedure along with the analysis performed on the sample. These numbers can be found in the U.S.EPA "List of Designated Reference and Equivalent Methods" (see U.S.EPA Transfer Technology Network web page at:
http://www.epa.gov/ttn/amtic/files/ambient/criteria/reference-equivalent-methods-list.pdf

Scale – The specific "spatial scales of representation" describes the physical dimensions of the air parcel around the monitoring station throughout which actual pollutant concentrations are reasonably similar.

° Microscale - Areas ranging from several meters to about 100 meters,
° Middle scale - Areas ranging from 100 meters to 0.5 kilometers,
° Neighborhood - 0.5 to 4.0 kilometers, and uniform land use,
° Urban scale - 4 to 50 kilometers, and
° Regional - 50 to hundreds of kilometers.

Monitoring Objective – Describes the purpose/objective for monitoring at a site.

° General/Background concentration – sites located to determine general background concentration levels.
° Highest concentration – sites located to determine the highest concentrations expected to occur in the area covered by the network.

° Maximum Precursor Emissions Impact – sites where the magnitude and type of precursor emissions in the area are expected to impact. These sites are suited for the monitoring of urban air toxic pollutants.
° Population exposure – sites located to measure typical concentrations in areas of high population density.
°Quality assurance – sites where two monitors of the same type are located; one used to report air quality for the site, the other dedicated as an audit monitor.
° Regional transport – sites located to determine the extent of regional pollutant transport among populated areas; and in support of secondary standards.
° Source-oriented – sites located to determine the impact of significant sources or source categories on air quality.
° Upwind background – sites established to characterize upwind background and transported ozone and its precursor concentrations into an area.

NAAQS Comparable – 40 CFR Part 58 Appendix B requires the identification of any sites that are suitable or not suitable for comparison against the Annual $PM_{2.5}$ NAAQS as described in Section §58.30. If a 'No' is present in this category this site is located close to a localized hot spot and can only be compared to the 24-hour $PM_{2.5}$ NAAQS, not the Annual $PM_{2.5}$ NAAQS.

MSA – MSAs are defined by the U.S. Office of Management and Budget as geographical areas having a large population nucleus and a high degree of economic and social integration with the nucleus. In Indiana, MSAs are either one county or a group of counties. Figure 2 is a map of the MSAs in Indiana. Several border areas are included with other counties in bordering states.

Site Change Proposed – Designates whether this particular site is being considered for some type of modification during 2014; relocation, discontinuation, or addition.

Monitoring Requirements

Appendix A of 40 CFR Part 58 outlines the Quality Assurance Requirements for SLAMS, SPMs, and PSD Air Monitoring. It details the calibration and auditing procedures used to collect valid air quality data, the minimum number of collocated monitoring sites, the calculation used for data quality assessments, and the reporting requirements. All sites in Indiana operate following the requirements set forth in this appendix.

Appendix C of 40 CFR Part 58 specifies the criteria pollutant monitoring methods which must be used in SLAMS and NCore stations. All criteria pollutant monitoring in Indiana follows the methods specified in this appendix.

Appendix D of 40 CFR Part 58 deals with the network design criteria for ambient air quality monitoring. The overall design criteria, the minimum number of sites for each parameter, the type of sites, the spatial scale of the sites, and the monitoring objectives of the sites are detailed. In designing the air monitoring network for Indiana, the requirements of this appendix were followed. The specifics for each pollutant network are in the individual parameter chapters.

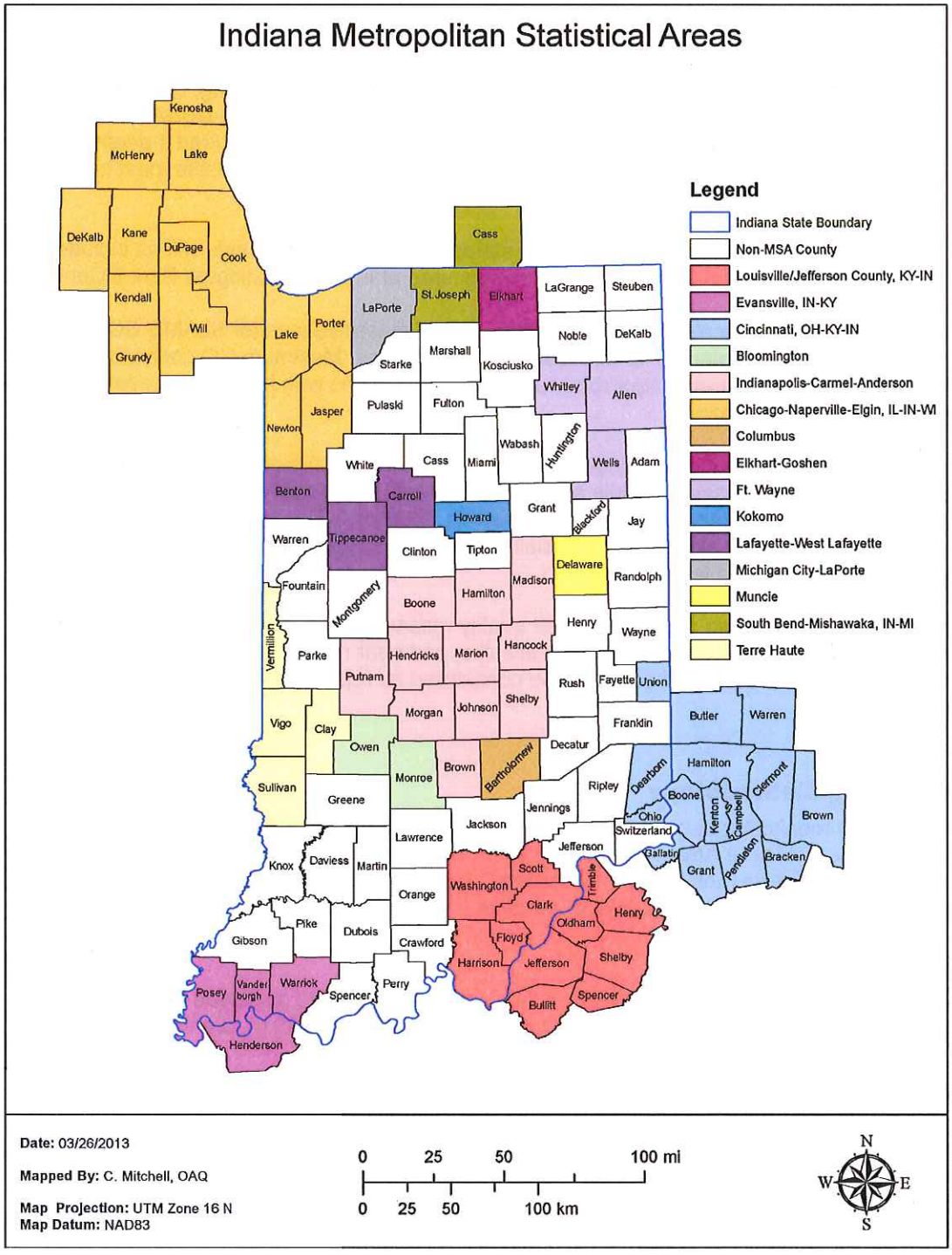
O_3, PM_{10}, and $PM_{2.5}$ have minimum monitoring requirements based upon the population of an MSA. Population data from the 2010 census is used in this report.

According to 2.(e) of this appendix, "The EPA recognizes that State and 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." The individual tables list the data, the requirements, and the current sites for the full multi-agency MSAs or CBSAs. In the instances where it is more logical or desirable to divide the monitoring requirements, Indiana has entered into agreements with some of the neighboring agencies to ensure that the minimum requirements for the MSA continue to be met and the resulting network provides adequate coverage. Agreements have been signed with the Southwest Ohio Air Quality Agency (SWOAQA) and the Louisville Metropolitan Air Pollution Control District (APCD).

The placement of a monitoring probe, its spacing from obstructions, and probe materials are outlined in Appendix E of 40 CFR Part 58, which deals with the placement of the monitoring probe, it's spacing from obstructions and what materials the probe can be made of. All monitors operated in Indiana meet Appendix E criteria.

Figure 2 – Indiana MSAs



Parameter Networks

Carbon Monoxide (CO)

Monitoring Requirements

40 CFR Part 58 Appendix D, 4.2 details the requirements for CO monitoring. One CO monitor is required to operate collocated with one required near-road NO_2 monitor in CBSAs having a population of 1,000,000 or more persons. Other CO monitors may be required if deemed necessary by the Regional Administrator. As per 58.13(e)(2) Indiana's CO site must be operational by January 1, 2017.

In addition 40 CFR Part 58 Appendix D, 3(b) states that CO measurements will be included at the NCore multi-pollutant monitoring sites. CO is monitored at Indpls-Washington Park NCore site.

Microscale and middle scale measurements are useful classifications for SLAMS CO sites since most people have the potential for exposure on these scales. Maximum CO concentrations primarily occur in areas near major roadways and intersections with high traffic density and often poor atmospheric ventilation.

Middle scale CO monitoring is intended to represent areas with dimensions from 100 meters to 0.5 kilometers. In some cases middle scale measurements may apply to areas that have a total length of several kilometers such as "Line Emission Sources." This type of emission source area would include air quality along a commercially developed street, shopping plaza, freeway corridor, parking lots and feeder streets.

Microscale CO monitoring applies when air quality measurements are to be used to represent distributions within street canyons, over sidewalks, and near major roadways. Microscale measurements in one location can often be considered as representative of similar locations throughout a city.

Monitoring Methodology

Indiana's CO monitoring network collects data with the Thermo Electron Model 48c and Model 48i along with the Teledyne Advanced Pollution Instrumentation (API) T300 analyzers using nondispersive infrared monitoring methodology. The API Model 300EU Trace level/Ultra-sensitive analyzer is used to collect trace level CO data at the NCore Indpls - Washington Park site.

Monitoring Network

Indiana operates six CO monitors located throughout the state, as displayed in Figure 3. The details of the current network, along with any changes planned in 2014, are listed in Table 2.

Network Modifications

There are two changes planned for the CO monitoring network in 2014. Fort Wayne - Career Center (180030011) will be discontinued after December 31, 2014. Data from this site has been collected since March 1, 1994. During this time no CO 1-hour values above 10.9 ppm have ever been recorded at this site. The maximum 8-hour average recorded is 7.2 ppm in 1997. The maximum 8-hour average recorded in the last eight years is 2.8 ppm. Additionally, since the site installation in 1994 several small trees have been planted by the city between the sidewalk and roadway that have now grown and interfere with the sample probe.

A CO monitor will be installed at the Indianapolis near-road NO_2 site.

