Indiana
2009
Ambient Air Monitoring
Network Plan

Indiana Department of Environmental Management
Office of Air Quality
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Table of Contents

Appendices

List of Tables

List of Figures

Acronyms

AQS	Air Quality System
BAM	Beta Attenuation Monitor
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
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
GC/MS	Gas Chromatograph / Mass Spectrometry
ICP/MS	Inductive Coupled Plasma / Mass Spectrometry
IDEM	Indiana Department of Environmental Management
IMPROVE	Interagency Monitoring of Protected Visual Environments
IOES	Indianapolis Office of Environmental Services
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standard
NAMS	National Air Monitoring Station
NATTS	National Air Toxics Trends Station
NCore	National Core multipollutant monitoring stations
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NO_y	Total Reactive Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Association
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
PTFE	Polytetrafluoroethylene
QA	Quality Assurance
SASS	Speciation Air Sampling System
SLAMS	State or Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SPM	Special Purpose Monitor
STN $PM_{2.5}$	Speciation Trends Network
TSP	Total Suspended Particulate
TEOM	Tapered Element Oscillating Microbalance
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
VOC	Volatile Organic Compounds

Introduction

In October 2006, the USEPA issued final regulations concerning state and local agency ambient air monitoring networks. These regulations require states to submit an annual monitoring network review to the USEPA. 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 2009 season.

Public Review and Comment

The annual monitoring network plan must be made available for public inspection for thirty (30) days prior to submission to USEPA. Information on how to comment to the plan and any comments received is 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 the USEPA'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 (6) 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 standard 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.

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

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.

PAMS (Ozone Precursors)

Of the six (6) 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 ozone, USEPA 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, the USEPA called for improved monitoring of ozone and its precursors, VOC and NO_x, to obtain more comprehensive and representative data on ozone air pollution. EPA initiated the PAMS program in February 1993. The PAMS program requires the establishment of an enhanced monitoring network in all ozone nonattainment areas classified as serious, severe, or extreme.

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 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.

National Ambient Air Quality Standards (NAAQS)

NAAQS are identified for the criteria pollutants; CO, lead, 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 the USEPA, 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, a city, a county, or an MSA 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 (3) year average of the annual fourth highest daily 8-hour maximums. If this number is above the NAAQS for O_3, then it is an exceedance of the NAAQS and the area defined by that monitor would be classified as 'nonattainment'. If the design value is below the NAAQS then the area is in 'attainment' of the standard. 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

Network Overview

Indiana has reviewed its current ambient air quality network and developed a proposed network to be implemented during 2009. Current and possible proposed NAAQS, site redundancy, siting problems, site access concerns, and other identified monitoring issues all contribute to any proposed network revisions.

The number of sites listed as in the current monitoring network includes changes planned to occur sometime during 2008 and which have not yet been completed. These include the establishment of the Bloomington and Hamilton County sites for $PM_{2.5,}$ and the relocation of the Anderson $PM_{2.5}$ site and the Evansville CO site. In addition, two changes were proposed after the completion of the 2007 Network Review. $PM_{2.5}$ speciation monitoring will be added to Jeffersonville – Walnut St. and $PM_{2.5}$ monitoring will be added to Charlestown – State Park. These additions are scheduled to begin operation on July 1.

Indiana's air monitoring network consists of the sites and monitors listed in Table 1. Any planned changes in the network for 2009 are also identified. Figure 1 is an overview of Indiana's current monitoring network and shows the types of changes planned in 2009.

Overall, the number of monitoring locations operated by the State and Local Agencies in Indiana is planned to go from eighty-two (82) sites to eighty-one (81) sites. The number of monitored parameters or monitoring systems will remain at one hundred seventy-four (174).

Table 1 - State and Local Air Monitoring Network

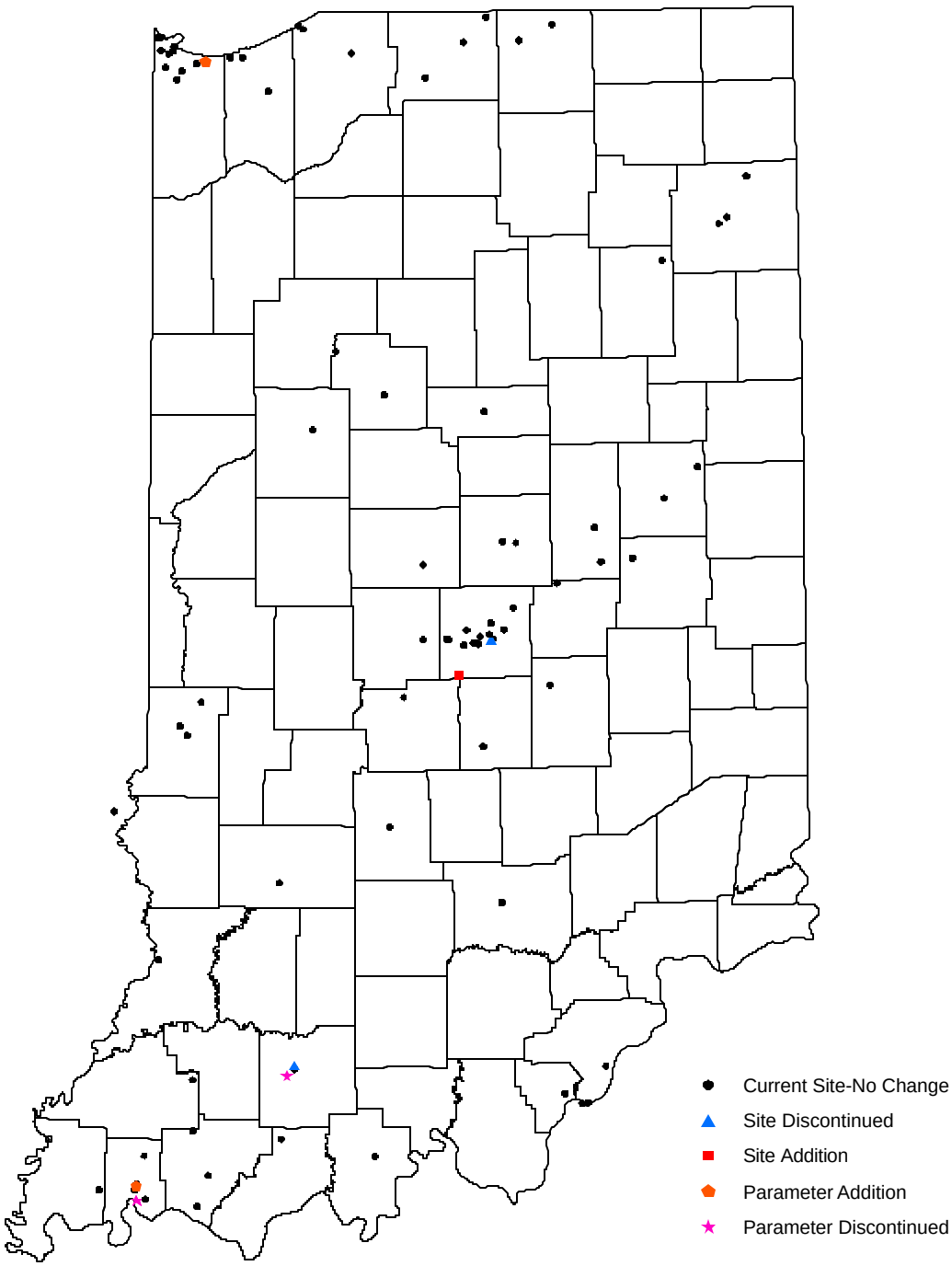
AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
170230001	Clark, IL	West Union, IL	West Union	416 S. Hwy 1	X														X
180030002	Allen	Leo	Leo	Leo HS, 14600 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.			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
180190008	Clark		Charlestown St. Park	Charlestown State Park, 12500 Highway 62, Charlestown	X					X									X
180190006	Clark	Jeffersonville	Jeffersonville - Walnut St	PFAU, 719 Walnut St.					X	X		X							
180190009	Clark	Clarksville	Clarksville	Falls of the Ohio State Park, 201 W. Riverside Dr.											X				
180350010	Delaware	Albany	Albany	Albany Elem. Sch., 700 W. State St.	X														
180370004	Dubois	Jasper	Jasper - Sport	Jasper Sport Complex, 1401 12th Ave.						Disc									X
180370005	Dubois	Jasper	Jasper - Golf	Jasper Golf Course, 1729 Jackson St.						Disc									
180372001	Dubois	Jasper	Jasper - Post Office	Post Office, 206 E. 6th St.					X	X		X							
180390008	Elkhart	Elkhart	Elkhart - Prairie St.	2745 Prairie St.						X		X							
180390007	Elkhart	Bristol	Bristol	Bristol Elem. Sch. 705 Indiana Ave.	X														
180431004	Floyd	New Albany	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	X	X				X	X								
180510012	Gibson		Oakland City	2205 S. 1350 E, Oakland City						X									X
180550001	Greene		Plummer	2500 S. 275 W	X														
180570005	Hamilton	Noblesville	Noblesville - 10th St.	1685 N. 10th St.	X														
	Hamilton			Site to be operational by end of 2008						X									
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
180670003	Howard	Kokomo	Kokomo	Fire Station, 215 W. Superior St.						X									
180690002	Huntington	Roanoke	Roanoke	Roanoke Elem. Sch., 423 W. Vine St.	X														
180710001	Jackson		Brownstown	225 W & 300 N, Brownstown	X														X
180810002	Johnson	Trafalgar	Trafalgar	200 W. Pearl St.	X														
180830004	Knox		Southwest Ag Center	Southwest Purdue Ag. Center, Vincennes						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 Add Sulfate		X	X	X		X

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
180890023	Lake	East Chicago	East Chicago - Aldis St.	East Chicago Water Treatment Plant, 3330 Aldis St.					X					X	X				
180890026	Lake	Gary	Gary - Burr St.	25th Ave. and Burr St.						X									
180890027	Lake	Griffith	Griffith	Ready Elementary School, 1345 N. Broad 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									
180892004	Lake	Hammond	Hammond - Purdue	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.						X	X	X							
180892008	Lake	Hammond	Hammond - 141st St.	1300 E. 141st St.	X	X								X	X				X
180892010	Lake	Hammond	Hammond - Clark HS	Clark High School, 1921 Davis St.					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 Sch.	400 E. Homer St.						X									
180950009	Madison	Anderson	Anderson - W. 5th St.	44 W. 5th St.						X									
	Madison	Anderson	44 W. 5th St is still operational.	Site will be relocated by end of 2008.						X	X								
180950010	Madison		Emporia	East Elem. Sch., 893 E. US 36, Pendleton	X														
180970042	Marion	Indianapolis	Indpls - Mann Rd.	8327 Mann Rd.															Add
180970043	Marion	Indianapolis	Indpls - West St.	1735 S. West St.					X	X									
180970050	Marion	Indianapolis	Indpls - Ft. Harrison	Ft. Harrison St. Park	X														
180970057	Marion	Indianapolis	Indpls - Harding St.	1321 S. Harding St.	X	X													X
180970063	Marion	Indianapolis	Indpls - Rockville Rd.	7601 Rockville Rd										X					
180970066	Marion	Indianapolis	Indpls - English Ave.	Seal Products. 3302 English Ave.					X	X									
180970071	Marion	Indianapolis	Indpls - Drover St.	National Printing Plate, 1415 Drover St.					X										
180970072	Marion	Indianapolis	Indpls - N. Ilinois St	50 N. Illinois St.			X												
180970073	Marion	Indianapolis	Indpls - E. 16th St	6125 E. 16th St.	X	X	X	X	X										X
180970076	Marion	Indianapolis	Indpls - Quemetco	230 S. Girls School Rd.										X					
180970078	Marion	Indianapolis	Indpls - Washington Park	Washington Park, 3120 E. 30th St,	Add	X	X	X		X	X	X	B. Carbon Sulfate		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, 3815 English Ave.											Disc				Disc
	Monroe	Bloomington		Site to be operational by end of 2008						X	X								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}	$PM_{2.5}$ (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										
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. Philips Rd., Evansville	X														X
181410010	St. Joseph		Potato Creek St. Park	Potato Creek St. Park, 25601 St. Rd. 4, N. Liberty	X														
181410014	St. Joseph	South Bend	S. Bend - Nuner Sch.	Nuner Elem. Sch., 2716 Pleasant St.						X									
181410015	St. Joseph	South Bend	S. Bend - Shields Dr.	2335 Shields Dr.	X			X		X	X								X
181411007	St. Joseph	Granger	Granger	Harris Twnshp Fire Sta, 12481 Anderson Rd.	X														
181450001	Shelby		Fairland	Triton Central HS, 4774 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				X				
181630006	Vanderburgh	Evansville	Evansville - Civic Center	Civic Center Courts Building					Disc	X				X					
181630012	Vanderburgh	Evansville	Evansville - Mill Rd.	Fire Station # 17, 425 W. Mill Rd.	X	X		X	X	X	X	X	Sulfate Add B. Carbon						
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				
181630019	Vanderburgh	Evansville	Evansville - Harwood Sch.	Harwood Middle School, 3013 North 1st Ave.			X												
	Vanderburgh	Evansville	Harwood Sch. is still operational.	Site will be relocated by end of 2008.			X												
181670018	Vigo	Terre Haute	Terre Haute - Lafayette Ave.	961 N. Lafayette Ave.	X	X			X	X	X								
181670023	Vigo	Terre Haute	Terre Haute - Devaney Sch.	Devaney Elementary School, 1011 S. Brown Ave.						X									
181670024	Vigo		Sandcut	7597 Stevenson Rd., Terre Haute	X														
181730008	Warrick	Boonville	Boonville	Boonville HS, 300 N. 1st St.	X														
181730009	Warrick		Lynnville	Tecumseh HS, 5244 State Road 68, Lynnville	X														
181730011	Warrick		Dayville	2844 Eble Rd., Newburgh	X														X

			Number of Parameters															
	Number of Monitoring Sites	Number of Monitored Parameters	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (SPEC)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
Current Monitoring Network (2008)	**82**	**174**	**41**	**8**	**6**	**5**	**16**	**38**	**13**	**8**	**4**	**5**	**10**	**1**	**2**	**1**	**16**
Proposed Monitoring Network (2009)	**81**	**174**	**42**	**8**	**6**	**5**	**15**	**36**	**13**	**8**	**6**	**5**	**9**	**1**	**2**	**1**	**17**

Figure 1 - State and Local Air Monitoring Network (2008 and 2009)



Review Summary

The changes proposed for the 2009 Monitoring Network are:
The addition of O_3 at Indpls – Washington Park (identified in 2007).
The discontinuation of PM_{10} at Evansville – Civic Center.
The discontinuation of collocated PM_{10} sampling at East Chicago – Franklin School.
The discontinuation of $PM_{2.5}$ monitoring at Jasper – Sport and Jasper – Golf.
The addition of continuous black carbon at Evansville – Mill Rd.
The addition of continuous sulfate at Gary – IITRI.
The discontinuation of toxics and meteorological monitoring at Indpls – School 21.
And the addition of meteorological monitoring at Indpls – Mann Rd. and Bloomington.