Figure 3 – CO Monitoring Network

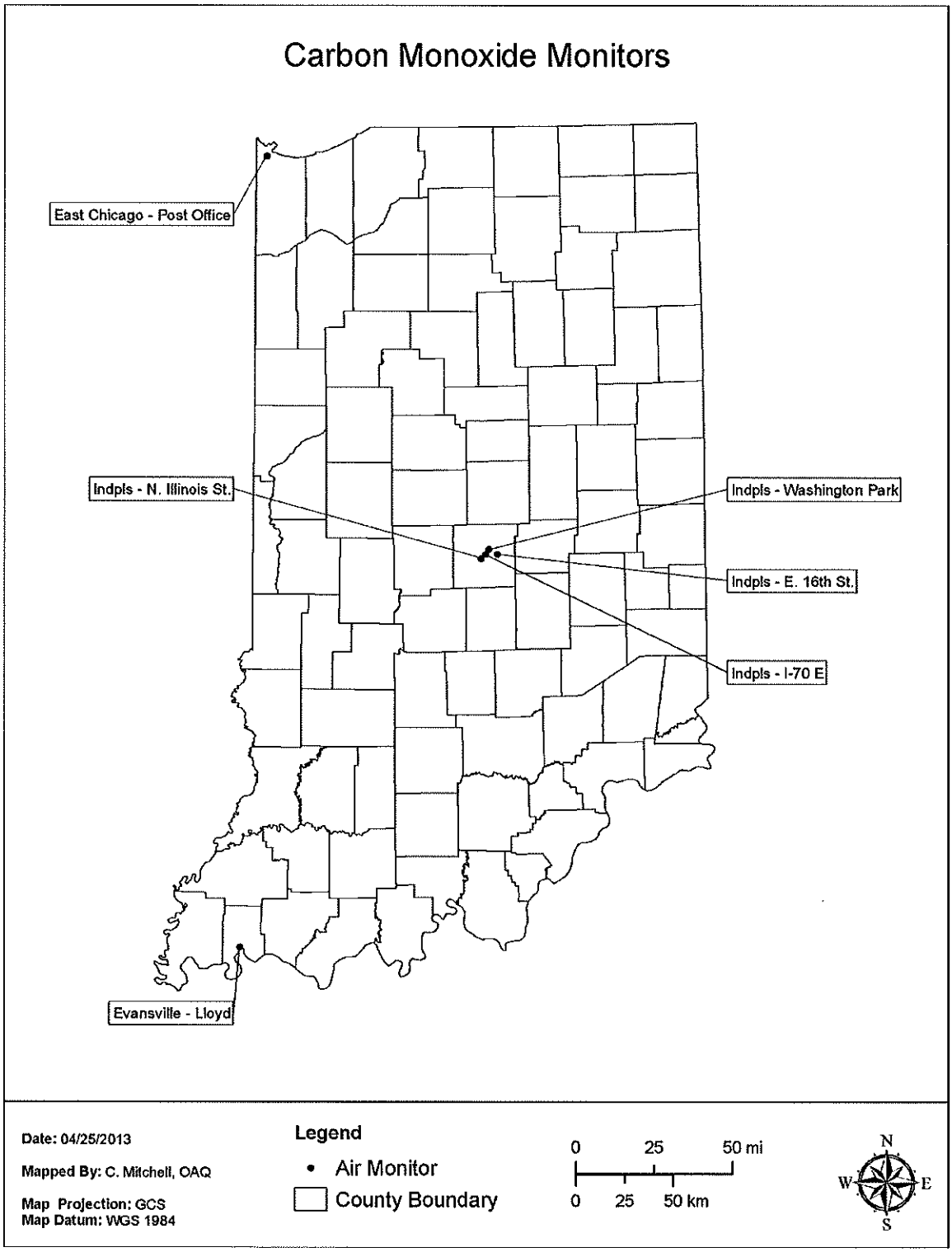


Table 2 – CO Monitoring Network

Parameter Code: 42101 **CO - Carbon Monoxide**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180030011	Fort Wayne Career Cntr.	Allen	Fort Wayne	Career Center, 203 E. Douglas St.	SLAMS	03/01/94	Continuous	054	Micro	Highest Conc	41.074167	-85.138667	Ft. Wayne	Discontinue
180890015	East Chicago - Post Office	Lake	East Chicago	Post Office, 901East Chicago Ave.	SLAMS	03/01/84	Continuous	054	Micro	Highest Conc	41.628611	-87.461389	Chicago-Naperville-Elgin, IL-IN-WI	No
180970072	Indpls - Illinois St.	Marion	Indianapolis	50 N. Illinois St.	SLAMS	02/01/90	Continuous	054	Micro	Highest Conc	39.768056	-86.160000	Indianapolis-Carmel-Anderson	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/02/90	Continuous	054	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	01/01/10	Continuous	593	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel-Anderson	No
180970087	Indpls - I-70 E	Marion	Indianapolis	1650 Ludlow Ave.	Near-Road	01/01/14	Continuous	054	Neigh	Pop Exp	39.788793	-86.131121	Indianapolis-Carmel-Anderson	Add
181630022	Evansville - Lloyd	Vanderburgh	Evansville	10 S. 11th Ave	SLAMS	09/10/09	Continuous	054	Micro	Highest Conc	37.977222	-87.596439	Evansville, IN-KY	No

CO MONITORING METHOD: 054 - THERMO ELECTRON 48C, 48i
593 - TELEDYNE INSTR. 300EU

Lead (Pb)

Monitoring Requirements

40 CFR Part 58 Appendix D, 4.5 specifies that Pb monitoring must be conducted taking into account Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, the potential for population exposure, and logistics. At a minimum there must be one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each Pb source which emits 0.5 or more tons per year. Waivers may be granted if the state can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS.

In addition, Pb monitoring is required at any NCore site in each CBSA with a population equal to or greater than 500,000 people. This site is located at Indpls – Washington Park (180970078) and has been collecting data since 1999.

Collocated samplers are required at 15% of the sites operated by a PQAO or a minimum of one per network. Indiana is required to operate one collocated site.

Monitoring Scale

The appropriate scales for the source-oriented sites are either microscale (up to 100 meters) or middle scale (100 to 500 meters). The neighborhood scale (0.5 – 4.0 kilometers) is the appropriate scale for population-oriented monitoring.

Monitoring Methodology

Indiana utilizes TSP filter sampling with atomic absorption analysis to generate ambient Pb concentrations from the monitoring sites.

Monitoring Network

The Pb monitoring network in Indiana in 2014 consists of eight sites. These sites are displayed in Figure 4, and detailed in Table 3.

Network Modifications

Due to the elevated concentrations measured at Muncie – Mt. Pleasant Blvd. (180350009) additional sampling began in April 2012, but the sampling frequency will remain at 1/6 day.

There are no changes planned for the Pb monitoring network in 2014.

Figure 4 – Lead Monitoring Network

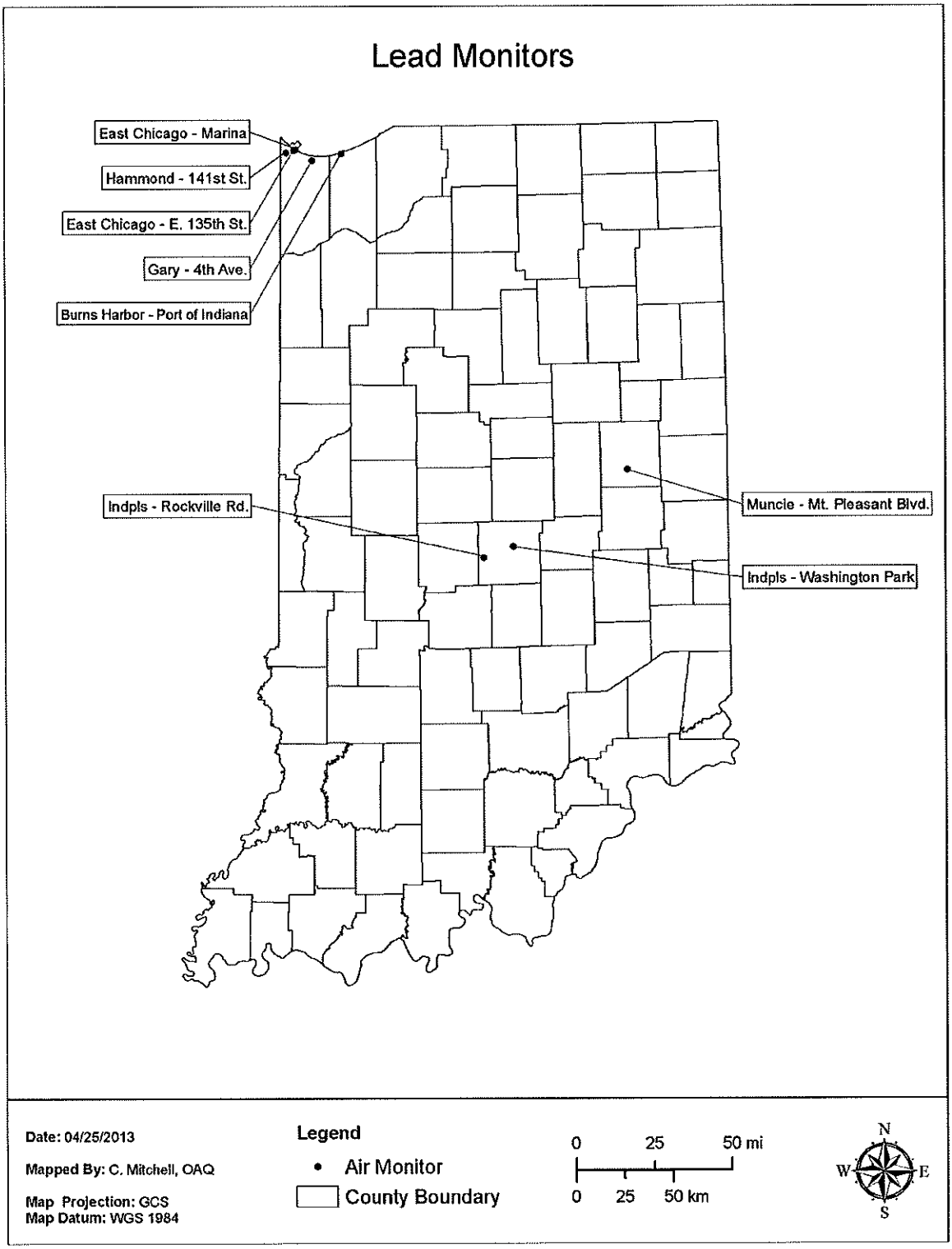


Table 3 – Lead Monitoring Network

Parameter Code: 14129 **Pb - Lead**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Source Oriented?	Site Change Proposed?
180350009	Muncie - Mt. Pleasant Blvd.	Delaware	Muncie	2601W. Mt. Pleasant Blvd.	SLAMS	01/02/10	6-Day	107	Middle	Source Oriented	40.158417	-85.415021	Muncie	Yes Exide	No
180890032	Gary - 4th. Ave	Lake	Gary	Gary SouthShore RailCats, One Stadium Plaza	SLAMS	01/02/10	6-Day	107	Middle	Source Oriented	41603582	-87.332658	Chicago-Naperville-Elgin, IL-IN-WI	Yes US Steel	No
180890033	East Chicago - E. 135th St.	Lake	East Chicago	Abraham Lincoln Elem. Sch., E. 135 th St.	SLAMS	01/02/10	6-Day	107	Middle	Source Oriented	41649064	-87.447256	Chicago-Naperville-Elgin, IL-IN-WI	Yes Mittal West	No
180890034	East Chicago-Marina	Lake	East Chicago	East Chicago Marina 3301Aldis St.	SLAMS	10/30/12	6-Day	107	Middle	Source Oriented	41653580	-87.435650	Chicago-Naperville-Elgin, IL-IN-WI	Yes Mittal East	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	SLAMS	01/01/77	6-Day	107	Neigh	Pop Exp	41639444	-87.493611	Chicago-Naperville-Elgin, IL-IN-WI	No	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	SLAMS	01/01/07	6-Day	107	Neigh	Quality Assurance	41639444	-87.493611	Chicago-Naperville-Elgin, IL-IN-WI	No	No
180970063	Indpls - Rockville Rd.	Marion	Indianapolis	7601Rockville Road	SLAMS	01/01/84	6-Day	107	Middle	Src Oriented Highest Conc	39.760833	-86.297222	Indianapolis-Carmel-Anderson	Yes Quemetco	No
180970063	Indpls - Rockville Rd.	Marion	Indianapolis	7601Rockville Road	SLAMS	10/01/00	6-Day	107	Middle	Quality Assurance	39.760833	-86.297222	Indianapolis-Carmel-Anderson	Yes Quemetco	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	SLAMS / NCORE	04/18/99	6-Day	107	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel-Anderson	No	No
181270027	Burns Harbor-Port of Indiana	Porter		E. Boundary Rd	SLAMS	08/18/11	6-Day	107	Middle	Source Oriented	41635594	-87.150197	Chicago-Naperville-Elgin, IL-IN-WI	Yes Arcelor Mittal	No

MONITORING METHOD: 107 - HI-VOL SAMPLER/FLAMELESS ATOMIC ABSORPTION (GFAA)

Oxides of Nitrogen (NO, NO_2, NO_x, NO_y)

Monitoring Requirements

On February 9, 2010, the Federal Register amended 40 CFR Parts 50 and 58 establishing a new NO_2 NAAQS for one hour concentrations, and new monitoring requirements to be implemented by January 1, 2014.

One microscale near-road NO_2 monitoring station must be located within each CBSA with a population of 500,000 or more to be installed by January 1, 2014. An additional near-road NO_2 monitoring station is required for any CBSA with a population of 2,500,000 persons or more. For Indiana, one near-road site is required for Indianapolis-Carmel-Anderson MSA. Additionally, sites are required for the Cincinnati, OH-KY-IN CBSA, the Louisville/Jefferson County, KY-IN CBSA, and the Chicago-Naperville-Elgin, IN-IL-WI CBSA. These cross state requirements are addressed in agreements signed with the appropriate neighboring agencies.

One area-wide NO_2 monitoring station must also be located in each CBSA with a population greater than 1,000,000 persons and was required to be installed by January 1, 2013. Each area listed above also requires an area-wide monitor.

40 CFR Part 58 Appendix D 3(b) and 40 CFR Part 58 Appendix D, 4.3 state that NO/NO_y measurements should be included at the NCore multi-pollutant monitoring sites and the PAMS program. NO/NO_y monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding O_3 photochemistry.

Monitoring Methodology

The NO, NO_2 and NO_x network uses the Thermo Electron Model 42c and the 42i chemiluminescence monitors to collect data. The API Model 200EU/501 NO_y Trace level/Ultra-sensitive analyzer is used to collect NO and NO_y data at the Indpls - Washington Park NCore site (180970078).

Monitoring Network

Indiana operates seven NO_2 monitors and one trace level monitor as displayed in Figure 5. The current network, along with any changes planned in 2014, is listed in Table 4.

Network Modifications

The original date for the near-road NO_2 site installation was January 1, 2013. Due to delays in funding and implementation of the pilot sites, the site in Indianapolis is scheduled to be operational on January 1, 2014. Details of the new NO_2 monitoring sites are being submitted in a separate NO_2 Monitoring Plan to U.S.EPA. See Appendix B of this document. Appendix C contains the site approval letter from USEPA.