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 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.

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. The 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 multipollutant 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 planned and funded for Indiana to be set up in the Indianapolis area.
° QA Collocated – An audit monitor that is located adjacent to another monitor of the same type used to report air quality for the site. The audit monitor is used solely for Quality Assurance purposes.

Operating Schedule - specifies how often a sample is taken.
° Continuous - operates 24/7; applies mainly to gaseous analyzers, although some particulate samplers (TEOM/FDMS 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 EPA "List of Designated Reference and Equivalent Methods" (see 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 - ten 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
° 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 2009; relocation, discontinuation, or addition.

Monitoring Requirements

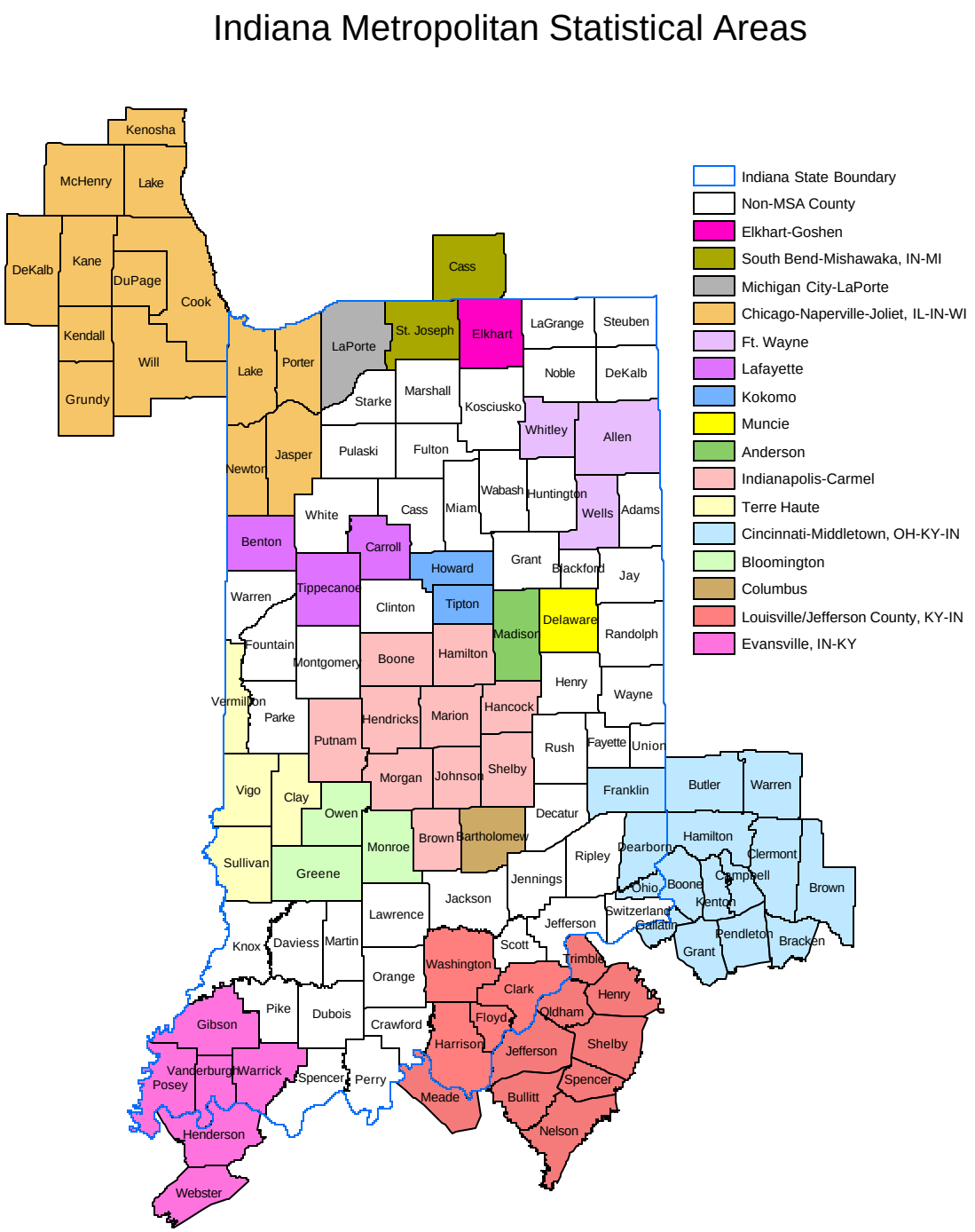
Appendix A of 40 CFR Part 58 outlines the Quality Assurance Requirements for SLAMS, SPMs, and PSD Air Monitoring. It details the calibration and auditing procedures used to collect valid air quality data, the minimum number of collocated monitoring sites, the calculation used for data quality assessments, 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.

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

CO

Monitoring Requirements

40 CFR Part 58 Appendix D, 4.2 details the requirements for CO monitoring. There are no minimum requirements for the number of CO monitoring sites. Continued operation of the existing SLAMS CO sites using FRM or FEM is required until discontinuation is approved by the EPA. Where SLAMS CO monitoring is ongoing, at least one site must be a "maximum concentration" site for that particular area under investigation.

40 CFR Part 58.10 (a)(3) requires NCore monitoring to be operational by January 1, 2011. 40 CFR Part 58 Appendix D, 3.(b) states that CO measurements will be included at the NCore multipollutant monitoring sites.

Monitoring Methodology

Indiana's CO monitoring network collects data with the Thermo Environmental Model 48c and Model 48i 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 (6) CO monitors located throughout the state. Included in the six (6) is the NCore site at Indpls – Washington Park and the relocation of Evansville – Harwood, identified in last year's review. These monitors will begin operations later in 2008. The details of the current network, along with any changes planned in 2009, are listed in Table 2.

Figure 3 - CO Monitoring Network

Network Modifications

There are no changes planned for the CO monitoring network in 2009.

Table 2 - CO 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	MSA	Site Change Proposed?
.80030011	Fort Wayne - Career Cntr.	Allen	Fort Wayne	Career Center, 203 E. Douglas St.	SLAMS	03/01/94	Continuous	054	Micro	Highest Conc	41.074167	-85.136667	Ft. Wayne	No
.80890015	East Chicago - Post Office	Lake	East Chicago	Post Office, 901 East Chicago Ave.	SLAMS	03/01/84	Continuous	054	Micro	Highest Conc	41.628611	-87.461389	Chicago-Naperville-Joliet, IL	No
.80970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	NAMS	04/02/90	Continuous	054	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
.80970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	2008	Continuous	093	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
.81630019	Evansville	Vanderburgh	Evansville	*	SLAMS	2008	Continuous	054	Micro	Highest Conc	38.006517	-87.574117	Evansville, IN-KY	No

* As of July 1, Harwood Mid. Sch. is still operational but will be relocated by the end of 2008.

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
.80970072	Indpls - Illinois St.	Marion	Indianapolis	50 Illinois St.	NAMS	02/01/90	Continuous	054	Micro	Highest Conc	39.768056	-86.160000	Indianapolis-Carmel	No

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

Lead

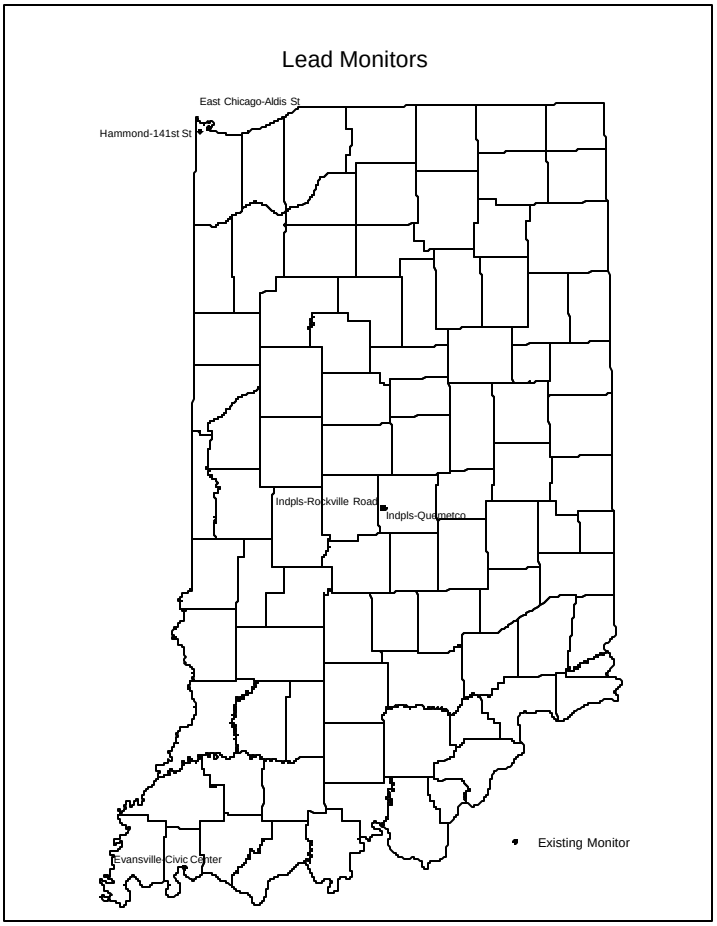
Monitoring Requirements
40 CFR Part 58 Appendix D, 4.5 specifies that lead monitoring must be conducted in all areas where lead levels have been shown or are expected to be of concern over the most recent two (2) years. Lead monitoring in Indiana is currently not required.

Collocated samplers are required at 15% of the sites operated by a primary quality assurance organization or a minimum of one (1) per network. Currently one (1) collocated site is in operation.

On May 1, 2008 EPA proposed a new lead NAAQS, and monitoring requirements. The new requirements, once finalized, may require changes be made to Indiana's lead monitoring network. Indiana will address any new requirements for monitoring once EPA finalizes the monitoring regulations.

Monitoring Methodology
The particulate lead monitoring network utilizes TSP filter sampling with atomic absorption analysis to generate ambient lead concentrations.

Figure 4 - Lead Monitoring Network



Monitoring Network
The lead monitoring network in Indiana currently consists of five (5) sites.

Network Modifications
There are no changes planned for the lead monitoring network in 2009.

Table 3 - Lead Monitoring Network

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
RO: 0520	**OPERATING AGENCY: Indiana Department of Environmental Management**													
180890023	East Chicago - Aldis St.	Lake	East Chicago	Water Filtration Plant, 3330 Aldis St.	SLAMS	01/01/97	6-Day	803	Middle	Pop Exp	41.652778	-87.439444	Chicago-Naperville-Joliet, IL	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	SLAMS	01/01/77	6-Day	803	Middle	Pop Exp	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	QA Colocated	01/01/07	6-Day	803	Middle	Quality Assurance	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
181630006	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	Special Purpose	01/01/77	6-Day	803	Middle	Pop Exp	37.971667	-87.567222	Evansville, IN-KY	No
RO: 0523	**OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)**													
180970063	Indpls - Rockville Rd.	Marion	Indianapolis	7601 Rockville Road	SLAMS	01/01/84	6-Day	803	Middle	Highest Conc	39.760833	-86.297222	Indianapolis-Carmel	No
180970063	Indpls - Rockville Rd.	Marion	Indianapolis	7601 Rockville Road	QA Colocated	10/01/00	6-Day	803	Middle	Quality Assurance	39.760833	-86.297222	Indianapolis-Carmel	No
180970076	Indpls - Quemetco	Marion	Indianapolis	230 S. Girls School Road	SLAMS	05/06/91	6-Day	803	Middle	Highest Conc	39.758889	-86.289722	Indianapolis-Carmel	No

MONITORING METHOD: 803 - HI-VOL SAMPLER/ATOMIC ABSORPTION ANALYSIS

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

Monitoring Requirements

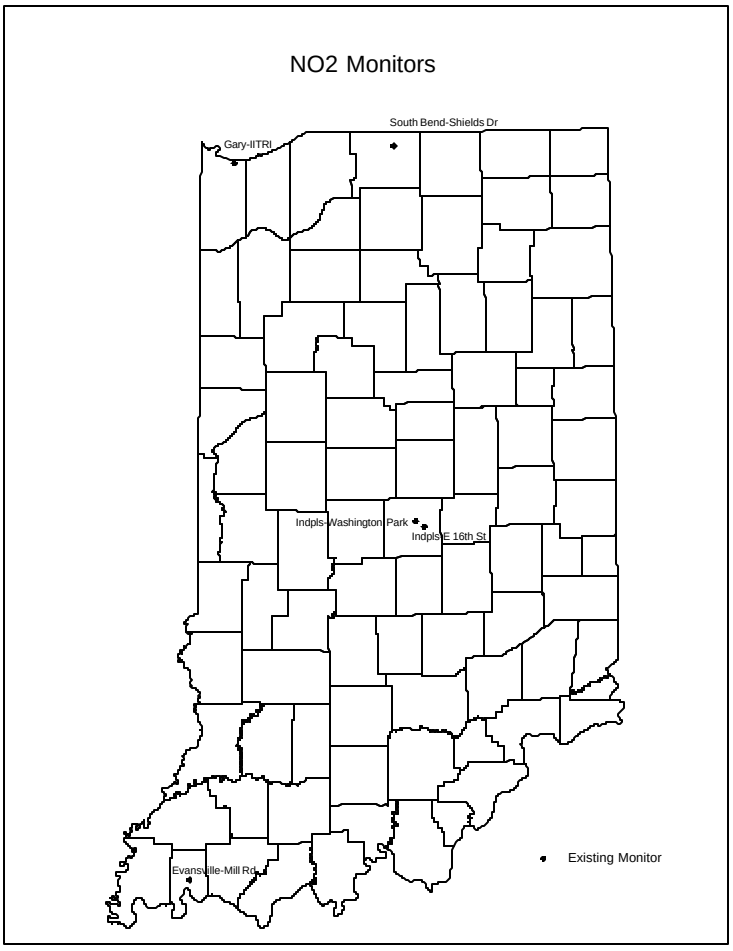
40 CFR Part 58 Appendix D, 4.3 details the requirements for NO_2 monitoring. There are no minimum requirements for the number of NO_2 monitoring sites. Continued operation of current NO_2 SLAMS using FRM or FEM is required until discontinuation is approved by the EPA. If NO_2 monitoring is ongoing, at least one site should be a "maximum concentration" monitoring site.