Figure 5 – Oxides of Nitrogen Monitoring Network

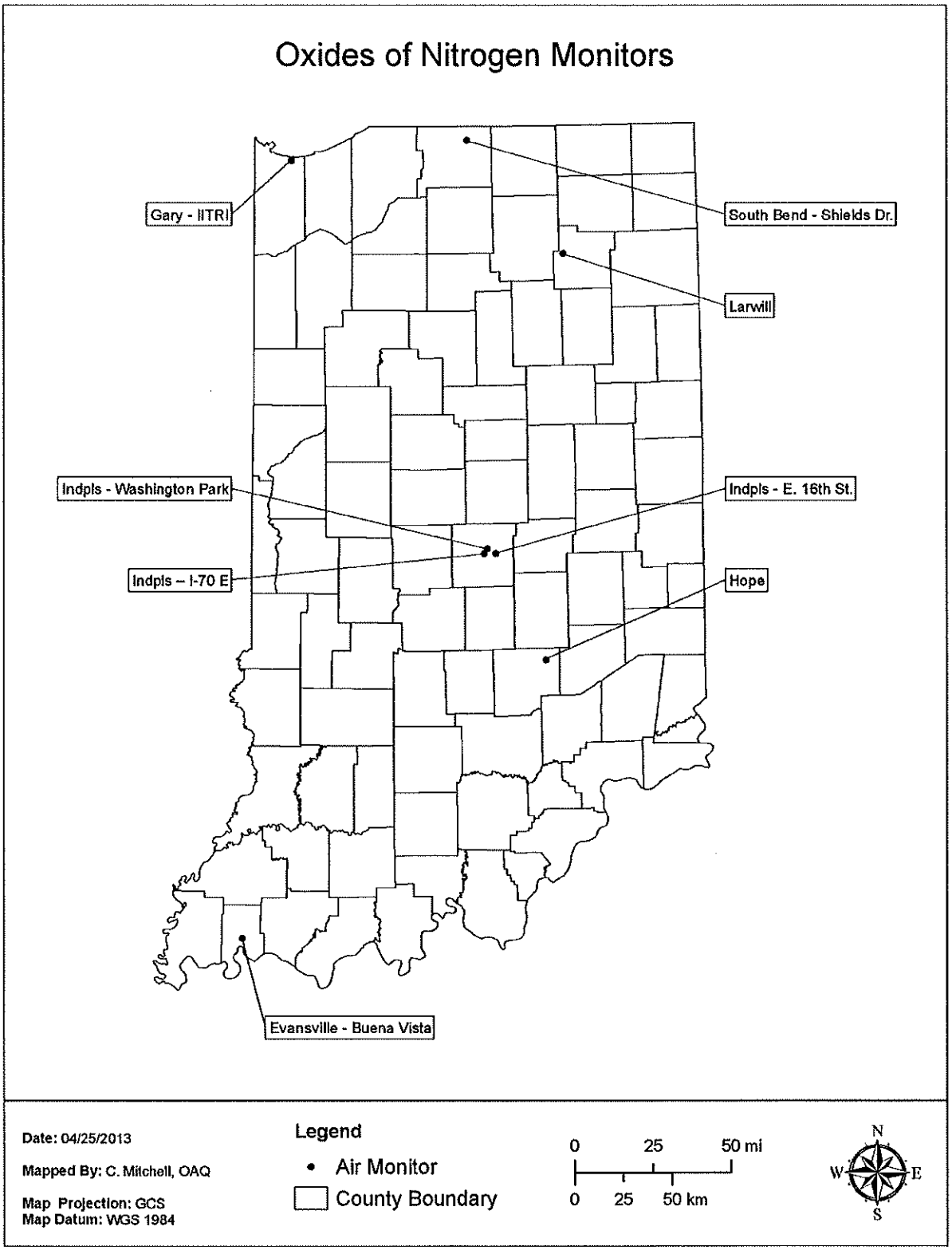


Table 4 – Oxides of Nitrogen (NO, NO_2, NO_x, NO_y) Monitoring Network

Parameter Code: 42602 **NO, NO_2, NO_x, NO_y - Oxides of Nitrogen**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180050007	Hope	Bartholomew		9404 N775 E.	SPM	05/02/13	Continuous	074	Urban	Background	39.294322	-85.766816	Columbus	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	06/27/95	Continuous	074	Neigh	Highest Conc	41.606667	-87.304722	Chicago-Naperville-Elgin, IL-IN-WI	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/02/90	Continuous	074	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	01/01/10	Continuous	099	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel-Anderson	No
180970087	Indpls - I-70 E	Marion	Indianapolis	1650 Ludlow Ave.	Near-Road	01/01/14	Continuous	074	Neigh	Pop Exp	39.788793	-86.131121	Indianapolis-Carmel-Anderson	Add
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	Continuous	074	Neigh	Pop Exp	41.696692	-86.214683	South Bend-Mishawaka, IN-MI	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/08/09	Continuous	074	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
181830003	Larwill	Whitley		Whitko Middle School, 710 N. State Rd. 5	SPM	05/01/13	Continuous	074	Urban	Background	41.169646	-85.629292	Fort Wayne	No

NOx MONITORING METHOD: 074 - THERMO ELECTRON 42C, 42i
099 - TELEDYNE INSTR. 200EU

Ozone (O_3)

Monitoring Requirements

Table D-2 in 40CFR Part 58 Appendix D details the number of O_3 sites required in each MSA. The number of sites is based on the population of an MSA and if the design value exceeds 85% of the standard (0.064 ppm) for that area. Table 5 lists the requirements stated in Part 58. Table 6 lists the requirements as they relate to Indiana. There are five MSAs which cross state lines. Except for Cincinnati, OH-KY-IN, Indiana meets the requirement for all MSAs, including the multi-agency MSAs. A multi-agency agreement between the Southwest Ohio Air Quality Agency (Cincinnati, OH) and IDEM specifies that Southwest Ohio Air Quality Agency will fulfill all the O_3 monitoring requirements in this MSA. In the absence of an agreement, Indiana would be required to operate two sites in the Cincinnati, OH-KY-IN MSA.

Monitoring Season

Table D-3 of Appendix D of Part 58 defines the O_3 monitoring season for all of the states. Indiana's monitoring season is from April 1 to September 30. Indiana operates one site in Illinois (West Union) and two sites (Charlestown State Park and New Albany) in the Louisville/Jefferson County, KY-IN MSA. As the monitoring season extends through October in Illinois and Kentucky, Indiana operates these three sites through October as well. In addition, the Charlestown State Park and New Albany sites in the Louisville MSA are operated in March to correspond with Kentucky's ozone season.

There is a possibility that new monitoring requirements may be promulgated in 2013. If any changes in the monitoring season are required to begin in 2014, Indiana will implement any season modification at that time.

Data

The design value for an area, usually a county or an MSA, is determined by the three year average of the 4th highest daily 8-hour maximum from the highest site in the area. If this value is greater than 0.075 ppm, then the area is considered to be in nonattainment of the NAAQS. If the air quality improves and the design value is 0.075 ppm or less, then the area may be reclassified as a maintenance area. The design values for all sites for the most recent sampling period (2010 – 2012) along with the 1997 8-hr attainment areas with maintenance plans (based on current NAAQS of 0.075 ppm) are illustrated in Figure 6.

The design values for Michigan City (180910005) in the LaPorte MSA, Cassopolis - Ross Beatty High School (260270003) in the South Bend-Mishawaka, IN-MI MSA, Plummer (180550001) in the Bloomington MSA and Charlestown State Park (180190008) and New Albany (180431004) in the Louisville/Jefferson County KY-IN MSA were greater than 0.075 ppm during the sampling period 2010 - 2012. Since these MSAs had design values greater than 0.075 ppm their attainment status is subject to change. All other O_3 monitoring sites were under the 0.075 ppm for the most recent sampling period of 2010 - 2012.

Monitoring Methodology

All monitoring sites in Indiana use O_3 analyzers from Thermo Electron, Models 49c, or 49i. These monitors use ultraviolet absorption photometry. Air is drawn through a sample cell where ultraviolet light (254 nm wavelength) passes through. Any light that is not absorbed by the ozone is then converted into an electrical signal proportional to the ozone concentration.

Monitoring Network

Currently there are 43 monitoring sites in Indiana's O_3 monitoring network as displayed in Figure 7. The O_3 monitoring network with any changes proposed for 2014 is in Table 7.

Network Modifications

The Boonville site (181730008) will be relocated from the inside of the Boonville High School building to a shelter on the Boonville High School property. The relocation is due to electrical power and temperature control issues at the current location.

A new O_3 site will be installed downwind of the City of Bloomington to provide concentrations in the Bloomington MSA since the Plummer site is no longer in the Bloomington MSA. If a suitable downwind site cannot be found the O_3 monitor will be installed at the existing Bloomington – Binford Elementary School $PM_{2.5}$ site (181050003).

Even though O_3 monitoring is not required at the near-road NO_2 monitoring site, it is listed in the TAD as a primary priority parameter in the CASAC AAMMS's Recommended Priorities. This monitor will be installed at the Indpls – I-70E (180970087) monitoring site.

Table 5 – SLAMS Minimum O_3 Monitoring Requirement

# of Sites Required per Population and Design Value		
MSA Population	3yr Design Value ≥ 85% of NAAQS (0.064ppm)	3 yr Design Value < 85% of NAAQS (0.064ppm)
>10 million	4	2
4-10 million	3	1
350,000 - 4 million	2	1
50,000 - 350,000	1	0

Table 6 – SLAMS O_3 Sites Required for Indiana

MSA	MSA Population [1] (2010)	Design Value (ppm) (2010-2012)	# of Sites Required per CFR	Current No. of Sites	2014 No. of Sites
Anderson [2]	131,636	0.070	1 to NA [2]	1 to 0 [2]	NA
Bloomington [3]	159,549	0.078 [3]	1	1 to 0 [3]	1
Chicago-Naperville-Elgin, IL-IN-WI (total MSA)	9,461,105	0.084 [4]	3	22 [4]	-
Chicago-Naperville-Elgin, IL-IN-WI (IN only)	9,461,105	0.072 [5]	3	5 [5]	5
Cincinnati, OH-KY-IN (total MSA)	2,114,580	0.085 [4]	2	10 [4]	
Cincinnati, OH-KY-IN (IN only)	2,114,580	No Data [5]	2	0 [5]	0
Columbus	76,794	No Data	0	1	1
Elkhart-Goshen	197,559	0.070	1	1	1
Evansville, IN-KY (total MSA)	311,552	0.079 [4]	1	7 [4]	-
Evansville, IN-KY (IN only)	311,552	0.074 [5]	1	6 [5]	6
Fort Wayne	416,257	0.071	2	2	2
Indianapolis-Carmel-Anderson	1,887,862	0.075	2	11 to 12	13
Kokomo	82,752	No Data	0	0	0
Lafayette-West Lafayette	201,789	0.071	1	1	1
Louisville/Jefferson County, KY-IN (total MSA)	1,235,708	0.086 [4]	2	7 [4]	-
Louisville/Jefferson County, KY-IN (IN only)	1,235,708	0.081 [5]	2	2 [5]	2
Michigan City-LaPorte	111,467	0.083	1	2	2
Muncie	117,671	0.070	1	1	1
South Bend-Mishawaka, IN-MI (total MSA)	319,224	0.077 [4]	1	4 [4]	-
South Bend-Mishawaka, IN-MI (IN only)	319,224	0.066 [5]	1	3 [5]	3
Terre Haute	172,425	0.068	1	2	2
Non MSA					
West Union - Clark Co., IL		0.068		1	1
Plummer - Greene Co. [3]		0.078 [3]		0 to 1 [3]	1
Huntington - Huntington Co.		0.066		1	1
Brownstown - Jackson Co.		0.067		1	1
Leopold - Perry Co.		0.075		1	1
	Value exceeds NAAQS				
	DV ≥ 85% of NAAQS				
# of sites needed if Indiana meets all multi-state MSA requirements			19		
		Sites in Indiana Network		**43**	**45**

[1] MSA populations adjusted according to MSA changes in February 2013.

[2] Anderson MSA becomes part of Indianapolis MSA in Feb 2013. Anderson requirements and sites are absorbed by Indianapolis.

[3] Green County removed from Bloomington MSA in Feb 2013.

[4] Information for full MSA.

[5] Information for Indiana's portion of MSA.