40 CFR Part 58.10 (a)(3) requires NCore monitoring to be operational by January 1, 2011. 40 CFR Part 58 Appendix D 3(b) and 40 CFR Part 58 Appendix D, 4.3 state that NO/NO_y measurements will be included at the NCore multipollutant monitoring sites.

Monitoring Methodology

The NO, NO_2 and NO_x network uses the Thermo Environmental Model 42 C 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.

Figure 5 - NO2 Monitoring Network



Monitoring Network

Indiana operates four (4) NO_2 monitors and one trace level monitor. The trace level NOy monitor, part of the NCore monitoring at Indpls – Washington Park, was identified in last year's review. This monitor will begin operations later in 2008. The current network, along with any changes planned in 2009, is listed in Table 4.

Network Modifications

There are no changes planned for the NO_2 monitoring network in 2009.

Table 4 - Oxides of Nitrogen (NO, NO_2, NO_x, NO_y) 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	MSA	Site Change Proposed?
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-Joliet, IL	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	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	2008	Continuous	099	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
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	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 W. Mill Rd.	SLAMS	03/01/91	Continuous	074	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	No

NOx MONITORING METHOD: 074 - THERMO ELECTRON 42, 42C, 42i

NOy MONITORING METHOD: 099 - TELEDYNE INSTR. 200EU

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 the design value 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 (5) MSAs which cross state lines. The number of sites required in each MSA is for the total area, not just Indiana's portion. If all the required sites in the multi-state MSAs were outside of Indiana, then the number of required sites for the state would be eleven (11). If all the required sites in the multi-state MSAs were in Indiana, then the number of required sites would be nineteen (19).

Table 5 - SLAMS Minimum O_3 Monitoring Requirement

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

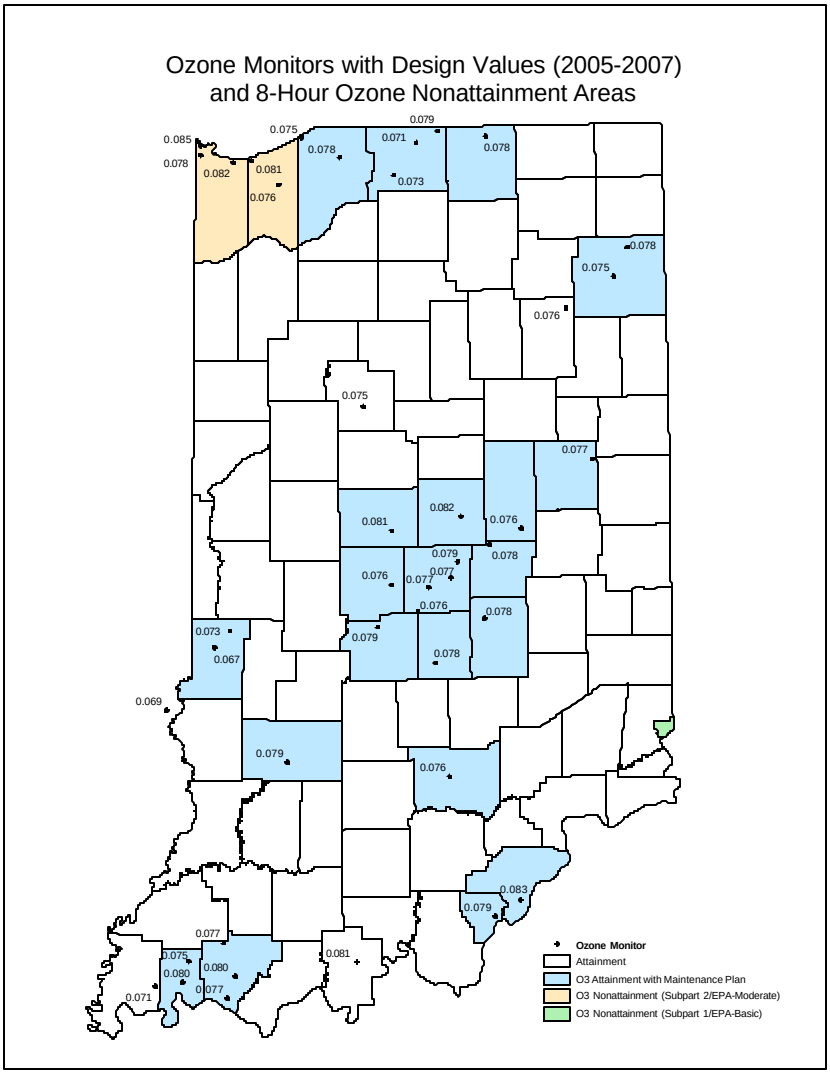
Table 6 - SLAMS O_3 Sites Required for Indiana

MSA	MSA Population	Design Value (ppm) (2005-2007)	# of Sites Required per CFR	Current No. of Sites	2009 No. of Sites
Anderson	133,358	0.076	1	1	1
Bloomington	175,506	0.079	1	1	1
Chicago-Naperville-Joliet, IL-IN-WI	9,098,316	0.085*	3#	5	5
Cincinnati-Middletown, OH-KY-IN	2,009,632	No Data	2#	0	0
Columbus	71,435	No Data	0	0	0
Elkhart-Goshen	182,791	0.078	1	1	1
Evansville, IN-KY	342,815	0.080*	1#	6	6
Fort Wayne	390,156	0.078	2	2	2
Indianapolis-Carmel	1,525,104	0.082	2	11	11
Jasper	52,511	No Data	0	0	0
Kokomo	101,541	No Data	0	0	0
Lafayette	178,541	0.075	1	1	1
Louisville-Jefferson County, KY-IN	1,161,975	0.083*	1#	2	2
Michigan City-LaPorte	110,106	0.078	1	2	2
Muncie	118,769	0.074	1	1	1
South Bend-Mishawaka, IN-MI	316,663	0.079	1#	3	3
Terre Haute	170,943	0.073	1	2	2
Non MSA					
Clark, IL		0.069		1	1
Huntington		0.076		1	1
Jackson		0.076		1	1
Perry		0.081		1	1
	* Design Value is from Indiana sites				
	# Number of sites required for entire MSA				
Min. # of Sites Required for Indiana if all multi-state MSA sites are not in Indiana			11		
Max. # of sites required for Indiana if all multi-state MSA sites are in Indiana			19		
		Sites in Indiana Network		42	42

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 (1) site in Illinois (West Union) and two (2) sites (Charlestown State Park and New Albany) in the Louisville MSA. As the monitoring season extends through October in Illinois and Kentucky, Indiana operates these three (3) sites through October as well.

Data
The design value for an area, usually a county or an MSA, is determined by the three (3) year average of the 4th highest daily 8-hour maximum. 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 (2005 – 2007) along with the current O_3 classifications are on the map in Figure 7.

Figure 6 – O_3 Design Values (2005-2007)



Monitoring Methodology
All monitoring sites in Indiana use O_3 analyzers from Thermo Electron, Models 49, 49c, or 49i. These monitors use ultraviolet absorption photometry. Air is drawn through a sample cell where ultraviolet light (254 nm wavelength) passes through it. 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 forty-two (42) monitoring sites in Indiana's O_3 monitoring network. According to the number of sites required and the number of sites currently operating, as indicated in Table 6, the Indiana monitoring network more than meets the minimum site requirements. The O_3 monitoring network with the changes proposed for 2008 is in Table 7.

Network Modifications
An O_3 monitor will be added to the Indianapolis – Washington Park site in 2009 as part of the O_3 monitoring requirement for the future NCore site. This addition was identified in the 2007 review, but implementation was delayed until 2009, pending approval of this site for NCore monitoring purposes.

Figure 7 – O_3 Monitoring Network

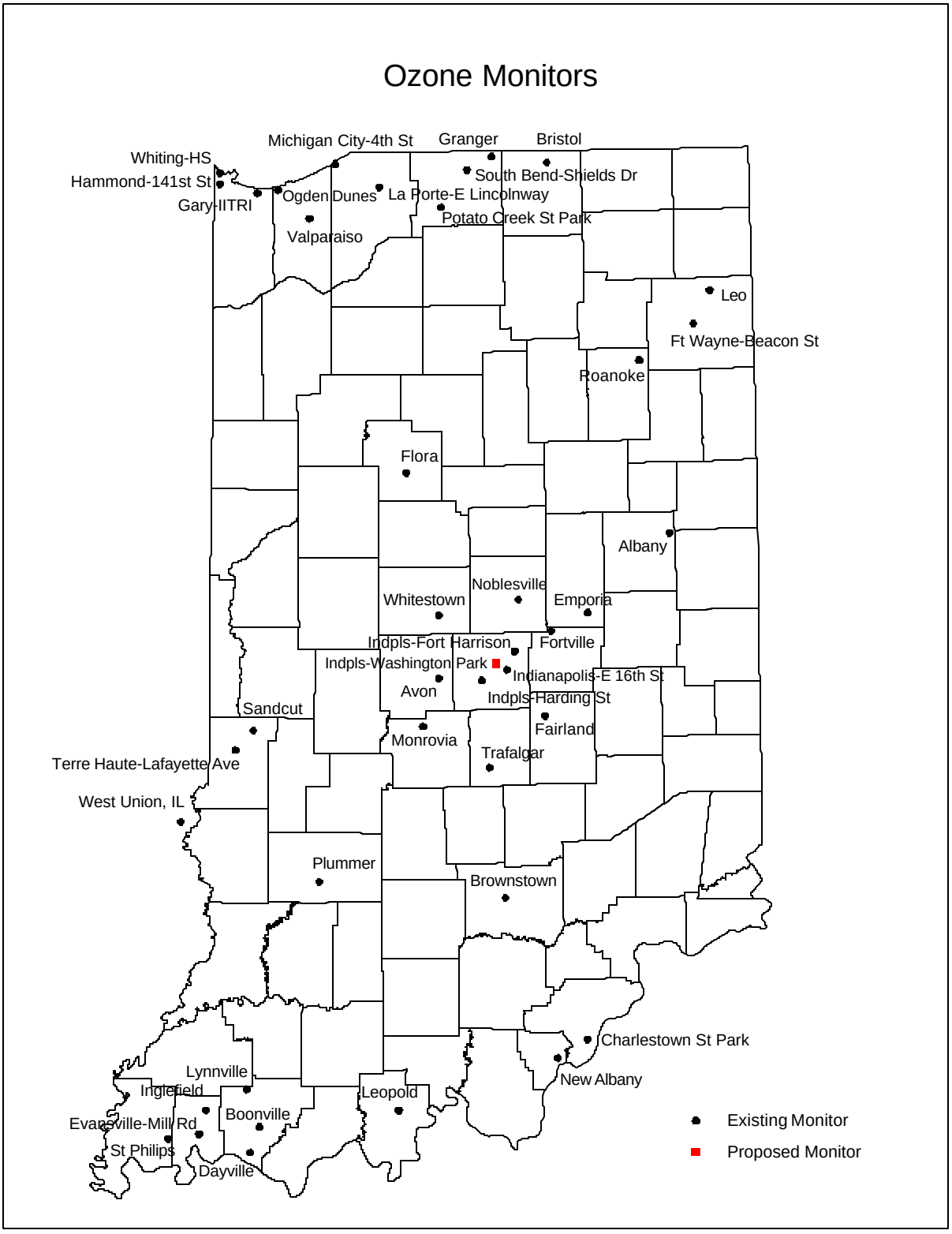


Table 7 – O_3 Monitoring Network

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	MSA	Site Change Proposed?
180030002	Leo	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.	NAMS	07/01/79	Continuous	047	Neigh	Pop Exp	41.094722	-85.101944	Ft. Wayne	No
180150002	Flora	Carroll		Flora Airport, 481 S. 150 W., Flora	Special Purpose	04/01/01	Continuous	047	Urban	Highest Conc	40.540556	-86.553056	Lafayette	No
180190008	Charlestown St. Park	Clark		Charlestown State Park, 12500 Hwy 62, Charlestown	NAMS	05/04/07	Continuous	047	Urban	Highest Conc	38.393833	-85.664167	Louisville/Jefferson Co.	No
180350010	Albany	Delaware	Albany	Albany Elem. Sch., 706 W. State St.	Special Purpose	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	41.718050	-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	Pop Exp	38.308056	-85.834167	Louisville/Jefferson Co.	No
180690002	Roanoke	Huntington	Roanoke	Roanoke Elem. Sch., 423 W. Vine St.	SLAMS	04/14/00	Continuous	047	Neigh	Upwind Bkgrd	40.960556	-85.380000	Non-MSA County	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-Joliet, IL	No
180890030	Whiting - HS	Lake	Whiting	Whiting HS, 1751 Oliver St.	Special Purpose	04/01/04	Continuous	047	Urban	Pop Exp	41.681384	-87.494722	Chicago-Naperville-Joliet, IL	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-Joliet, IL	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
180950010	Emporia	Madison		East Elem. Sch., 893 E. US 36, Pendleton	SLAMS	04/05/93	Continuous	047	Urban	Pop Exp	40.002500	-85.656944	Anderson	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	NAMS	04/02/90	Continuous	047	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
181230009	Leopold	Perry		Perry Central HS, 19856 Old St Rd 37, Leopold	Special Purpose	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-Joliet, IL	No
181270026	Valparaiso	Porter	Valparaiso	Valpo Water Department, 1000 Wesley St.	Special Purpose	04/01/98	Continuous	047	Urban	Pop Exp	41.510278	-87.038611	Chicago-Naperville-Joliet, IL	No
181290003	St Philips	Posey		2027 South St. Philips Rd., Evansville	SLAMS	07/01/96	Continuous	047	Urban	Upwind Bkgrd	38.005278	-87.718333	Evansville, IN-KY	No
181410010	Potato Creek St. Park	St Joseph		Potato Creek St. Park, 25601 St. Rd 4, North Liberty	SLAMS	04/24/91	Continuous	047	Urban	Pop Exp	41.551667	-86.370556	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	NAMS	04/01/78	Continuous	047	Neigh	Pop Exp	41.696692	-86.214683	South Bend-Mishawaka	No