Figure 6 – O_3 Design Values (2010 – 2012)

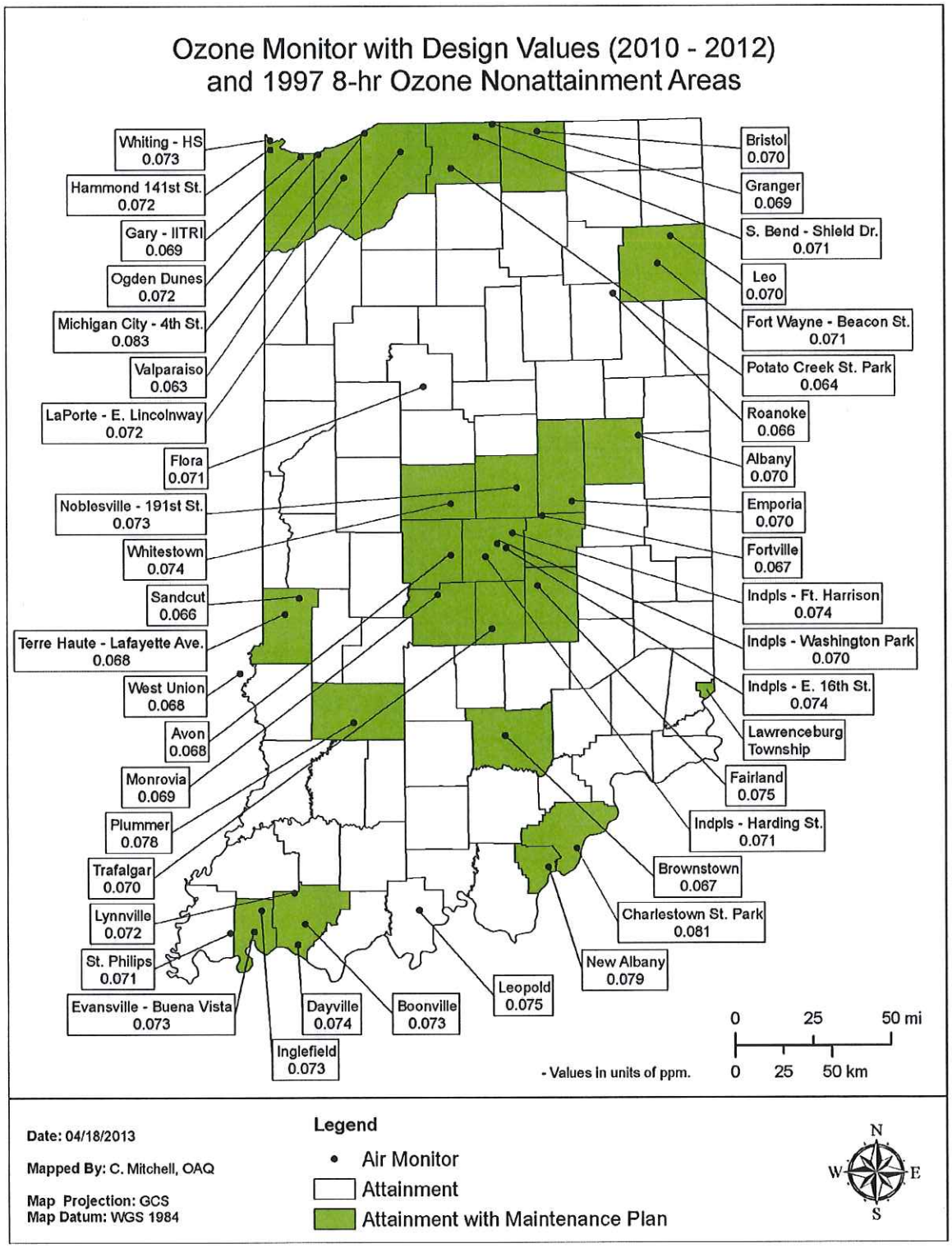


Figure 7 – O_3 Monitoring Network

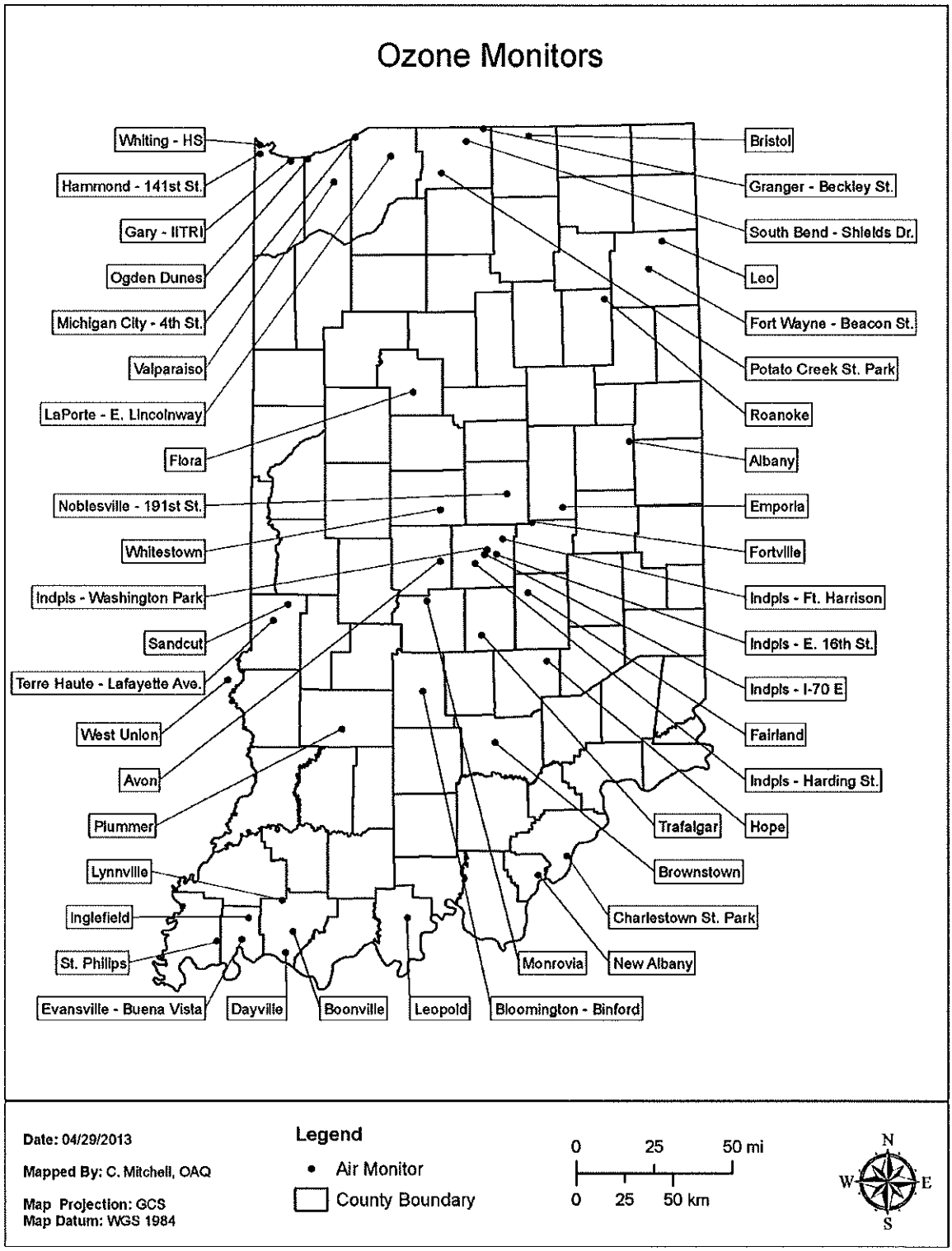


Table 7 – Ozone Monitoring Network

Parameter Code: 44201 **O_3 - Ozone**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
170230001	West Union	Clark, IL		416 S. Hwy 1, West Union, IL	SLAMS	04/01/01	Continuous	047	Urban	General Bkgrd	39.210883	-87.668416	Non-MSA County	No
180030002	Leo HS	Allen	Leo	Leo HS, 14600 Amstutz Rd.	SLAMS	04/01/86	Continuous	047	Urban	Highest Conc	41.221667	-85.017222	Ft. Wayne	No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 N. Beacon St.	SLAMS	07/01/79	Continuous	047	Neigh	Pop Exp	41.094722	-85.101944	Ft. Wayne	No
180050007	Hope	Bartholomew		9404 N 775 E.	SPM	05/02/13	Continuous	047	Urban	Pop Exp	39.294322	-85.766816	Columbus	No
180110001	Whitestown	Boone		Perry - Worth Elem Sch., 3900 E. 300 S, Lebanon	SLAMS	04/01/01	Continuous	047	Urban	Highest Conc	39.997484	-86.395172	Indianapolis-Carmel-Anderson	No
180150002	Flora	Carroll		Flora Airport, 481 S. 150 W., Flora	SLAMS	04/01/01	Continuous	047	Urban	Pop Exp	40.540556	-86.553056	Lafayette-West Lafayette	No
180190008	Charlestown State Park	Clark		Charlestown State Park, 12500 Hwy 62, Charlestown	SLAMS	05/04/07	Continuous	047	Urban	Highest Conc	38.393833	-85.664167	Louisville/Jefferson County, KY-IN	No
180350010	Albany	Delaware	Albany	Albany Elem. Sch., 706 W. State St.	SLAMS	04/01/01	Continuous	047	Urban	Pop Exp	40.300000	-85.245556	Muncie	No
180390007	Bristol	Elkhart	Bristol	Bristol Elem Sch., 705 Indiana Ave.	SLAMS	04/01/02	Continuous	047	Urban	Pop Exp	41.716050	-85.830550	Elkhart-Goshen	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Road	SLAMS	01/01/77	Continuous	047	Neigh	Highest Conc	38.308056	-85.834167	Louisville/Jefferson County, KY-IN	No
180550001	Plummer	Greene		2500 S. 275 W	SLAMS	04/03/00	Continuous	047	Regional	Upwind Bkgrd	38.985578	-86.990120	Non-MSA County	No
180570006	Noblesville - 191st St.	Hamilton	Noblesville	Our Lady of Grace Catholic Church, 9900 E. 191st St.	SLAMS	05/13/10	Continuous	047	Urban	Highest Conc	40.068297	-85.992451	Indianapolis-Carmel-Anderson	No
180590003	Fortville	Hancock	Fortville	Fortville Municipal Bldg., 714 E Broadway	SLAMS	06/01/87	Continuous	047	Urban	Highest Conc	39.935008	-85.840513	Indianapolis-Carmel-Anderson	No
180630004	Avon	Hendricks	Avon	7203 E. US 36, Avon	SLAMS	04/01/00	Continuous	047	Urban	Pop Exp	39.758967	-86.397148	Indianapolis-Carmel-Anderson	No
180690002	Roanoke Elem School	Huntington	Roanoke	Roanoke Elem. Sch., 423 W. Vine St.	SLAMS	04/14/00	Continuous	047	Urban	Upwind Bkgrd	40.960556	-85.380000	Non-MSA County	No
180710001	Brownstown	Jackson		225 W & 300 N, Brownstown	SLAMS	04/04/00	Continuous	047	Regional	Upwind Bkgrd	38.920798	-86.080523	Non-MSA County	No
180810002	Trafalgar	Johnson	Trafalgar	200 W. Pearl St.	SLAMS	04/01/97	Continuous	047	Urban	Pop Exp	39.417203	-86.152395	Indianapolis-Carmel-Anderson	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	07/01/95	Continuous	047	Neigh	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Elgin, IL-IN-WI	No
180890030	Whiting HS	Lake	Whiting	Whiting HS, 1751 Oliver St.	SLAMS	04/01/04	Continuous	047	Urban	Highest Conc	41.681384	-87.494722	Chicago-Naperville-Elgin, IL-IN-WI	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st St.	SLAMS	01/01/76	Continuous	047	Neigh	Pop Exp	41.639444	-87.493611	Chicago-Naperville-Elgin, IL-IN-WI	No
180910005	Michigan City - 4th St.	La Porte	Michigan City	NIPSCO Gas Station, 341 W. 4th St.	SLAMS	05/24/90	Continuous	047	Urban	Pop Exp	41.716944	-86.907500	Michigan City-LaPorte	No
180910010	LaPorte - E. Lincolnway	La Porte	La Porte	2011 E. Lincolnway	SLAMS	05/07/97	Continuous	047	Urban	Pop Exp	41.629167	-86.684722	Michigan City-LaPorte	No

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180950010	Emporia	Madison		East Elem. Sch., 893 E. US 36, Pendleton	SLAMS	04/05/93	Continuous	047	Urban	Pop Exp	40.002500	-85.656944	Indianapolis-Carmel-Anderson	No
180970050	Indpls - Ft Harrison	Marion	Indianapolis	5753 Glenn Rd	SLAMS	12/01/79	Continuous	047	Urban	Highest Conc	39.858961	-86.021341	Indianapolis-Carmel-Anderson	No
180970057	Indpls - Harding St.	Marion	Indianapolis	1321S. Harding St.	SLAMS	03/01/82	Continuous	047	Neigh	Pop Exp	39.749019	-86.186314	Indianapolis-Carmel-Anderson	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/02/90	Continuous	047	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	04/01/09	Continuous	047	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel-Anderson	No
180970087	Indpls - I-70 E	Marion	Indianapolis	1650 Ludlow Ave.	Near-Road	01/01/14	Continuous	047	Neigh	Pop Exp	39.788793	-86.131121	Indianapolis-Carmel-Anderson	Add
18105___	Bloomington	Monroe	Bloomington		SLAMS	2014	Continuous	047					Bloomington	Add
181090005	Monrovia	Morgan	Monrovia	Monrovia HS., 135 S. Chestnut St,	SLAMS	04/01/97	Continuous	047	Urban	Pop Exp	39.575596	-86.477914	Indianapolis-Carmel-Anderson	No
181230009	Leopold	Perry		Perry Central HS, 19856 Old St Rd 37, Leopold	SLAMS	04/01/04	Continuous	047	Urban	Highest Conc	38.113101	-86.603611	Non-MSA County	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	11/01/83	Continuous	047	Urban	Highest Conc	41.617500	-87.199167	Chicago-Naperville-Elgin, IL-IN-WI	No
181270026	Valparaiso	Porter	Valparaiso	Valpo Water Department, 1000 Wesley St.	SLAMS	04/01/98	Continuous	047	Urban	Pop Exp	41.510278	-87.038611	Chicago-Naperville-Elgin, IL-IN-WI	No
181290003	St Philips	Posey		2027 South St. Phillips Rd., Evansville	SLAMS	07/01/96	Continuous	047	Urban	Upwind Bkgrd	38.005278	-87.716333	Evansville, IN-KY	No
181410010	Potato Creek State Park	St Joseph		Potato Creek St. Park, 25601St. Rd 4, North Liberty	SLAMS	04/24/91	Continuous	047	Urban	Upwind Bkgrd	41.551667	-86.370556	South Bend-Mishawaka, IN-MI	No
181410015	South Bend-Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/06/06	Continuous	047	Neigh	Pop Exp	41.696692	-86.214683	South Bend-Mishawaka, IN-MI	No
181410016	Granger-Beckley St.	St Joseph	Granger	12441Beckley St., Granger	SLAMS	04/01/12	Continuous	047	Urban	Highest Conc	41.754870	-86.110090	South Bend-Mishawaka, IN-MI	No
181450001	Fairland	Shelby		Triton Central MS, 4740 W. 600N , Fairland	SLAMS	04/01/00	Continuous	047	Urban	General Bkgrd	39.613423	-85.870648	Indianapolis-Carmel-Anderson	No
181630013	Inglefield	Vanderburgh		Scott School, 14940 Old State Road	SLAMS	05/01/80	Continuous	047	Urban	Highest Conc	38.113889	-87.536944	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/08/09	Continuous	047	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961N. Lafayette Ave.	SLAMS	07/01/83	Continuous	047	Neigh	Pop Exp	39.486111	-87.401389	Terre Haute	No
181670024	Sandcut	Vigo		7597 N. Stevenson Rd., Terre Haute	SLAMS	04/01/01	Continuous	047	Urban	Pop Exp	39.560556	-87.313056	Terre Haute	No
181730008	Boonville	Warrick	Boonville	Boonville HS, 300 N. 1st St.	SLAMS	04/15/91	Continuous	047	Urban	Highest Conc	38.051944	-87.278333	Evansville, IN-KY	No
181730009	Lynnville	Warrick		Tecumseh HS, 5244 State Rd 68, Lynnville	SLAMS	05/02/91	Continuous	047	Urban	Highest Conc	38.194444	-87.341389	Evansville, IN-KY	No
181730011	Dayville	Warrick		3488 Eble Rd., Newburgh	SLAMS	04/01/07	Continuous	047	Urban	Highest Conc	37.954450	-87.321933	Evansville, IN-KY	No

O3 MONITORING METHOD: 047 - THERMO ELECTRON 49C, 49i

Particulate Matter (PM_{10})

Monitoring Requirements

The requirements for the design of the PM_{10} monitoring network are listed in 40 CFR Part 58 Appendix D 4.6. Indiana must operate the minimum number of sites as defined by the MSA population and the past design value of the area. Table 8 lists the sites required per MSA along with the design value in the proper category for each MSA. The current and proposed networks are also listed. There are five MSAs which cross state lines. Indiana meets the requirement for the number of sites for the full MSA, in the multi-agency MSAs, except for Cincinnati, OH-KY-IN and Louisville/Jefferson County, KY-IN. IDEM has multi-agency agreements with Southwest Ohio Air Quality Agency (Cincinnati, OH) and Louisville Metropolitan Air Pollution Control District (APCD) specifying the sites which will operate in each district to fulfill the PM_{10} monitoring requirements in the Cincinnati, OH-KY-IN and Louisville/Jefferson County, KY-IN MSAs.

Collocated samplers are required at 15% of the sites in the network to determine monitoring precision. IDEM is required to operate three collocated samplers.

Monitoring Methodology

Intermittent PM_{10} samples are collected on a pre-weighed 46.2 mm Teflon filter. Air is drawn through an inlet designed to pass only particles smaller than 10 microns in diameter and across the filter for 24 hours. It is then removed and weighed again. Concentrations are calculated by dividing the weight gain by the volume of air passed through the filter.

Continuous PM_{10} concentrations are obtained by using an R&P TEOM 1400a which collects the particulate on a filter attached to an oscillating glass rod. The concentration of the particulate is proportional to the change in oscillating frequency. A Met One BAM 1020 is also used to collect continuous PM_{10}.

Monitoring Network

Indiana currently operates 13 monitoring sites in the State. The 2014 network is displayed in Figure 9. Concentrations at all sites except for two source-oriented sites in Northwest Indiana, Gary – IITRI (180890022) and Portage – Hwy 12 (181270023), are well under 50% of the daily NAAQS of 150ug/m^3. Table 10 details the current PM_{10} network and the modifications planned for 2014.

Network Modifications

There are two network modifications planned for 2014. Monitoring at Indpls – School 21 (180970084) will be discontinued due to having a low design value and low annual average which is illustrated in Table 9 and Figure 8. The monitoring location lies between the other monitoring stations in the Indianapolis MSA. Three intermittent samplers and one continuous monitor will maintain the requirements for the Indianapolis-Carmel-Anderson MSA.

The second network modification is to replace the R&P TEOM 1400a at Portage – Hwy 12 (181270023) with a new monitoring method. Several instruments are being reviewed for their comparability and real time data production. Any new monitor must meet the FEM qualifications before being installed.

Table 8 – PM_{10} Site Requirements

CFR Requirement	MSA Population		High Conc.[1]	Medium Conc.[2]	Low Conc.[3]
	> 1,000,000	# of Required Sites =>	6-10	4-8	2-4

MSA	Population	MSA Design Value			# of Sites 2013	# of Sites 2014
Chicago-Naperville-Elgin, IL-IN-WI	9,461,105			108 [4,6] / 90 [5,6]	9	-
Chicago-Naperville-Elgin, IL-IN-WI	9,461,105			108 [4,7] / 67 [5,7]	6	6
Cincinnati, OH-KY-IN	2,114,580 [9]			101 [4] 50 [5,6]	7	-
Cincinnati, OH-KY-IN	2,114,580 [9]			No Data [7]	0	0
Indianapolis-Carmel-Anderson	1,887,862 [9]			71	3	3
Louisville-Jefferson County, KY-IN	1,235,708 [9]			67 [6]	3	-
Louisville-Jefferson County, KY-IN	1,235,708 [9]			47 [7]	1	1

CFR Requirement	MSA Population		High Conc.[1]	Medium Conc.[2]	Low Conc.[3]
	500,000 - 1,000,000	# of Required Sites =>	4-8	2-4	1-2

MSA	Population	MSA Design Value			# of Sites 2013	# of Sites 2014
No MSAs in this category						

CFR Requirement	MSA Population		High Conc.[1]	Medium Conc.[2]	Low Conc.[3]
	250,000 - 500,000	# of Required Sites =>	3-4	1-2	0-1

MSA	Population	MSA Design Value			# of Sites 2013	# of Sites 2014
Evansville, IN-KY	311,552 [9]			37 [6]	2	-
Evansville, IN-KY	311,552 [9]			37 [7]	1	1
Fort Wayne	416,257			No Data	0	0
South Bend-Mishawaka, IN-MI	319,224			No Data	0	0
South Bend-Mishawaka, IN-MI	319,224			No Data	0	0

CFR Requirement	MSA Population		High Conc.[1]	Medium Conc.[2]	Low Conc.[3]
	100,000 - 250,000	# of Required Sites =>	1-2	0-1	0

MSA	Population	MSA Design Value			# of Sites 2013	# of Sites 2014
Anderson [8]	131,636			No Data	0	0
Bloomington	159,549 [9]			No Data	0	0
Elkhart-Goshen	197,559			No Data	0	0
Kokomo	82,752 [9]			No Data	0	0
Lafayette-West Lafayette	201,789			No Data	0	0
Michigan City-LaPorte	111,467			No Data	0	0
Muncie	117,671			No Data	0	0
Terre Haute	172,425			41	1	1

Non MSA		Design Value			# of Sites 2013	# of Sites 2014
Jasper - Dubois Co.	54,734			38	1	1
				Sites in Indiana Network	13	13

[1] Exceeds NAAQS by 20% (180ug/m3).
[2] Exceeds 80% of NAAQS (120 ug/m3).
[3] <80% of NAAQS (120 ug/m3).
[4] Design value from source oriented site (not indicative of entire MSA).
[5] Design value from population oriented sites.
[6] Information for full MSA.
[7] Information for Indiana's portion of MSA
[8] Anderson MSA becomes part of Indianapolis MSA in Feb 2013. Anderson requirements and sites are absorbed by Indianapolis.
[9] MSA populations adjusted according to MSA changes in February 2013.

Table 9 – Marion County PM_{10} Data Comparison

PM_{10} Data						
Year	Indpls – West Street		Indpls – School 21		Indpls - Washington Park	
	Annual Average	Design Value	Annual Average	Design Value	Annual Average	Design Value
2003	24.7		24.6			
2004	24.7	52	21.1	50		
2005	28.2	57	24.8	50		
2006	24	57	20	49		
2007	27.5	57	22.5	49		
2008	23.6	53	17.6	47		
2009	***24.8***	53	***19.5***	47		
2010	31.6	61	24.3	41	***22.3***	
2011	***26.4***	64	21.1	41	18.7	
2012	30.0	71	21.6	50	19.4	49