181411007	Granger	St Joseph	Granger	Harris Twshp Fire Station, 12481 Anderson Rd.	NAMS	06/01/79	Continuous	047	Urban	Highest Conc	41.742583	-86.110556	South Bend-Mishawaka	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	10/01/82	Continuous	047	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	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
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. 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	Special Purpose	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	04/16/91	Continuous	047	Urban	Pop Exp	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	Pop Exp	38.194444	-87.341389	Evansville, IN-KY	No
181730011	Dayville	Warrick		2488 Eble Rd., Newburgh	SLAMS	04/01/05	Continuous	047	Urban	Highest Conc	37.954450	-87.321933	Evansville, IN-KY	No
170230001	West Union	Clark, IL		416 S. Hwy 1, West Union, IL	Special Purpose	04/01/01	Continuous	047	Urban	U	39.210883	-87.668416	Non-MSA County	No

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
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	No
180550001	Plummer	Greene		2500 S. 275 W	Special Purpose	04/03/00	Continuous	047	Regional	Upwind Bkgrd	38.985578	-86.990120	Bloomington	No
180570005	Noblesville	Hamilton	Noblesville	Noblesville Jr HS, 1685 N. 10th St.	SLAMS	04/19/07	Continuous	047	Urban	Highest Conc	40.065194	-86.008061	Indianapolis-Carmel	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	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	No
180710001	Brownstown	Jackson		225 W & 300 N, Brownstown	Special Purpose	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	No
180970050	Indpls - Ft Harrison	Marion	Indianapolis	Ft. Ben Harrison St Park	NAMS	12/01/79	Continuous	047	Urban	Highest Conc	39.858961	-86.021341	Indianapolis-Carmel	No
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	SLAMS	03/01/82	Continuous	047	Neigh	Pop Exp	39.749019	-86.186314	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	SLAMS	04/01/09	Continuous	047	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	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	No

181450001	Fairland	Shelby	Triton Central HS, 4774 W. 600N , Fairland	SLAMS	04/01/00	Continuous	047	Urban	General Bkgrd	39.611293	-85.873582	Indianapolis-Carmel	No	

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

PM_{10}

Monitoring Requirements

The requirements for the design of the PM_{10} monitoring network are listed 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 design values are from the Indiana sites only and do not address the values collected in other parts of the multi-state MSAs. Also listed are the number of monitoring sites operated currently and the number proposed to operate in 2009. In an area which requires PM_{10} monitoring, if no site is listed or less than the required number of sites is listed in a multi-state MSA, that requirement is addressed by other states listed in the MSA or a combination of sites in Indiana and the other states.

Collocated samplers are required at some sites to determine monitoring precision. If a primary quality assurance organization operates between one (1) and five (5) sites, one (1) collocated sampler is required. If a primary quality assurance organization operates between six (6) and twenty (20) sites, two (2) collocated samplers are required. IDEM is required to operate two (2) sites and IOES, Evansville EPA, and Vigo County Air Pollution Control Department are required one (1) each.

Monitoring Methodology

Intermittent PM_{10} samples are collected on a pre-weighed filter, either an 8" x 10" quartz fiber filter or a 46.2 mm. teflon filter, depending on the sampler. Air is drawn through an inlet designed to pass only particles smaller than 10 microns in diameter and across the filter for twenty-four (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.

Monitoring Network

Indiana currently operates sixteen (16) monitoring sites in the State. One (1) site is scheduled to be discontinued. Concentration 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 150 ug/m3. Table 9 details the current PM_{10} network and the modifications planned for 2008.

Network Modifications

Indiana plans to discontinue the Evansville – Civic Center site at the end of 2008. This site is not required by the CFR and the design value for this site is 55 ug/m^3, approximately one/third of the NAAQS. The collocated sampler at East Chicago – Franklin School is also planned to be discontinued as it is not required.

Table 8 – PM_{10} Site Requirements

MSA	Population	MSA Design Value			# of Sites 2008	# of Sites 2009
Chicago-Naperville-Joliet, IL-IN-WI	9,098,316		121[4]	62[5]	7	7
Cincinnati-Middletown, OH-KY-IN	2,009,632				0	0
Indianapolis-Carmel	1,525,104			58	4	4
Louisville-Jefferson County, KY-IN	1,161,975			54	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 2008	# of Sites 2009
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 2008	# of Sites 2009
Evansville, IN-KY	342,815			55	2	1
Fort Wayne	390,156			48	0	0
South Bend-Mishawaka, IN-MI	316,663			48	1	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 2008	# of Sites 2009
Anderson	133,358			47	0	0
Bloomington	175,506				0	0
Elkhart-Goshen	182,791				0	0
Kokomo	101,541				0	0
Lafayette	178,541				0	0
Michigan City-LaPorte	110,106				0	0
Muncie	118,769				0	0
Terre Haute	170,943			54	1	1

Non MSA		Design Value			# of Sites 2008	# of Sites 2009
Jasper				50	1	1

[1] Exceeds NAAQS by 20% (180 ug/m^3).
[2] Exceeds 80% of NAAQS (120 ug/m^3).
[3] <80% of NAAQS (120 ug/m^3).
[4] Design value from source oriented site (not indicative of entire MSA).
[5] Design value from population oriented sites.

Figure 8 – PM_{10} Monitoring Network

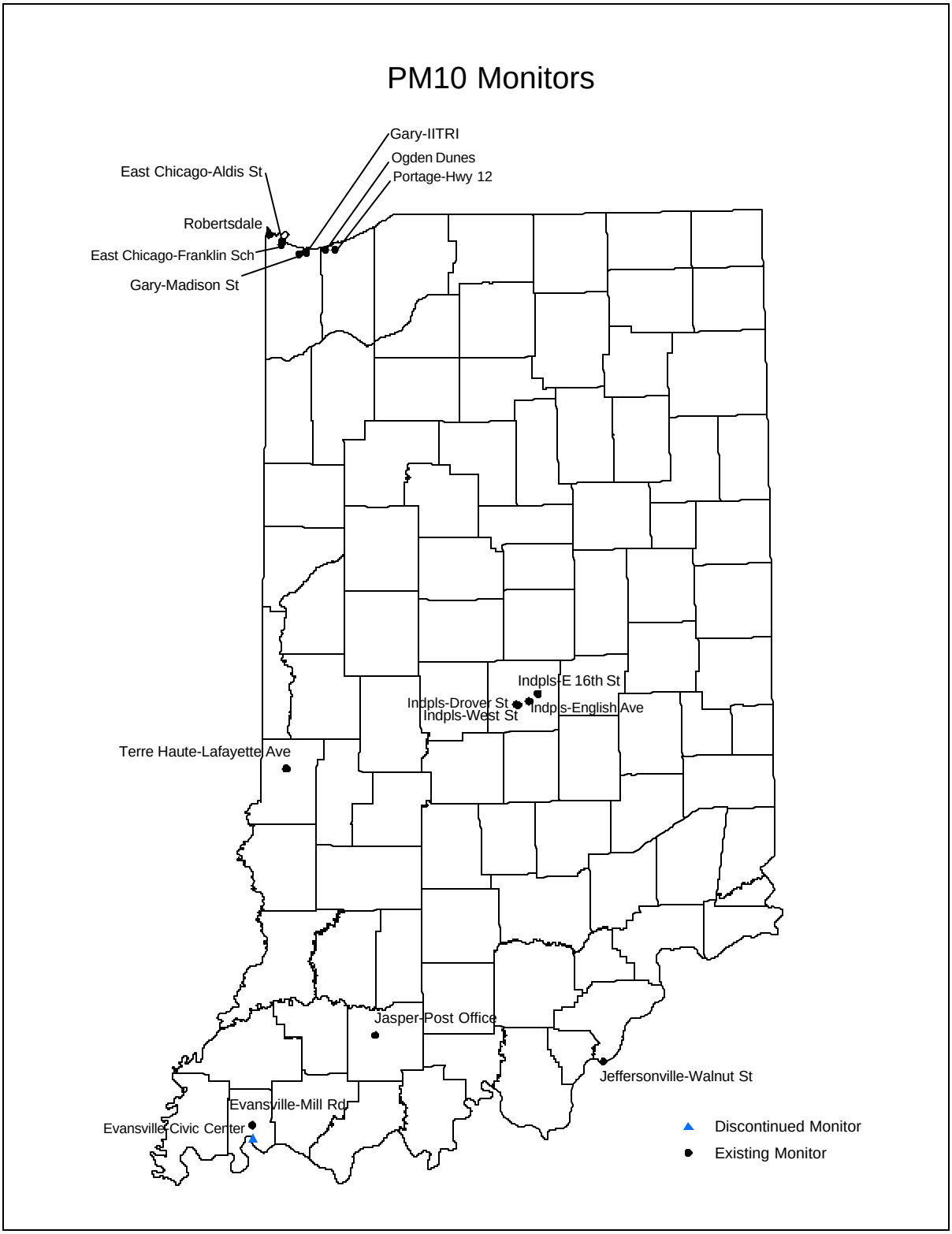


Table 9 – PM_{10} Monitoring Network

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	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 Co.	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	41.636111	-87.440833	Chicago-Naperville-Joliet, IL	No
180890006	East Chicago - Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	10/03/99	6-Day	127	Middle	Quality Assurance	41.636111	-87.440833	Chicago-Naperville-Joliet, IL	Discontinue
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	03/01/97	Continuous	079	Middle	Source Oriented	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890023	East Chicago - Aldis St.	Lake	East Chicago	Water Filtration Plant, 3330 Aldis St.	SLAMS	01/01/97	6-Day	062	Middle	Source Oriented	41.652778	-87.439444	Chicago-Naperville-Joliet, IL	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-Joliet, IL	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-Joliet, IL	No
180892010	Robertsdale	Lake	Hammond	Clark HS., 1921 Davis St.	SLAMS	10/01/87	6-Day	062	Middle	Pop Exp	41.678333	-87.508333	Chicago-Naperville-Joliet, IL	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/05/90	6-Day	127	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	10/03/99	6-Day	127	Neigh	Quality Assurance	39.789167	-86.060833	Indianapolis-Carmel	No
181270023	Portage - Hwy 12	Porter	Portage	Bethlehem Steel Waste Lagoon, Hwy 12	SLAMS	10/01/95	Continuous	079	Neigh	Highest Conc	41.616667	-87.145833	Chicago-Naperville-Joliet, IL	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/01/89	6-Day	127	Neigh	Pop Exp	41.617500	-87.199167	Chicago-Naperville-Joliet, IL	No

RO: 0372 OPERATING AGENCY: Evansville EPA

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
181630006	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	SLAMS	05/01/88	6-Day	063	Neigh	Pop Exp	37.971667	-87.567222	Evansville, IN-KY	Discontinue
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 W. Mill Rd	SLAMS	07/01/03	6-Day	063	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 W. Mill Rd	SLAMS	07/01/03	6-Day	063	Neigh	Quality Assurance	38.021667	-87.569444	Evansville, IN-KY	No

RO: 1121 OPERATING AGENCY: Vigo County Air Pollution Control Department

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	07/01/88	6-Day	063	Neigh	Pop Exp	39.486111	-87.401389	Terre Haute	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?
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	07/05/99	6-Day	063	Neigh	Quality Assurance	39.486111	-87.401389	Terre Haute	No
RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)														
180970043	Indpls - West St.	Marion	Indianapolis	1735 S. West St.	NAMS	10/29/86	6-Day	062	Middle	Source Oriented	39.744957	-86.166496	Indianapolis-Carmel	No
180970066	Indpls - English Ave.	Marion	Indianapolis	Seal Products Bldg., 3302 English Ave,	NAMS	03/01/87	6-Day	064	Middle	Source Oriented	39.760437	-86.108848	Indianapolis-Carmel	No
180970071	Indpls - Drover St.	Marion	Indianapolis	National Printing Plate, 1415 Drover St.	SLAMS	03/03/87	6-Day	062	Middle	Highest Conc	39.747931	-86.175812	Indianapolis-Carmel	No
180970071	Indpls - Drover St.	Marion	Indianapolis	National Printing Plate, 1415 Drover St.	SLAMS	01/05/98	6-Day	062	Middle	Quality Assurance	39.747931	-86.175812	Indianapolis-Carmel	No

PM10 MONITORING METHODS:
062 - WEDDING & ASSOC. HI VOL
064 - SIERRA-ANDERSEN 321-B
065 - SIERRA-ANDERSEN 321-C
079 - R & P TEOM 1400, 1400 A
127 - R&P 2025A Sequential

$PM_{2.5}$

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 the design value for that area. Table 10 (Table D-5 of Appendix D) lists the minimum requirements as stated in Part 58. Table 11 lists the requirements as they relate to Indiana. All of the design values for all the MSAs exceed 85% of either NAAQS with the exception of the annual design value for the Michigan City-LaPorte MSA. There are five (5) MSAs which cross state lines. The number of sites required in each MSA in the table is for the total area, not just Indiana's portion. If all the required sites in the multi-state MSAs were outside of Indiana, then the number of required sites for the state would be fifteen (15). If all the required sites in the multi-state MSAs were in Indiana, then the number of required sites would be twenty-five (25). In the Cincinnati MSA eleven (11) sites are operated in the Ohio and Kentucky portions MSA to satisfy the requirements there. Five (5) sites in the Kentucky portion of the Louisville MSA, along with two (2) sites in Indiana, satisfy the Louisville MSA requirement. The number of sites in Indiana's portion of the Chicago, Evansville, and South Bend MSA exceed the requirements for each entire MSA. The number of sites in Indiana's monitoring network is actually much higher. There are currently forty-two (42) operational sites.

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 of Appendix D" (Table 10). As these requirements are applied to Indiana, between eight (8) and thirteen (13) would be required in the state. Currently, eleven (11) sites operate in Indiana.

Collocated samplers are required at 15% of the FRM/FEM sites operated by each primary quality assurance organization. IDEM is required to have five (5) collocated samplers and IOES is required to operate one (1). This requirement is met.

Table 10 - 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 = 29.75 ug/m^3		
85% of Annual NAAQS = 12.75 ug/m^3		

Monitoring Methodology

$PM_{2.5}$ is sampled by drawing air through a specially designed inlet that excludes particles larger than 2.5 microns in diameter. The particles are collected on a Teflon™ Microfiber filter that is weighed before and after the sampling period to determine the particulate mass. Indiana uses R&P 2025 Sequential Samplers (FRM) to collect intermittent data. The normal sampling schedule varies, as determined by the regulations: ten (5) sites sample every day, the remainder sample every 3rd day. Collocated monitors used for assessing data precision operate on a one (1) in six (6) day schedule.

Continuous data are collected using either the Met One BAM 1020 or the R&P TEOM 1400a, either with or without the FDMS. 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.

Monitoring Network

In 2008 the Indiana $PM_{2.5}$ monitoring network consists of thirty-eight (38) monitoring sites. The number of monitoring sites includes the operational sites at the beginning of the year, two (2) new monitoring locations (Bloomington and Hamilton County) identified in the 2007 Network Review and not yet established, and the relocation of the Anderson site. Also Charlestown State Park was added. It was proposed after last year's review as part of a more intense study of the $PM_{2.5}$ concentrations in Clark County. All sites have FRMs collecting data for comparison to the NAAQS. Continuous monitors will be collecting data at thirteen (13) of the site locations by the end of 2008. The data from the continuous monitors are used for comparison to the intermittent sampling data, calculation of the AQI, forecasting, and for AIRNow mapping.

Table 11 - Number of SLAMS $PM_{2.5}$ Monitoring Sites Required for Indiana

MSA	MSA Population	Annual Design Value (ug/m^3) (2005-2007)	Daily Design Value (ug/m^3) (2005-2007)	# of Sites Required per CFR	Current No. of Sites	2009 No. of Sites
Anderson	133,358	13.9	34	1	1	1
Bloomington	175,506	No Data	No Data	0	1	1
Chicago-Naperville-Joliet, IL-IN-WI	9,098,316	14.8*	37*	3#	8	8
Cincinnati-Middletown, OH-KY-IN	2,009,632	No Data	No Data	3#	0	0
Columbus	71,435	No Data	No Data	0	0	0
Elkhart-Goshen	182,791	14	34	1	1	1
Evansville, IN-KY	342,815	15	36	1	3	3
Fort Wayne	390,156	13.6	33	1	1	1
Indianapolis-Carmel	1,525,104	16.1	40	3	6	6
Jasper	52,511	14.9	36	1	3	1
Kokomo	101,541	13.9	33	1	1	1
Lafayette	178,541	13.7	37	1	1	1
Louisville-Jefferson County, KY-IN	1,161,975	16.7*	40*	3#	3	3
Michigan City-LaPorte	110,106	12.5	32	1	1	1
Muncie	118,769	13.9	33	1	1	1
South Bend-Mishawaka, IN-MI	316,663	13.4*	33*	1#	2	2
Terre Haute	170,943	14.2	35	1	2	2
Non MSAs						
Knox Co. - State Background Site		14.2	36	1	1	1
Henry Co. -State Transport Site		13.3	32	1	1	1
Spencer Co.		14.6	33	0	1	1
		DV >= 85% of NAAQS				
	* Design Value is from Indiana sites					
	# Number of sites required for entire MSA					
Min. # of Sites Required for Indiana if all multi-state MSA sites are not in Indiana				15		
Max. # of sites required for Indiana if all multi-state MSA sites are in Indiana				25		
		Sites in Indiana Network			38	36

Data

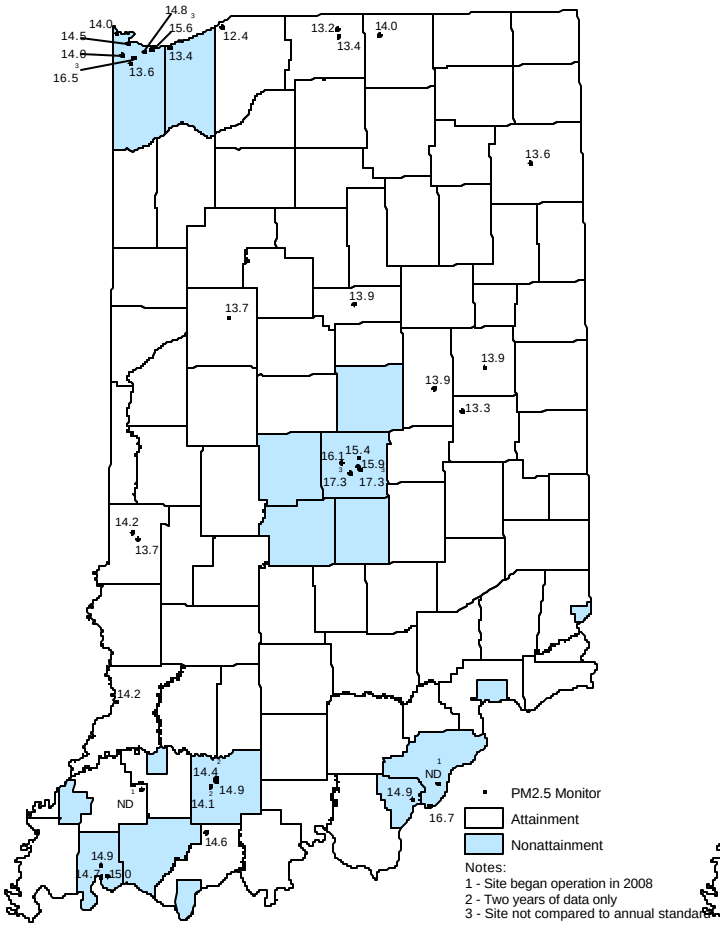
Only the intermittent data collected from the FRM samplers are eligible for comparison to the NAAQS and used for calculation of the design value for a site.

A site's annual design value is calculated by averaging the weighted annual averages from a site over a three (3) year period. The highest site design value in an MSA is generally determined to be the design value for the area. It is compared to the NAAQS to determine attainment/nonattainment for the area. Similarly, a site's daily design value is obtained by averaging the 98th percentile values from a three (3) year period. This value is then compared to the daily NAAQS, thirty-five (35) to determine attainment/nonattainment of the daily standard. The daily NAAQS was revised from sixty-five (65) to thirty-five (35) in 2006.

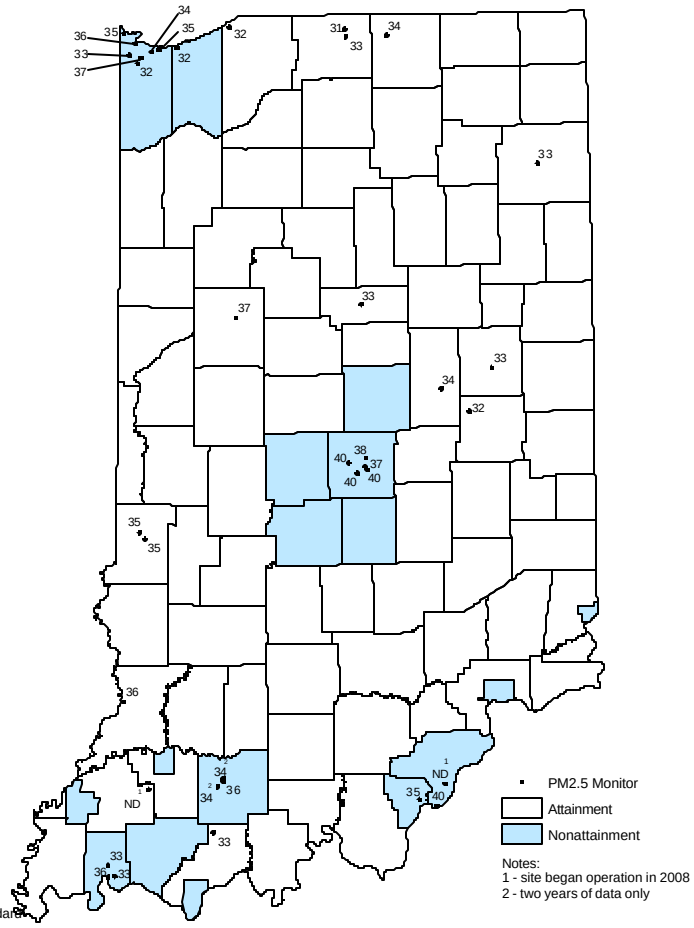
The design values for all sites for the most recent sampling period (2005 – 2007) along with the designated nonattainment areas for $PM_{2.5}$ are on the map in Figure 10. Note that the nonattainment areas were designated prior to the daily NAAQS change. Redesignation petitions are currently in the process of being submitted for Northwest and Southwest Indiana.

Figure 9 - $PM_{2.5}$ Site Design Values

PM2.5 Annual Design Value (2005-2007)



PM2.5 Daily Design Value (2005-2007)



Network Modifications

The total number of monitoring sites will decrease from thirty-eight (38) to thirty-six (36) in 2009. The $PM_{2.5}$ monitoring network with the changes proposed for 2009 is in Table 14. Maps comparing the current network and the network proposed for 2009 are in Figure 10.

The Jasper-Sport (180390004) and Jasper – Golf (180390005) sites will be discontinued at the end of 2008. These sites were established as special study sites for the Jasper area to aid in the analysis of the $PM_{2.5}$ concentrations reported there. It was thought that the values collected at the Jasper – Post Office (180392001) sites were overly influenced by local sources. During the course of the study one hundred eighty-nine (189) days had data from all three (3) samplers. Results of the study to date in Table 12 indicate that overall, the average concentrations at the three (3) sites varied only 0.2 ug/m^3. The daily values are generally within 1.0 ug/m^3 of each other across the city on given day. The correlations between the sites are very high, indicating the sites compare very well.

Table 12 - Jasper Sites Data Comparison

Common Data Collected between 2/1/06 and 4/30/08						
Site	**Average Conc.**	**High Values**				
		1st	**2nd**	**3rd**	**4th**	**5th**
Jasper - Sport	13.6	46	40.8	33.8	32.6	30
Jasper - PO	13.8	45.2	39.6	31.7	31	30.6
Jasper - Golf	13.7	45.2	38.9	32.3	32	30.1
		Correlation between Sport and PO				0.988
		Correlation between PO and Golf				0.989
		Correlation between Sport and Golf				0.982

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. Five (5) sites, listed in Table 13 operated on a daily sampling in 2008. Even though Jeffersonville – Walnut St. and Lafayette – Greenbush St. were outside the 5%, they continued to operate on the daily schedule. The daily data from Jeffersonville will be useful during the intense study for Clark County. Because Lafayette – Greenbush St. was barely outside the limit, it was decided to continue to operate it through 2008. All data will be reviewed in the fourth quarter of 2008 to determine which sites will collect daily samples in 2009.

Table 13 - FRM Sampling Frequency Changes

	Unrounded Design Value	
Site	**04-06**	**05-07**
Jeffersonville - Walnut St	36.60	40.03
Jasper - Post Office	34.27	36.73
Anderson	31.50	33.80
Lafayette - Greenbush St.	34.23	36.83
Terre Haute Devaney School	34.00	34.60
+/-5% of NAAQS = 33.25 ug/m^3 to 36.75 ug/m^3		

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.