Values in ***Bold/Italics*** did not meet completeness criteria

Figure 8 – Marion County PM_{10} Sites

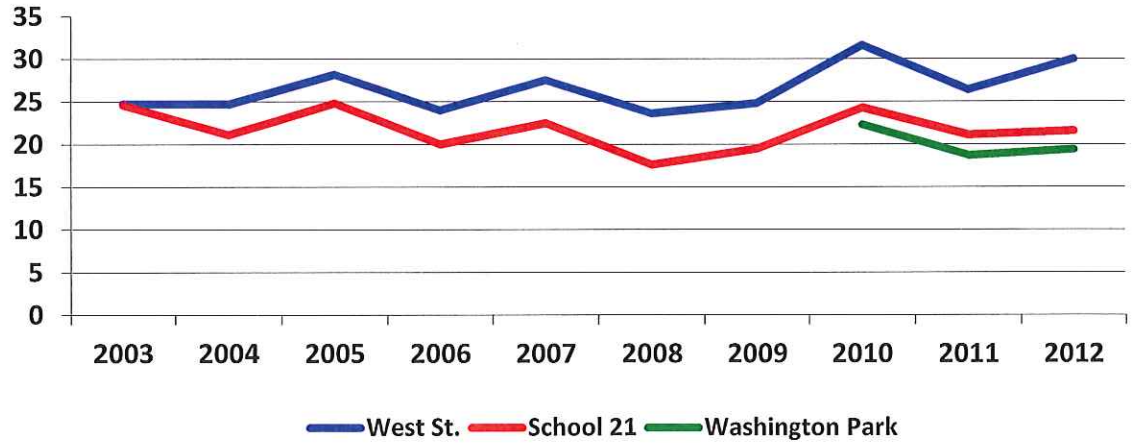


Figure 9 – PM_{10} Monitoring Network

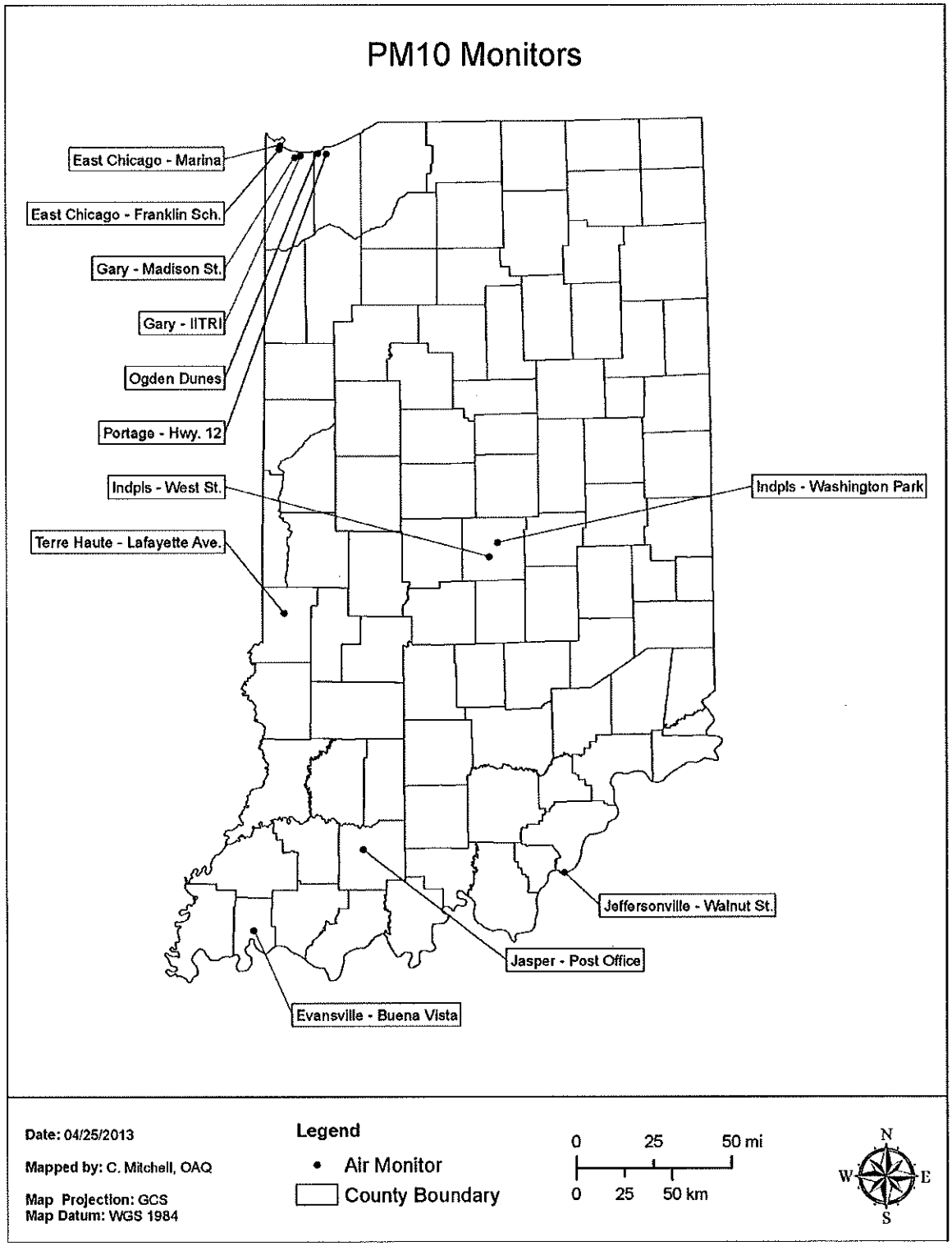


Table 10 – PM_{10} Monitoring Network

Parameter Code: 81102 **PM_{10} - Particulate Matter**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180190006	Jeffersonville - Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	SLAMS	06/26/03	6-Day	127	Neigh	Pop Exp	38.277675	-85.740153	Louisville/Jefferson County, KY-IN	No
180372001	Jasper - Post Office	Dubois	Jasper	Jasper Post Office, 206 E. 6th St.	SLAMS	07/01/87	6-Day	127	Neigh	Highest Conc	38.391389	-86.929167	Non-MSA County	No
180890006	East Chicago - Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	10/01/87	6-Day	127	Middle	Highest Conc	41636111	-87.440833	Chicago-Naperville-Elgin, IL-IN-WI	No
180890006	East Chicago - Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	10/01/87	6-Day	127	Middle	Quality Assurance	41636111	-87.440833	Chicago-Naperville-Elgin, IL-IN-WI	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201Mississippi St.	SLAMS	03/26/93	1-Day	127	Middle	Source Oriented	41.606667	-87.304722	Chicago-Naperville-Elgin, IL-IN-WI	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201Mississippi St.	SLAMS	03/01/97	Continuous	079	Middle	Source Oriented	41.606667	-87.304722	Chicago-Naperville-Elgin, IL-IN-WI	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	6-Day	127	Neigh	Pop Exp	41.598505	-87.342991	Chicago-Naperville-Elgin, IL-IN-WI	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	6-Day	127	Neigh	Quality Assurance	41.598505	-87.342991	Chicago-Naperville-Elgin, IL-IN-WI	No
180890034	East Chicago-Marina	Lake	East Chicago	East Chicago Marina 3301Aldis St.	SLAMS	10/30/12	6-Day	127	Middle	Source Oriented	41653580	-87.435650	Chicago-Naperville-Elgin, IL-IN-WI	No
180970043	Indpls - West St.	Marion	Indianapolis	1735 S. West St.	SLAMS	10/29/86	6-Day	127	Middle	Highest Conc	39.744957	-86.166496	Indianapolis-Carmel-Anderson	No
180970043	Indpls - West St.	Marion	Indianapolis	1735 S. West St.	SLAMS	01/01/13	6-Day	127	Middle	Quality Assurance	39.744957	-86.166496	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	SLAMS	07/01/10	1-Day	127	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	SLAMS	08/02/11	Continuous	122	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel-Anderson	No
180970084	Indpls - School 21	Marion	Indianapolis	IPS Sch 21, 2615 English Ave.	SLAMS	02/16/09	6-Day	127	Middle	Source Oriented	39.759083	-86.115556	Indianapolis-Carmel-Anderson	Discontinue
181270023	Portage - Hwy 12	Porter	Portage	Bethlehem Steel Waste Lagoon, Hwy 12	SLAMS	10/01/95	Continuous	079	Neigh	Highest Conc	41616618	-87.146959	Chicago-Naperville-Elgin, IL-IN-WI	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/01/89	6-Day	127	Neigh	Pop Exp	41617500	-87.199167	Chicago-Naperville-Elgin, IL-IN-WI	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/10/09	6-Day	127	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961N. Lafayette Ave.	SLAMS	07/01/88	6-Day	127	Neigh	Pop Exp	39.486111	-87.401389	Terre Haute	No

PM10 MONITORING METHODS: *079 - R & P TEOM 1400, 1400 A*
122- Met One - Beta Attenuation
127 - R&P 2025A or 2025B Sequential

Fine Particulate Matter ($PM_{2.5}$)

Monitoring Requirements

40CFR Part 58, Appendix D 4.7 details the number of $PM_{2.5}$ sites required in each MSA. The number of sites is based on the population of an MSA and if the design value for that area is greater or less than 85% of either NAAQS. Table 11 (Table D-5 of Appendix D) lists the minimum requirements as stated in Part 58. Table 12 lists the requirements as they relate to Indiana. Indiana meets the minimum number of sites for each MSA within Indiana's boundaries. There are five MSAs which cross state lines. Except for Cincinnati, OH-KY-IN Indiana meets the requirement for the number of sites for the full MSA, in the multi-agency MSAs. An agreement between the SWOAQA and IDEM specifies that SWOAQA will fulfill the $PM_{2.5}$ monitoring requirements in this MSA. In the absence of an agreement, Indiana would be required to operate three sites in the Cincinnati, OH-KY-IN MSA, and 17 additional monitoring sites overall.

In addition, 40 CFR, Appendix D, 4.7.2 states that "State, or where appropriate, local agencies must operate continuous fine particulate analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 (Table 11) of this appendix. At least one required FRM/FEM monitor in each MSA must be collocated." As these requirements are applied to Indiana, 11 would be required. Indiana meets this requirement in all MSAs, except Cincinnati, OH-KY-IN and Louisville/Jefferson County, KY-IN. IDEM has multi-agency agreements with SWOAQA (Cincinnati, OH) and APCD of Louisville specifying the sites which will operate in each district to fulfill the $PM_{2.5}$ monitoring requirements in the SE MSAs.

Collocated samplers are required at 15% of the FRM/FEM sites operated by each PQAO. IDEM is the sole PQAO for Indiana and plans to operate 35 sites. Indiana is required to have five collocated samplers.

Table 11 – SLAMS Minimum $PM_{2.5}$ Monitoring Site Requirements

Number of Sites per MSA and Design Value		
MSA Population	3 yr DV >= 85% of either NAAQS	3 yr DV < 85% of either NAAQS
> 1,000,000	3	2
500,000 - 1,000,000	2	1
50,000 - 500,000	1	0
	also	
	Statewide Background Site	1
	Statewide Transport Site	1
85% of Daily NAAQS (35) = 29.75 ug/m3		
85% of Annual NAAQS (12) = 10.2 ug/m3		

Monitoring Methodology

Intermittent $PM_{2.5}$ is sampled by drawing air through a specially designed inlet that excludes particles larger than 2.5 microns in diameter. The remaining particles are collected on a Teflon™ Microfiber filter that is weighed before and after the sampling period to determine the particulate mass. Indiana uses the R&P 2025 Sequential Samplers (FEM) (EQPM-0202-145) to collect intermittent data. The normal sampling schedule varies, as determined by the regulations: three sites sample every day, the remainder sample every 3rd day. Collocated monitors used for assessing data precision operate on a one in six day schedule.

Continuous data are collected using one of the following monitors: Met One BAM 1020 $PM_{2.5}$ (FEM) (EQPM-0308-170), Thermo Scientific TEOM 1400a with Series 8500C FDMS (EQPM-0609-181), or Thermo Scientific Model 5030 SHARP (EQPM-0609-184). The BAM 1020 collects fine particulate through a sampling inlet onto a filter tape, using a beta ray transmission to measure the amount of particulate concentration collected during a specific sampling period. The TEOM 1400a collects the particulate on a filter attached to an oscillating microbalance. The concentration of the particulate is proportional to the change in the oscillating frequency. The SHARP 5030 collects the particulate onto a filter tape and uses a beta ray transmission to measure the amount of particulate concentration, similar to the BAM 1020 FEM. In addition, it also has an optical assembly that senses the light scattered by the aerosol and is constantly referenced to the measurement of the mass sensor.

Table 12 – Number of SLAMS $PM_{2.5}$ Monitoring Sites Required for Indiana

MSA	MSA Population [1] (2010)	Annual Design Value (ug/m3) (2010-2012)	Daily Design Value (ug/m3) (2010-2012)	# of Sites Required per CFR	2013 # of Sites	2014 # of Sites (IN)	2013 # of Cont. Mont.	2014 # of Cont. Mont. (IN)
Anderson [2]	131,636	10.7	25	1 to NA [2]	1 to 0 [2]	-	1 to 0 [2]	-
Bloomington [3]	159,549	10.4	23	1	2 [4] to 1	1	1	1
Chicago-Naperville-Elgin, IL-IN-WI (total MSA)	9,461,105	13.0 [5]	32 [5]	3	24 [5]	-	11 [5]	-
Chicago-Naperville-Elgin, IL-IN-WI (IN only)	9,461,105	12.2 [6]	30 [6]	3	6 [6]	6	3 [6]	3
Cincinnati, OH-KY-IN (total MSA)	2,114,580	13.8 [5]	29 [5]	3	9 [5]	-	6 [5]	-
Cincinnati, OH-KY-IN (IN only)	2,114,580	No Data [6]	No Data [6]	3	0 [6]	0	0 [6]	0
Columbus	76,794	No Data	No Data	0	0	1	0	1
Elkhart-Goshen	197,559	11.2	31	1	1	1	1	1
Evansville, IN-KY (total MSA)	311,552	12.2 [5]	27 [5]	1	4 [5]	-	2 [5]	-
Evansville, IN-KY (IN only)	311,552	12.2 [6]	27 [6]	1	3 [6]	3	1 [6]	1
Fort Wayne	416,257	10.7	26	1	2	2	2	2
Indianapolis-Carmel-Anderson	1,887,862	12.7	30	3	6 to 7	8	3 to 4	4
Kokomo	82,752	11.6 [7]	26 [7]	1	0	1	0	1
Lafayette-West Lafayette	201,789	10.6	25	1	1	1	1	1
Louisville-Jefferson County, KY-IN (total MSA)	1,235,708	13.2 [5]	28 [5]	3	7 [5]	-	4 [5]	-
Louisville-Jefferson County, KY-IN (IN only)	1,235,708	13.2 [6]	27 [6]	3	3 [6]	3	1 [6]	1
Michigan City-LaPorte	111,467	10.1	26	0	1	1	0	0
Muncie	117,671	11.2	27	1	1	1	0	0
South Bend-Mishawaka, IN-MI (total MSA)	319,224	10.6 [5]	29 [5]	1	1 [5]	-	1 [5]	-
South Bend-Mishawaka, IN-MI (IN only)	319,224	10.6 [6]	29 [6]	1	1 [6]	1	1 [6]	1
Terre Haute	172,425	11.9	27	1	1	1	1	1
Other Requirements								
State Background Site - Green Co.		10.0 [8]	19 [8]	1	1	1		
State Transport Site - Henry Co.		10.5	25	1	1	1		
Non MSAs								
Jasper - Dubois Co.		12.4	26		1	1		
Dale - Spencer Co.		12.0	26		1	1		
		Values above new NAAQS						
		DV ≥ 85% of NAAQS						
# of sites needed if Indiana meets all multi-state MSA requirements				23				
# of continuous monitors required (1/2 of the required sites)(rounded up)				12				
			Sites in Indiana Network		32	35	16	18

[1] MSA populations adjusted according to MSA changes in February 2013.