Table 14 – $PM_{2.5}$ 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	118	Neigh	Pop Exp	41.094722	-85.101944	Yes	Ft. Wayne	No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	Special Purpose	01/01/02	Continuous	701	Neigh	Pop Exp	41.094722	-85.101944	No	Ft. Wayne	No
180190006	Jeffersonville - Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	SLAMS	06/26/03	1-Day	118	Neigh	Pop Exp	38.277675	-85.740153	Yes	Louisville/Jefferson Co.	No
180190008	Charlestown St. Park	Clark		Charlestown State Park 12500 Hwy 62, Charlestown	Special Purpose	07/01/08	3-Day	118	Urban	Regional Transport	38.393833	-85.664167	Yes	Louisville/Jefferson Co.	No
180350006	Muncie - Central HS	Delaware	Muncie	Muncie Central HS, 801 N. Walnut St.	SLAMS	10/15/99	3-Day	118	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	1-Day	118	Neigh	Pop Exp	38.391389	-86.929167	Yes	Non-MSA County	No
180370004	Jasper - Sport	Dubois	Jasper	Japer Sport Complex , 1401 12th Ave.	Special Purpose	03/01/06	3-Day	118	Neigh	Pop Exp	38.369436	-86.959031	Yes	Non-MSA County	Discontinue
180370005	Jasper - Golf	Dubois	Jasper	Jasper Golf Course , 1729 Jackson St.	Special Purpose	01/29/06	3-Day	118	Neigh	Pop Exp	38.404778	-86.928322	Yes	Non-MSA County	Discontinue
180390008	Elkhart - Prairie St.	Elkhart	Elkhart	2745 Prairie St.	SLAMS	01/01/08	3-Day	118	Neigh	Pop Exp	41.656905	-85.968371	Yes	Elkhart-Goshen	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	01/18/99	3-Day	118	Neigh	Pop Exp	38.308056	-85.834167	Yes	Louisville/Jefferson Co.	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	QA Collocated	01/18/99	6-Day	118	Neigh	Quality Assurance	38.308056	-85.834167	No	Louisville/Jefferson Co.	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	Special Purpose	11/01/03	Continuous	760	Neigh	Pop Exp	38.308056	-87.834167	Yes	Louisville/Jefferson Co.	No
180510012	Oakland City	Gibson		2205 S. 1350 E., Oakland City	Special Purpose	01/18/08	3-Day	118	Urban	Pop Exp	38.322930	-87.318789	Yes	Evansville, IN-KY	No
180650003	Mechanicsburg	Henry		Shenandoah HS, 7354 W. Hwy. 36, Pendleton	SLAMS	09/26/00	3-Day	118	Regional	Regional Transport	40.011667	-85.523611	Yes	Non-MSA County	No
180670003	Kokomo	Howard	Kokomo	Fire Station, 215 W. Superior	SLAMS	06/11/99	3-Day	118	Neigh	Pop Exp	40.485556	-86.132778	Yes	Kokomo	No
180830004	Southwest Ag Center	Knox		SW Purdue Ag Center, Vincennes	SLAMS	01/01/00	3-Day	118	Regional	General Background	38.740833	-87.484722	Yes	Non-MSA County	No
180890006	East Chicago- Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	01/27/99	3-Day	118	Neigh	Pop Exp	41.636111	-87.440833	Yes	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	03/04/99	3-Day	118	Middle	Source & Pop Exp	41.606667	-87.304722	Yes**	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Special Purpose	01/01/03	Continuous	701	Middle	Source & Pop Exp	41.606667	-87.304722	No	Chicago-Naperville-Joliet, IL	No
180890026	Gary - Burr St	Lake	Gary	Truck Stop, 25th Ave & Burr St.	SLAMS	02/12/00	3-Day	118	Middle	Source & Pop Exp	41.573056	-87.405833	Yes**	Chicago-Naperville-Joliet, IL	No
180890027	Griffith	Lake	Griffith	Eldon Ready Elem Sch, 1345 N. Broad St.	SLAMS	02/18/00	3-Day	118	Neigh	Pop Exp	41.546667	-87.426389	Yes	Chicago-Naperville-Joliet, IL	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?
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	3-Day	118	Neigh	Pop Exp	41.598505	-87.342991	Yes	Chicago-Naperville-Joliet, IL	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	QA Collocated	07/01/05	6-Day	118	Neigh	Quality Assurance	41.598505	-87.342991	Yes	Chicago-Naperville-Joliet, IL	No
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	SLAMS	02/11/99	3-Day	118	Neigh	Pop Exp	41.585278	-87.474444	Yes	Chicago-Naperville-Joliet, IL	No
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	Special Purpose	12/01/03	Continuous	760	Neigh	Pop Exp	41.585278	-87.474444	No	Chicago-Naperville-Joliet, IL	No
180892010	Hammond - Clark HS	Lake	Hammond	Robertsdale Clark HS, 1921 Davis St.,	SLAMS	01/27/99	3-Day	118	Middle	Pop Exp	41.678333	-87.508333	Yes	Chicago-Naperville-Joliet, IL	No
180910011	Michigan City - Marsh Elem	La Porte	Michigan City	Marsh Elem. Sch., 400 E. Homer St.	SLAMS	12/17/99	3-Day	118	Neigh	Pop Exp	41.706944	-86.891111	Yes	Michigan City-LaPorte	No
	Anderson	Madison[1]	Anderson		SLAMS	2008	3-Day	118	Middle	Pop Exp			Yes	Anderson	Add
	Anderson	Madison[1]	Anderson		SLAMS	2008	Continuous		Middle	Pop Exp			Yes	Anderson	Add
	Bloomington	Monroe[2]	Bloomington		SLAMS	2008	3-Day	118	Neigh	Pop Exp			Yes	Bloomington	No
	Bloomington	Monroe[2]	Bloomington		SLAMS	2008	Continuous		Neigh	Pop Exp			No	Bloomington	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/27/99	3-Day	118	Neigh	Pop Exp	41.617500	-87.199167	Yes	Chicago-Naperville-Joliet, IL	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	Special Purpose	12/03/03	Continuous	760	Neigh	Pop Exp	41.617500	-87.199167	No	Chicago-Naperville-Joliet, IL	No
181410014	South Bend - Nuner Sch.	St Joseph	South Bend	Nuner Elem Sch, 2716 Pleasant St.	SLAMS	11/20/99	3-Day	118	Neigh	Pop Exp	41.663333	-86.207778	Yes	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	3-Day	118	Neigh	Pop Exp	41.696692	-86.214683	Yes	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	QA Collocated	06/01/06	6-Day	118	Neigh	Quality Assurance	41.696692	-86.214683	Yes	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	Special Purpose	06/01/06	Continuous	731	Neigh	Pop Exp	41.696692	-86.214683	No	South Bend-Mishawaka	No
181470009	Dale	Spencer	Dale	David Turnham School, Dunn & Locust	SPM	02/01/00	3-Day	118	Urban	Regional Trans	38.167500	-86.983333	Yes	Non-MSA County	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	SLAMS	10/01/02	1-Day	118	Neigh	Pop Exp	40.431639	-86.852500	Yes	Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	QA Collocated	10/01/02	6-Day	118	Neigh	Quality Assurance	40.431639	-86.852500	Yes	Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	Special Purpose	04/01/05	Continuous	701	Neigh	Pop Exp	40.431639	-86.852500	No	Lafayette	No
181630006	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	SLAMS	04/15/99	3-Day	118	Neigh	Pop Exp	37.971667	-87.567222	Yes	Evansville, IN-KY	No
181630006	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	QA Collocated	04/15/99	6-Day	118	Neigh	Quality Assurance	37.971667	-87.567222	Yes	Evansville, IN-KY	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?
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	04/15/99	3-Day	118	Neigh	Pop Exp	38.021667	-87.569444	Yes	Evansville, IN-KY	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	10/01/02	Continuous	701	Neigh	Pop Exp	38.021667	-87.569444	No	Evansville, IN-KY	No
181630016	Evansville - U of E	Vanderburgh	Evansville	Carson Center, Walnut St.	SLAMS	06/05/99	3-Day	118	Neigh	Pop Exp	37.974444	-87.532222	Yes	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	03/19/99	3-Day	118	Neigh	Pop Exp	39.486111	-87.401389	Yes	Terre Haute	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	Special Purpose	07/02/03	Continuous	731	Neigh	Pop Exp	39.486111	-87.401389	No	Terre Haute	No
181670023	Terre Haute - Devaney	Vigo	Terre Haute	Devaney School, 1011 Brown St.	SLAMS	12/06/99	1-Day	118	Neigh	Pop Exp	39.456111	-87.370556	Yes	Terre Haute	No

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)

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?
		Hamilton[2]			SLAMS	2008	3-Day	118	Neigh	Pop Exp			Yes	Indianapolis-Carmel	No
180970043	Indpls - West St.	Marion	Indianapolis	1735 South West Street	SLAMS	01/24/99	3-Day	118	Middle	Pop Exp	39.744957	-86.166496	Yes**	Indianapolis-Carmel	No
180970066	Indpls - English Ave.	Marion	Indianapolis	Seal Products Bldg., 3302 English Ave,	SLAMS	01/24/99	3-Day	118	Middle	Pop Exp	39.760437	-86.108848	Yes**	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	SLAMS	03/07/99	3-Day	118	Neigh	Pop Exp	39.811097	-86.114469	Yes	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	01/01/04	Continuous	701	Neigh	Pop Exp	39.811097	-86.114469	No	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch, 3351 W. 18th St.	SLAMS	01/22/99	3-Day	118	Neigh	Pop Exp	39.788903	-86.214628	Yes	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch, 3351 W. 18th St.	QA Collocated	02/11/99	6-Day	118	Neigh	Quality Assurance	39.788903	-86.214628	Yes	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch, 3351 W. 18th St.	Special Purpose	11/01/07	Continuous	701	Neigh	Pop Exp	39.788903	-86.214628	No	Indianapolis-Carmel	No
180970083	Indpls - E. Michigan St.	Marion	Indianapolis	Thomas Gregg Sch, 2302 E. Michigan St.	SLAMS	01/22/99	3-Day	118	Neigh	Pop Exp	39.774944	-86.122053	Yes	Indianapolis-Carmel	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.

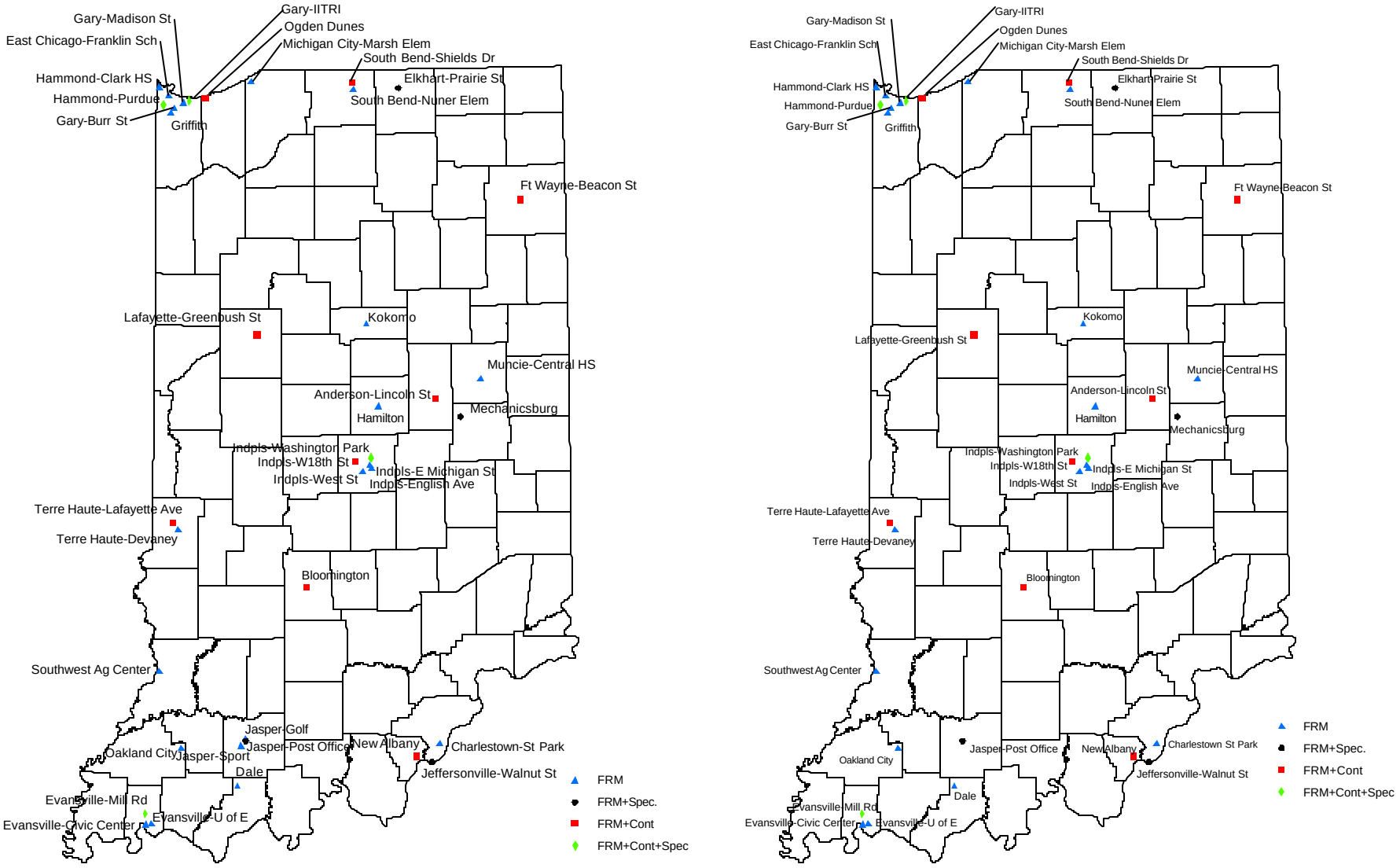
[1] Site relocation identified in 2007 Review; will be completed by end of 2008.

[2] Site identified in 2007 Review; will be operational by end of 2008.

MONITORING METHODS:

118 - R & P 2025	*760 - FDMS TEOM*
701- TEOM	*731 - MET ONE BAM W/ SCC*

Figure 10 – $PM_{2.5}$ Monitoring Networks (2008 & 2009)



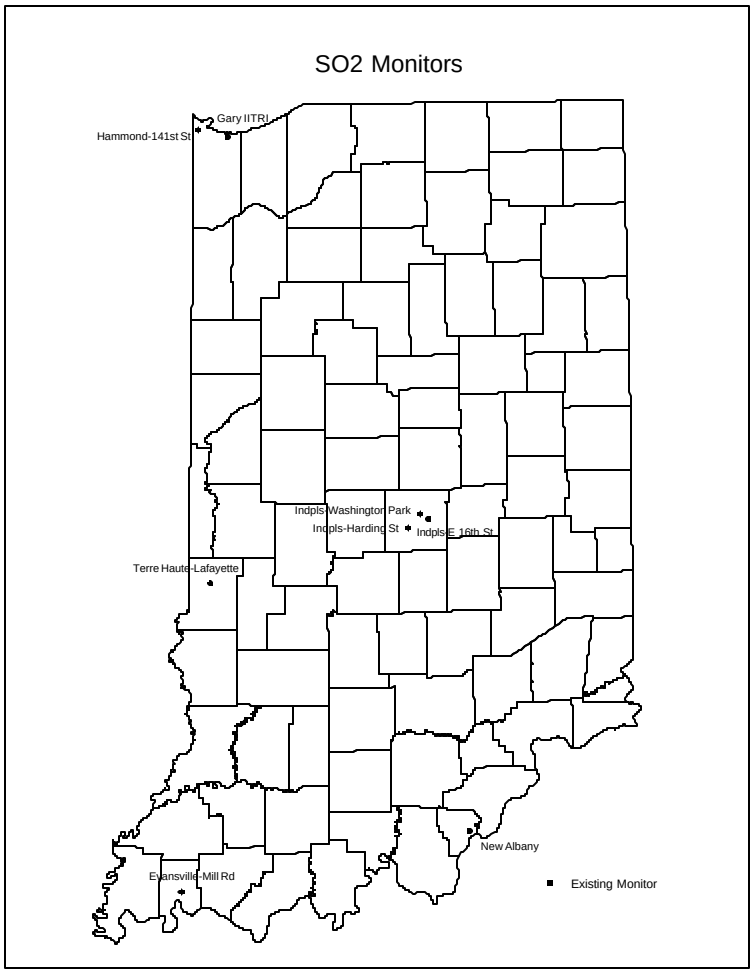
SO_2

Monitoring Requirements
40 CFR Part 58 Appendix D, 4.4 details the requirements for SO_2 monitoring. There are no minimum requirements for the number of SO_2 monitoring sites listed. Continued operation of existing SLAMS SO_2 sites using FRM or FEM is required until discontinuation is approved by the EPA.

40 CFR Part 58.10 (a)(3) requires NCore monitoring to be operational by January 1, 2011. 40 CFR Part 58 Appendix D, 3(b) states that SO_2 measurements will be included at the NCore multipollutant monitoring sites.

Monitoring Methodology
Indiana's SO_2 monitoring network collects data with Thermo Environmental Models 43C, 43i and the API Model 100E using pulsed ultra-violet fluorescence monitoring methodology. The API Model 100EU Trace level/Ultra-sensitive analyzer is used to collect trace level SO_2 data at the NCore, Indpls-Washington Park site.

Figure 11 - SO_2 Monitoring Network



Monitoring Network
Indiana operates eight (8) SO_2 monitors located throughout the state. Included in the eight (8) is the NCore site at Indianapolis – Washington Park, identified in last year's review. This monitor will begin operations later in 2008. The current network, along with any changes planned in 2009, is listed in Table 15.

Network Modifications
No changes are planned for the Indiana SO_2 monitoring network in 2009.

Table 15 – SO_2 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	MSA	Site Change Proposed?
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	11/01/76	Continuous	060	Neigh	Pop Exp	38.308056	-85.834167	Louisville/Jefferson Co.	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	06/12/97	Continuous	060	Neigh	Unknown	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	NAMS	08/01/75	Continuous	060	Neigh	Highest Conc	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	NAMS	04/02/90	Continuous	060	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	2008	Continuous	100	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	10/01/82	Continuous	060	Middle	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	07/01/83	Continuous	060	Neigh	Pop Exp	39.486111	-87.401389	Terre Haute	No

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	NAMS	03/04/82	Continuous	060	Neigh	Highest Conc	39.749019	-86.186314	Indianapolis-Carmel	No

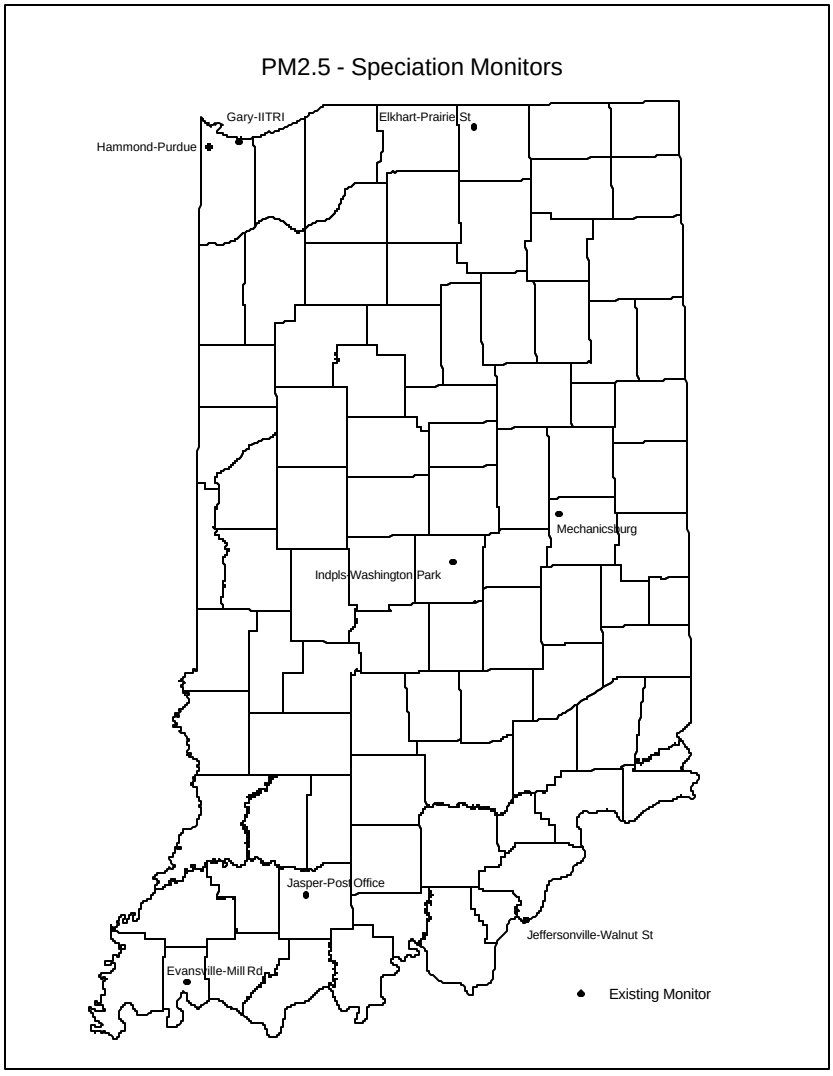
SO2 MONITORING METHOD: 060 - THERMO ELECTRON 43A, 43C, 43i,
100 - TELEDYNE INSTR. 100EU
075 - MONITOR LABS 8850S

$PM_{2.5}$ Speciation

Monitoring Requirements
Monitoring requirements in 40 CFR Part 58 Appendix D 4.7.4 states that "each state shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the $PM_{2.5}$ Speciation Trends Network (STN)."

Monitoring Methodology
Intermittent speciation samples are collected on three different filter mediums, each for a specific analysis and list of compounds. A Teflon filter using the Energy Dispersive X-ray Fluorescence analysis methodology is used to target the mass and forty-eight (48) trace metals. A nylon filter using Ion Chromatography for an analytical method is used to target sulfates, nitrates, and three (3) cations; ammonium, potassium, and sodium. And a quartz fiber filter using Thermal Optical Analysis is used to target organic, elemental, and total carbon.

Figure 12 - Speciation Monitoring Network



The Met One SASS has been used at all sites to collect the three (3) samples in the past. In May 2007, as part of a nationwide conversion of the carbon sampling and analytical method to more closely match the IMPROVE analytical method, Indiana began to collect the carbon channel using the URG-3000N at three (3) sites; Gary – IITRI (180890022), Hammond – Purdue (180892004), and Indianapolis – Washington Park (180970078) in 2007. The remaining sites are scheduled for the conversion in the third or fourth quarter of 2008. Samples are collected on a 1/6 day sampling frequency at all sites except Washington Park, which samples every third day.

Indiana also operates continuous speciation monitors at three (3) different locations. A Magee Model AE2100 Aethalometer, using optical absorption analysis methodology, is used for sampling black carbon at Indianapolis - Washington Park and Gary -IITRI. A Thermo Electron Model 5200 Sulfate Monitor, using Catalytic Thermal Reduction and Pulsed Fluorescence analysis, monitors sulfates at Indianapolis - Washington Park and Evansville-Mill Rd.

Monitoring Network
Indiana speciation network consists of eight (8) sites across the state. Jeffersonville – Walnut St. was proposed and added after the 2007 Review. It is scheduled to begin operation on July 1, 2008. Monitoring is planned to continue at these sites in 2009. The current network, along with any changes planned for 2009, is listed in Table 16.

Network Modifications
A continuous sulfate monitor will be deployed at Gary – IITRI during 2009.

An aethalometer will be deployed at Evansville – Mill Rd. in 2009.

Table 16 – $PM_{2.5}$ Speciation 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	MSA	Site Change Proposed?
180372001	Jasper - Post Office	Dubois	Jasper	Post Office, 206 E. 6th St	Suplmntl Speciation	01/04/05	6-Day	811, 812, 813	Neigh	Pop Exp	38.391389	-86.929167	Non-MSA County	No
180390008	Elkhart - Prairie St.	Elkhart	Elkhart	2745 Prairie St.	Suplmntl Speciation	01/01/08	6-Day	811, 812, 813	Neigh	Pop Exp	41.656905	-85.968371	Elkhart-Goshen	No
180650003	Mechanicsburg	Henry		Shenandoah HS, 7354 W. Hwy. 36	Suplmntl Speciation	02/01/02	6-Day	811, 812, 813	Regional	Regional Trans	40.011667	-85.523611	Non-MSA County	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Suplmntl Speciation	04/03/03	6-Day	811, 812, 833	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Special Purpose	04/03/03	Continuous Black Carbon	861	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Special Purpose	Proposed	Continuous Sulfate	875	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	Add
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	Suplmntl Speciation	01/01/04	6-Day	811, 812, 833	Neigh	Pop Exp	41.585278	-87.474444	Chicago-Naperville-Joliet, IL	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Trends Speciation	12/13/00	3-Day	811, 812, 833	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	10/01/03	Continuous Black Carbon	861	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	01/01/06	Continuous Sulfate	875	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
180190006	Jeffersonville-Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	Suplmntl Speciation	07/01/08	6-Day	811, 812, 813	Neigh	Pop Exp	38.277675	-85.740153	Louisville/Jefferson Co.	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	Suplmntl Speciation	10/05/02	6-Day	811, 812, 813	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	Special Purpose	Proposed	Continuous Black Carbon	861	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Add
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	Special Purpose	2008	Continuous Sulfate	875	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	No

MONITORING METHOD: *811 - MET ONE SASS TEFLON / ANALYSIS METHOD: ENERGY DISPERSIVE XRF*
812 - MET ONE SASS NYLON / ANALYSIS METHOD: ION CHROMATOGRAPHY
813 - MET ONE SASS QUARTZ / ANALYSIS METHOD: STN TOT
833 - URG MASS450 QUARTZ WINS / ANALYSIS METHOD: STN TOT
861 - MAGEE AETHALOMETER AE2100 / ANALYSIS METHOD: OPTICAL ABSORPTION
875 - THERMO ELECTRON 5020 / CATALYTIC THERMAL REDUCT, PULSED FLUORESCENCE

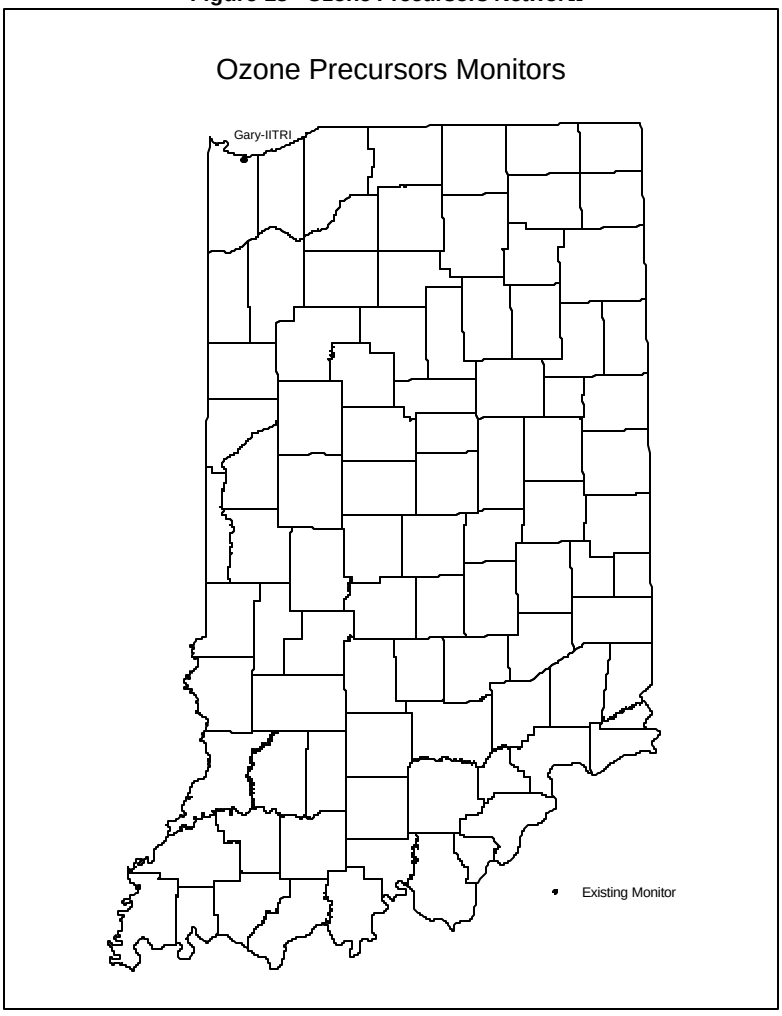
Ozone Precursors (VOCs)

Monitoring Requirements
Ozone precursor monitoring is required as part of the PAMS program. The specific requirements are addressed in Table D-6 of 40 CFR Part 58 Appendix D. According to the Modified Network Plan for the Chicago Nonattainment Area, Indiana operates one (1) type 2 PAMS site. A type 2 site requires measurements for speciated VOCs, carbonyls, NO_x, CO, O_3, and surface met.