[2] Anderson MSA becomes part of Indianapolis MSA in Feb 2013. Anderson requirements and sites are absorbed by Indianapolis.

[3] Green County removed from Bloomington MSA in Feb 2013.

[4] Background site in Green County included.

[5] Information for full MSA.

[6] Information for Indiana's portion of MSA.

[7] Site discontinued March 2012, data from 2009-2011.

[8] Site relocated 1/1/12, 1 year of data.

Monitoring Network

In 2014 the Indiana $PM_{2.5}$ monitoring network consists of 35 monitoring sites. The number of monitoring sites includes the operational sites at the beginning of the year, and the southeast Hamilton County (Fishers area) site, Columbus site, Kokomo site, and the Indpls – I-70 E (near-road NO_2). The Fishers area site had been proposed to be operational in 2010. Locations had to be changed, and the agreements necessary to install this site have been negotiated. It is anticipated that this site will be established prior to the end of 2014. The Columbus and Kokomo sites are also anticipated to be established prior to the end of 2014.

Continuous monitors will be collecting data at 18 of the site locations in 2014.

Data / Design Value

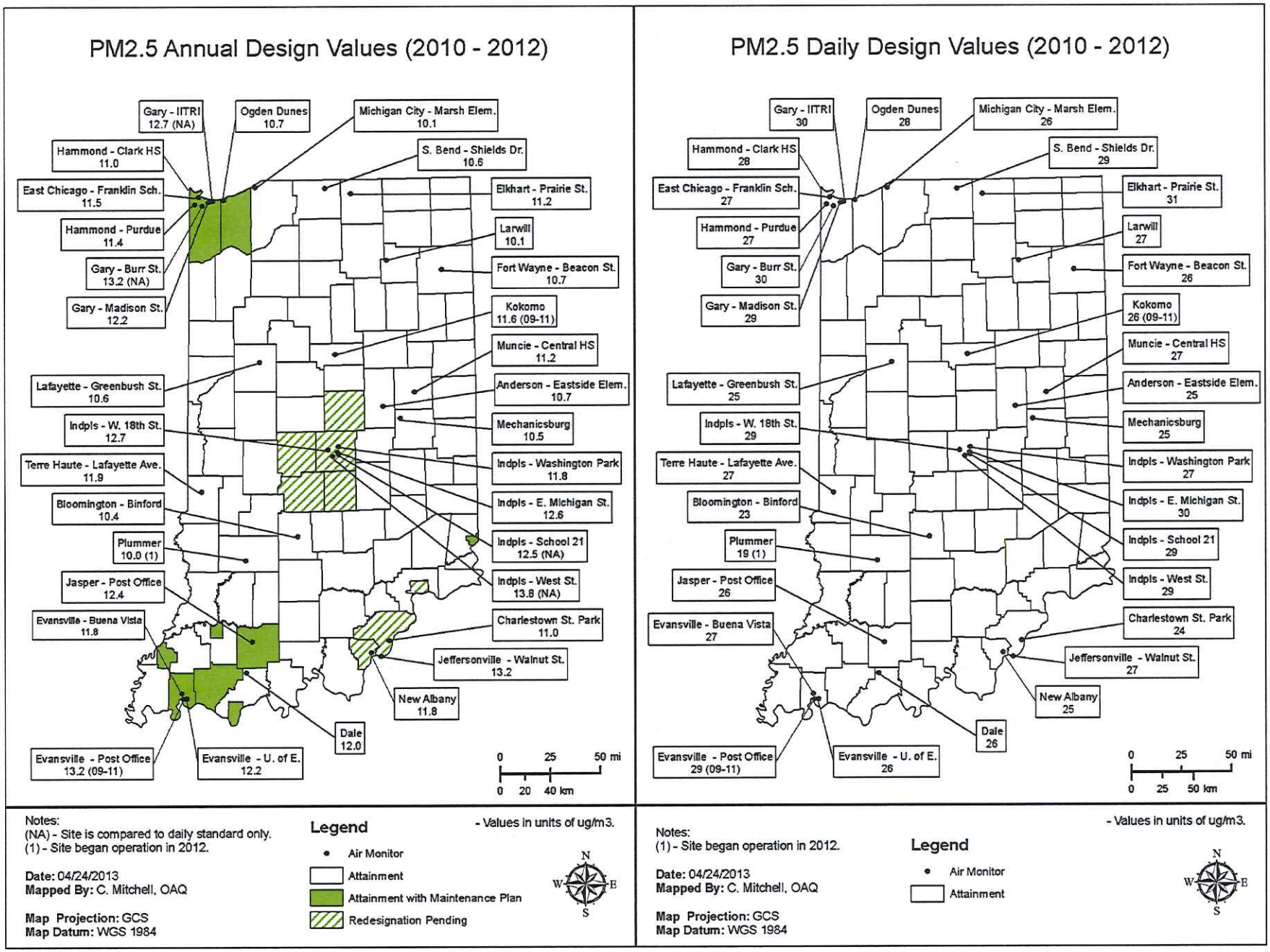
Only the intermittent data collected from the intermittent FEM samplers are considered eligible for comparison to the NAAQS and used for calculation of the design value for a site. The continuous data are used for AQI calculations and AIRNow mapping. The continuous data will continue to be compared to the intermittent data to determine when it would be appropriate to use it for NAAQS comparison purposes.

Instructions were received on April 15, 2013 regarding the ability to request the exclusion of $PM_{2.5}$ Continuous FEM data for determining NAAQS calculations. Data from the state's continuous $PM_{2.5}$ network are being further reviewed in accordance with the PM NAAQS rule published on January 15, 2013 (78 FR 3086) and specific to the provisions detailed in §58.10 (b)(13) and §58.11 (e). Appendix D contains IDEM's evaluation of the data from the continuous FEM monitoring sites as to their acceptability for use in attainment/nonattainment determinations. As a response to IDEM's request to be allowed more time to prepare a proper and more detailed evaluation, USEPA will accept this request after July 1, 2013 and make their determination on the acceptability of the exclusion request. IDEM will put Appendix D out for a 30 day comment period and submit the final to USEPA by August 31, 2013.

A site's annual design value is determined by first calculating the quarterly average concentrations, then calculating the weighted annual concentration by averaging the quarterly values, and then averaging the three consecutive annual averages. The highest site design value in an MSA is generally determined to be the design value for the area. It is compared to the annual NAAQS of 12 ug/m^3 to determine attainment/nonattainment for the area. Similarly, a site's daily design value is obtained by averaging the 98th percentile value from three consecutive years. This value is then compared to the daily NAAQS, 35 ug/m^3, to determine attainment/nonattainment of the daily standard.

The design values for all sites for the most recent sampling period (2010 - 2012) along with the designation status of areas for $PM_{2.5}$ are on the maps in Figure 10. Currently all counties in Indiana meet the daily NAAQS for $PM_{2.5}$. Several sites do not meet the new annual NAAQS of 12 ug/m^3.

Figure 10 – $PM_{2.5}$ Site Design Values



Network Modifications

The $PM_{2.5}$ monitoring network with the changes proposed for 2014 is in Table 13. A map of the 2014 network is in Figure 11.

The first modification is the proposed relocation of the Hammond – Purdue (180892004) monitoring site. Currently an R&P 2025 and a Thermo 5030 SHARP are operating. The continuous SHARP monitor is installed in a reconfigured R&P TEOM 1400a shelter. The result is inconsistent temperature/relative humidity control, instrument access problems, and data loss. A new location is necessary to accommodate the installation of a full trailer/monitoring shelter.

A Teledyne API 602 continuous monitor is also being installed at the Indianapolis – Washington Park (180970078) location. This will be a one year special purpose monitor. Pending the data comparison to the onsite FRM, the API 602 may replace a Met One BAM 1020 located elsewhere in the monitoring network.

As per 40CFR Part 58.12, if the daily design value of an area is within plus or minus 5% of the NAAQS, then sampling must be daily. Each year the data are evaluated to determine which sites must collect daily data. The design values from the period of 2010 through 2012 will determine which sites will collect daily samples in 2014. No sites are required to collect daily samples. However, Indpls – Washington Park (180970078) and Indpls – W. 18th St. (180970081) will continue sampling daily to continue to collect comparison data for the continuous monitors operating at these sites. Jeffersonville – Walnut St. (180190006) will also collect daily samples to continue to collect more data for the Jeffersonville Special Study.

Unanticipated Network Changes

Since Indiana has not opted to spatially average $PM_{2.5}$ values from multiple sites in an MSA, if access to a site is lost or the site must be discontinued, and that site is violating the NAAQS for $PM_{2.5}$, a new site need not be found, if the 'design value site' for the MSA is still operational. The attainment of the area would still be determined by the 'design value site'. However, if the violating 'design value site' were to be lost, every effort would be made to obtain a new site close to the old site and having the same scale of representativeness and monitoring objectives as the original site.

Figure 11 – $PM_{2.5}$ Monitoring Network

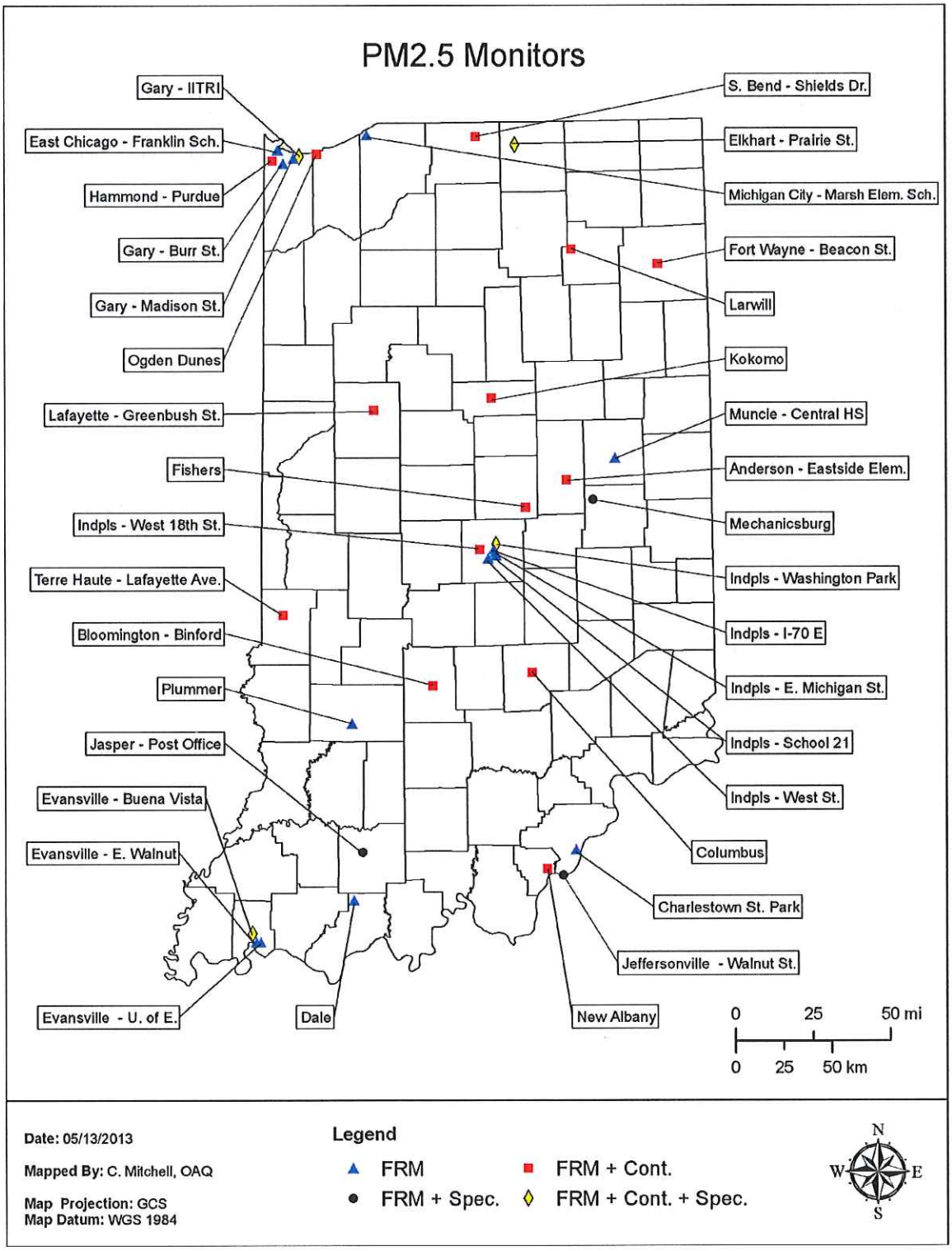


Table 13 – $PM_{2.5}$ Monitoring Network

$PM_{2.5}$ Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	NAAQS Comparable	MSA	Site Change Proposed?
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	SLAMS	01/01/99	3-Day	145	Neigh	Pop Exp	41094722	-85.101944	Yes	Ft. Wayne	No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	SLAMS	01/04/13	3-Day	145	Neigh	Quality Assurance	41094722	-85.101944	No	Ft. Wayne	No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	Non-regulatory	01/01/02	Continuous	181	Neigh	Pop Exp	41094722	-85.101944	No	Ft. Wayne	No
180050007	Columbus	Bartholomew			SLAMS	2013	3-Day		Neigh	Pop Exp			Yes	Columbus	No
180050007	Columbus	Bartholomew			Non-regulatory	2013	Continuous		Neigh	Pop Exp			No	Columbus	No
180190006	Jeffersonville - Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	SLAMS	06/26/03	1-Day	145	Neigh	Pop Exp	38.277675	-85.740153	Yes	Louisville/Jefferson County, KY-IN	No
180190008	Charlestown State Park	Clark		Charlestown State Park 12500 Hwy 62, Charlestown	Special Purpose	07/01/08	3-Day	145	Urban	Pop Exp	38.393833	-85.664167	Yes	Louisville/Jefferson County, KY-IN	No
180350006	Muncie - Central HS	Delaware	Muncie	Muncie Central HS, 801N. Walnut St.	SLAMS	10/15/99	3-Day	145	Neigh	Pop Exp	40.201111	-85.388056	Yes	Muncie	No
180372001	Jasper - Post Office	Dubois	Jasper	Post Office, 206 E. 6th St.	SLAMS	01/01/00	3-Day	145	Neigh	Pop Exp	38.391389	-86.929167	Yes	Non-MSA County	No
180390008	Elkhart - Prairie St.	Elkhart	Elkhart	2745 Prairie St.	SLAMS	01/01/08	3-Day	145	Neigh	Pop Exp	41656905	-85.968371	Yes	Elkhart-Goshen	No
180390008	Elkhart - Prairie St.	Elkhart	Elkhart	2745 Prairie St.	Non-regulatory	11/23/10	Continuous	170	Neigh	Pop Exp	41656905	-85.968371	No	Elkhart-Goshen	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	01/18/99	3-Day	145	Neigh	Pop Exp	38.308056	-85.834167	Yes	Louisville/Jefferson County, KY-IN	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	01/18/99	6-Day	145	Neigh	Quality Assurance	38.308056	-85.834167	No	Louisville/Jefferson County, KY-IN	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	Non-regulatory	11/01/03	Continuous	181	Neigh	Pop Exp	38.308056	-85.834167	No	Louisville/Jefferson County, KY-IN	No
180550001	Plummer	Greene		2500 S. 275 W	SLAMS	01/12/12	3-Day	145	Regional	Upwind Bkgrd	38.985578	-86.990120	Yes	Bloomington	No
180570007	Fishers	Hamilton	Fishers		SLAMS	10/01/13	3-Day	145	Urban	Pop Exp			Yes	Indianapolis-Carmel-Anderson	No
180570007	Fishers	Hamilton	Fishers		Non-regulatory	10/01/13	Continuous	170	Urban	Pop Exp			No	Indianapolis-Carmel-Anderson	No
180650003	Mechanicsburg	Henry		Shenandoah HS, 7354 W. Hwy. 36, Pendleton	SLAMS	09/26/00	3-Day	145	Regional	Regional Transport	40.009525	-85.523455	Yes	Non-MSA County	No
18067___	Kokomo	Howard	Kokomo		SLAMS	2013	3-Day	145	Urban	Pop Exp			Yes	Kokomo	No
18067___	Kokomo	Howard	Kokomo		Non-regulatory	2013	Continuous	170	Urban	Pop Exp			No	Kokomo	No

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	NAAQS Comparable	MSA	Site Change Proposed?
180890006	East Chicago - Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	01/27/99	3-Day	145	Neigh	Pop Exp	41636111	-87.440833	Yes	Chicago-Naperville-Elgin, IL-IN-WI	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201Mississippi St.	SLAMS	03/04/99	3-Day	145	Middle	Source & Pop Exp	41606667	-87.304722	Yes**	Chicago-Naperville-Elgin, IL-IN-WI	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201Mississippi St.	Non-regulatory	01/01/03	Continuous	184	Middle	Source & Pop Exp	41606667	-87.304722	No	Chicago-Naperville-Elgin, IL-IN-WI	No
180890026	Gary - Burr St	Lake	Gary	Truck Stop, 25th Ave & Burr St.	SLAMS	02/12/00	3-Day	145	Middle	Source & Pop Exp	41573056	-87.405833	Yes**	Chicago-Naperville-Elgin, IL-IN-WI	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	3-Day	145	Neigh	Pop Exp	41598505	-87.342991	Yes	Chicago-Naperville-Elgin, IL-IN-WI	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	6-Day	145	Neigh	Quality Assurance	41598505	-87.342991	No	Chicago-Naperville-Elgin, IL-IN-WI	No
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	SLAMS	02/11/99	3-Day	145	Neigh	Pop Exp	41585278	-87.474444	Yes	Chicago-Naperville-Elgin, IL-IN-WI	Relocate
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	Non-regulatory	12/01/03	Continuous	184	Neigh	Pop Exp	41585278	-87.474444	No	Chicago-Naperville-Elgin, IL-IN-WI	Relocate
18089____	Hammond	Lake	Hammond		SLAMS	2014	3-Day	145	Neigh	Pop Exp			Yes	Chicago-Naperville-Elgin, IL-IN-WI	Relocation
18089____	Hammond	Lake	Hammond		Non-regulatory	2014	Continuous	184	Neigh	Pop Exp			No	Chicago-Naperville-Elgin, IL-IN-WI	Relocation
180910011	Michigan City - Marsh Elem. Sch.	La Porte	Michigan City	Marsh Elem. Sch., 400 E. Homer St.	SLAMS	12/17/99	3-Day	145	Neigh	Pop Exp	41706944	-86.891111	Yes	Michigan City-LaPorte	No
180950011	Anderson - Eastside Elem.	Madison	Anderson	Eastside Elementary Sch., 844 N. Scatterfield Rd.	SLAMS	07/22/10	3-Day	145	Middle	Pop Exp	40.125556	-85.652222	Yes	Indianapolis-Carmel-Anderson	No
180950011	Anderson - Eastside Elem.	Madison	Anderson	Eastside Elementary Sch., 844 N. Scatterfield Rd.	Non-regulatory	07/08/10	Continuous	184	Middle	Pop Exp	40.125556	-85.652222	No	Indianapolis-Carmel-Anderson	No
180970043	Indpls - West St.	Marion	Indianapolis	1735 South West Street	SLAMS	01/24/99	3-Day	145	Middle	Pop Exp	39.744957	-86.166496	Yes**	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCore	03/07/99	1-Day	145	Neigh	Pop Exp	39.811097	-86.114469	Yes	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCore / Non-regulatory	01/01/04	Continuous	170	Neigh	Pop Exp	39.811097	-86.114469	No	Indianapolis-Carmel-Anderson	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Non-regulatory	07/06/05	Continuous	204	Neigh	Pop Exp	39.811097	-86.114469	No	Indianapolis-Carmel-Anderson	Add
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch 90, 3351W. 18th St.	SLAMS	01/22/99	1-Day	145	Neigh	Pop Exp	39.788903	-86.214628	Yes	Indianapolis-Carmel-Anderson	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch 90, 3351W. 18th St.	SLAMS	02/11/99	6-Day	145	Neigh	Quality Assurance	39.788903	-86.214628	No	Indianapolis-Carmel-Anderson	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch 90, 3351W. 18th St.	Non-regulatory	11/01/07	Continuous	181	Neigh	Pop Exp	39.788903	-86.214628	No	Indianapolis-Carmel-Anderson	No
180970083	Indpls - E. Michigan St.	Marion	Indianapolis	Thomas Gregg Sch 15, 2302 E. Michigan St.	SLAMS	01/22/99	3-Day	145	Neigh	Pop Exp	39.774944	-86.122053	Yes	Indianapolis-Carmel-Anderson	No
180970084	Indpls - School 21	Marion	Indianapolis	IPS Sch 21,2615 English Ave.	SLAMS	02/16/09	3-Day	145	Middle	Pop Exp	39.759083	-86.115556	Yes**	Indianapolis-Carmel-Anderson	No
180970087	Indpls - I-70 E	Marion	Indianapolis	1650 Ludlow Ave.	Near-Road	01/01/14	3-Day	145	Neigh	Pop Exp	39.788793	-86.131121	No	Indianapolis-Carmel-Anderson	Add
181050003	Bloomington	Monroe	Bloomington	Binford Elementary Sch, 2300 E. 2nd St.	SLAMS	04/01/09	3-Day	145	Neigh	Pop Exp	39.159444	-86.504722	Yes	Bloomington	No
181050003	Bloomington	Monroe	Bloomington	Binford Elementary Sch, 2300 E. 2nd St.	Non-regulatory	04/01/09	Continuous	184	Neigh	Pop Exp	39.159444	-86.504722	No	Bloomington	No

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	NAAQS Comparable	MSA	Site Change Proposed?
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/27/99	3-Day	145	Neigh	Pop Exp	41617500	-87.199167	Yes	Chicago-Naperville-Elgin, IL-IN-WI	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/10/13	3-Day	145	Neigh	Quality Assurance	41617500	-87.199167	Yes	Chicago-Naperville-Elgin, IL-IN-WI	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	Non-regulatory	12/03/03	Continuous	181	Neigh	Pop Exp	41617500	-87.199167	No	Chicago-Naperville-Elgin, IL-IN-WI	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	3-Day	145	Neigh	Pop Exp	41696692	-86.214683	Yes	South Bend-Mishawaka, IN-MI	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	6-Day	145	Neigh	Quality Assurance	41696692	-86.214683	No	South Bend-Mishawaka, IN-MI	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	Non-regulatory	06/01/06	Continuous	170	Neigh	Pop Exp	41696692	-86.214683	No	South Bend-Mishawaka, IN-MI	No
181470009	Dale	Spencer	Dale	David Turnham School, Dunn & Locust	SLAMS	02/01/00	3-Day	145	Urban	Regional Trans	38.167500	-86.983333	Yes	Non-MSA County	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401Greenbush St	SLAMS	10/01/02	3-Day	145	Neigh	Pop Exp	40.431639	-86.852500	Yes	Lafayette-West Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401Greenbush St	SLAMS	10/01/02	6-Day	145	Neigh	Quality Assurance	40.431639	-86.852500	No	Lafayette-West Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401Greenbush St	Non-regulatory	04/01/05	Continuous	170	Neigh	Pop Exp	40.431639	-86.852500	No	Lafayette-West Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401Greenbush St	Non-regulatory	11/09/07	Continuous	181	Neigh	Pop Exp	40.431639	-86.852500	No	Lafayette-West Lafayette	No
181630016	Evansville - U of E	Vanderburgh	Evansville	Carson Center, Walnut St.	SLAMS	06/05/99	3-Day	145	Neigh	Pop Exp	37.974444	-87.532222	Yes	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/10/09	3-Day	145	Neigh	Pop Exp	38.013333	-87.577778	Yes	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	04/03/11	6-Day	145	Neigh	Quality Assurance	38.013333	-87.577778	No	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Non-regulatory	07/14/09	Continuous	170	Neigh	Pop Exp	38.013333	-87.577778	No	Evansville, IN-KY	No
181630023	Evansville - E. Walnut	Vanderburgh	Evansville	500 E. Walnut St.	SLAMS	01/01/13	3-Day	145	Neigh	Pop Exp	37.974468	-87.558037	Yes	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961N. Lafayette Ave.	SLAMS	03/19/99	3-Day	145	Neigh	Pop Exp	39.486111	-87.401389	Yes	Terre Haute	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961N. Lafayette Ave.	Non-regulatory	07/02/03	Continuous	170	Neigh	Pop Exp	39.486111	-87.401389	No	Terre Haute	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961N. Lafayette Ave.	Non-regulatory	01/01/13	Continuous	170	Neigh	Quality Assurance	39.486111	-87.401389	No	Terre Haute	No
181830003	Larwill	Whitley	Larwill	Whitko Middle School, 710 N. State Rd. 5	SLAMS	04/08/10	3-Day	145	Regional	Regional Transport	41169646	-85.629292	Yes	Ft. Wayne	No
181830003	Larwill	Whitley	Larwill	Whitko Middle School, 710 N. State Rd. 5	Non-regulatory	04/08/10	Continuous	170	Regional	Regional Transport	41169646	-85.629292	No	Ft. Wayne	No

** According to 40 CFR Part 58 Subpart D, PM2.5 data that is representative of a unique population-oriented scale or localized hot spot are only eligible for comparison to the 24-hour PM2.5 NAAQS. The annual standard does not apply.

MONITORING METHODS: *145 - R & P 2025A or B* *170 - MET ONE BAM - FEM* *184 - Thermo SHARP* *181 - FDMS TEOM* *204 - TAPI 602 Beta*