This section deals with the speciated VOCs. The other parameters are addressed in their own area. According to the plan, fifty-six (56) speciated VOCs are to be collected at Indiana's PAMS site.

Monitoring Methodology
Ozone precursor VOCs are collected continuously in June, July, and August using a Perkin Elmer Clarus 500 GC, with dual FIDs and a TurboMatrix thermal desorber. In addition, canister samples are collected year round on a 1/6 day sampling schedule. These canisters are analyzed using the same analytical method.

Figure 13 - Ozone Precursors Network



Monitoring Network
Indiana operates one PAMS monitoring site collecting ozone precursors VOCs at Gary – IITRI (180890022). The site details are in Table 17.

Network Modifications
No changes are planned for ozone precursor VOC monitoring in 2009.

Table 17 - Ozone Precursor 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	MSA	Site Change Proposed?
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	07/06/95	Continuous*	128	Middle	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	07/06/95	6-Day	146	Middle	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No

* Data collected June, July, & August only

MONITORING METHOD: 126 - CRYOGENIC PRECONCENTRATION GC/FID DETECTION
146 - E.S.A. AC32M / CHEMILUMINESCENT

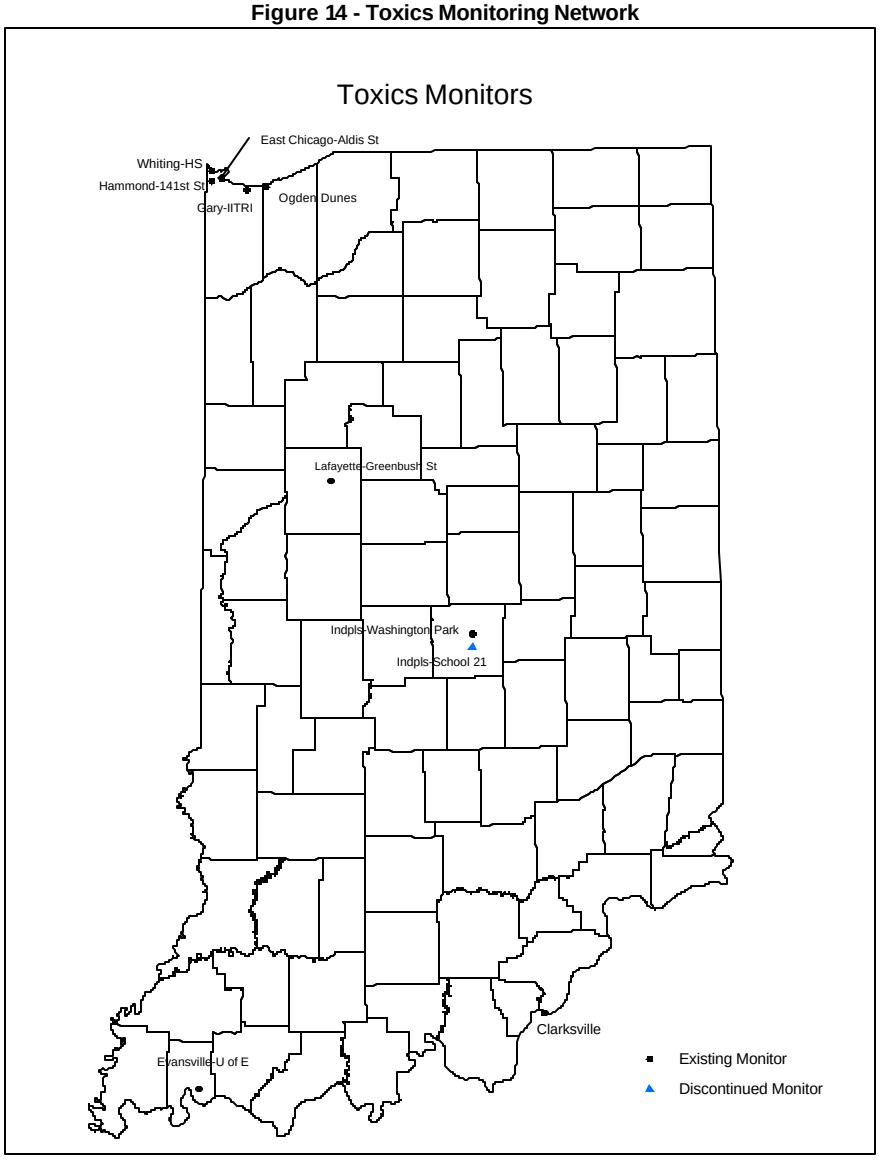
Toxics (VOCs)

Monitoring Requirements
There are no requirements for toxics monitoring listed in 40 CFR Part 58.

Monitoring Methodology
Indiana uses a modification of the TO-15 method at the majority of its sites to collect toxics VOC data. TO-15 is part of EPA's Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air and consists of guidance for the sampling and analysis of volatile organic compounds in air. Ambient air is collected in a stainless steel canister in the field and analyzed using a GC/MS to determine the concentration of the compounds found in the sample. Samples are collected for 24 hours on a 1/6 sampling schedule. Sixty-two (62) different VOCs are currently analyzed.

A Perkin Elmer Clarus 500 GC, with dual FIDs and a TurboMatrix thermal desorber is used to collect hourly data for nine (9) compounds at the Indianapolis – School 21 Site.

Figure 14 - Toxics Monitoring Network



Monitoring Network
Indiana currently operates ten (10) toxics monitoring sites. In 2009, Indiana will operate nine (9) sites. The current network, along with any changes planned in 2009, is listed in Table 18.

Network Modifications
The Indianapolis – School 21 site will be discontinued at the end of 2008. It had been established to monitor high benzene values near the Citizen's Gas and Coke facility. Those operations have terminated and cleanup of the coking batteries will be complete soon. Almost all hourly values have diminished to less than 1 ppb, with occasional values of 2 ppb or 3 ppb. It is no longer necessary to operate this site.

Table 18 - Toxics Monitoring Network

Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
Clarksville	Clark	Clarksville	201 W. Riverside Dr. Clarksville, IN	Special Purpose	03/07/08	6-Day	126	Neigh	Pop Exp	38.276628	-85.763811	Louisville/Jefferson Co.	No
Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Special Purpose	07/06/95	6-Day	126	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
East Chicago - Aldis St.	Lake	East Chicago	Water Filtration Plant, 3330 Aldis St.	Special Purpose	06/01/99	6-Day	126	Neigh	Pop Exp	41.652778	-87.439444	Chicago-Naperville-Joliet, IL	No
Whiting - HS	Lake	Whiting	Whiting HS, 1751 Oliver St.	Special Purpose	04/01/04	6-Day	126	Neigh	Pop Exp	41.681384	-87.494722	Chicago-Naperville-Joliet, IL	No
Hammond - 141st St.	Lake	Hammond	1300 E. 141st St.	Special Purpose	02/01/89	6-Day	126	Neigh	Pop Exp	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd.	Special Purpose	08/15/98	6-Day	126	Neigh	Pop Exp	41.617500	-87.199167	Chicago-Naperville-Joliet, IL	No
Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	Special Purpose	04/18/99	6-Day	126	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
Indpls - School 21	Marion	Indianapolis	IPS Sch 21, 2815 English Ave.	Special Purpose	11/01/00	Continuous	128	Middle	Pop Exp	39.759083	-86.115556	Indianapolis-Carmel	Discontinue
Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St.	Special Purpose	01/01/08	6-Day	126	Neigh	Pop Exp	40.431639	-86.852500	Lafayette	No
Evansville - U of E	Vanderburgh	Evansville	Carson Center, Walnut St.	Special Purpose	06/05/99	6-Day	126	Neigh	Pop Exp	37.974444	-87.532222	Evansville, IN-KY	No

MONITORING METHOD: 126 - CRYOGENIC PRECONCENTRATION GC/FID DETECTION
128 - PERKIN ELMER 8700; AUTO GC; SUBAMBIENT DUAL FID

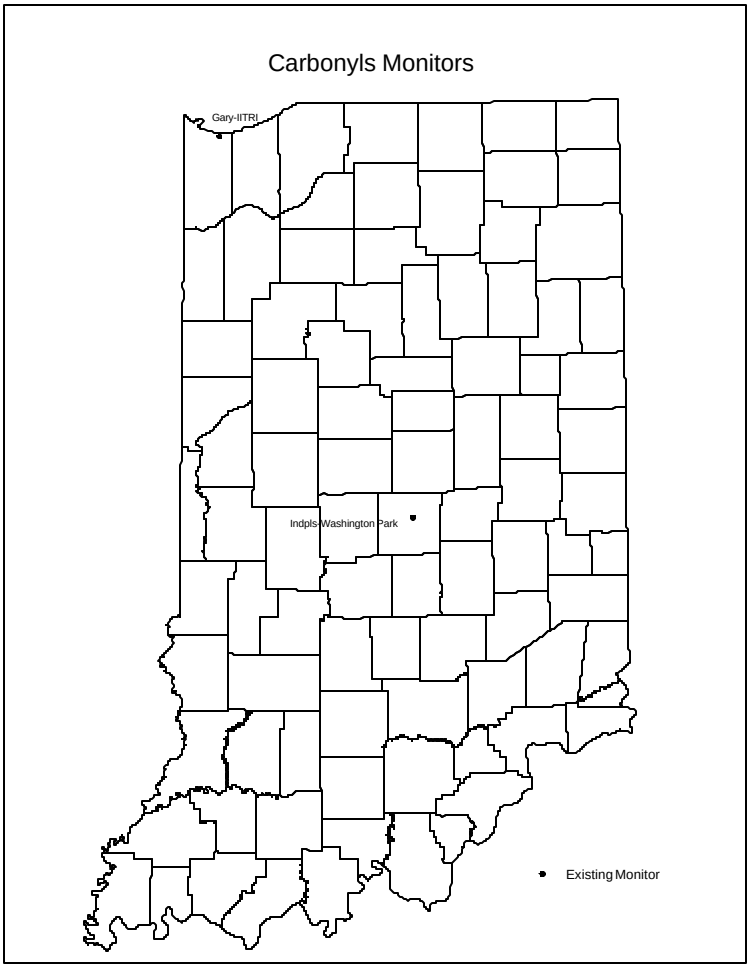
Carbonyls

Monitoring Requirements
Carbonyl monitoring is required as one of the components of the PAMS monitoring program. The overall requirements are addressed in Table D-6 of 40 CFR Part 58 Appendix D. The specific requirement of monitoring for carbonyls at Indiana's PAMS site is listed in the approved PAMS network plan for the Chicago nonattainment area.

Monitoring Methodology
Carbonyl data are collected using Method TO-11A of the of EPA's Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Compendium of Method. Samples are collected by drawing a known volume air through a cartridge filled with silica gel coated with activated DNPH. These samples are analyzed using HPLC with a UV absorption detector.

Samples are collected on a 1/6 day sampling schedule at all sites. In addition, at the PAMS site at Gary – IITRI, four (4) 3-hour samples are also collected on a 1/3 day sampling schedule during June, July, and August.

Figure 15 - Carbonyl Monitoring Network



Monitoring Network
Indiana currently operates two (2) carbonyl monitoring sites. Gary - IITRI collects data for the PAMS program. Washington Park is conducted as part of the toxics monitoring network. The details of the network are in Table 19.

Network Modifications
No changes are planned for the carbonyl monitoring network in 2009.

Table 19 - Carbonyl 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	MSA	Site Change Proposed?
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	06/01/95	3-Day (4-3Hr Samples)*	102	Neigh	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	06/01/95	6-Day	102	Neigh	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	04/18/99	6-Day	102	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No

*June - August

MONITORING METHOD: 102 - HPLC (TO-14) DNPH-COATED CARTRIDGES

Metals

Monitoring Requirements
There are no requirements for metals monitoring listed in 40 CFR Part 58.

Monitoring Methodology
Metals data is collected using a TSP sampler and collecting the sample on filters for a 24-hour period according to a 1/6 day sampling schedule. Filters are analyzed using the flameless atomic absorption method.

Figure 16 - Metals Monitoring Network

Monitoring Network
There is one (1) site that monitors particulate metals in Indiana. Arsenic, beryllium, cadmium, chromium, lead, manganese, and nickel are monitored. This site is detailed in Table 20.

Network Modifications
No changes are planned for the metals monitoring network in 2009.

Table 20 - Metals Monitoring Network

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	04/18/99	6-Day	107	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No

Metals Monitored
Lead
Manganese
Nickel
Arsenic
Beryllium
Cadmium
Chromium

MONITORING METHOD: 107 - HI-VOL SAMPLER / ANALYSIS METHOD: FLAMELESS ATOMIC ABSORPTION

Meteorological Parameters

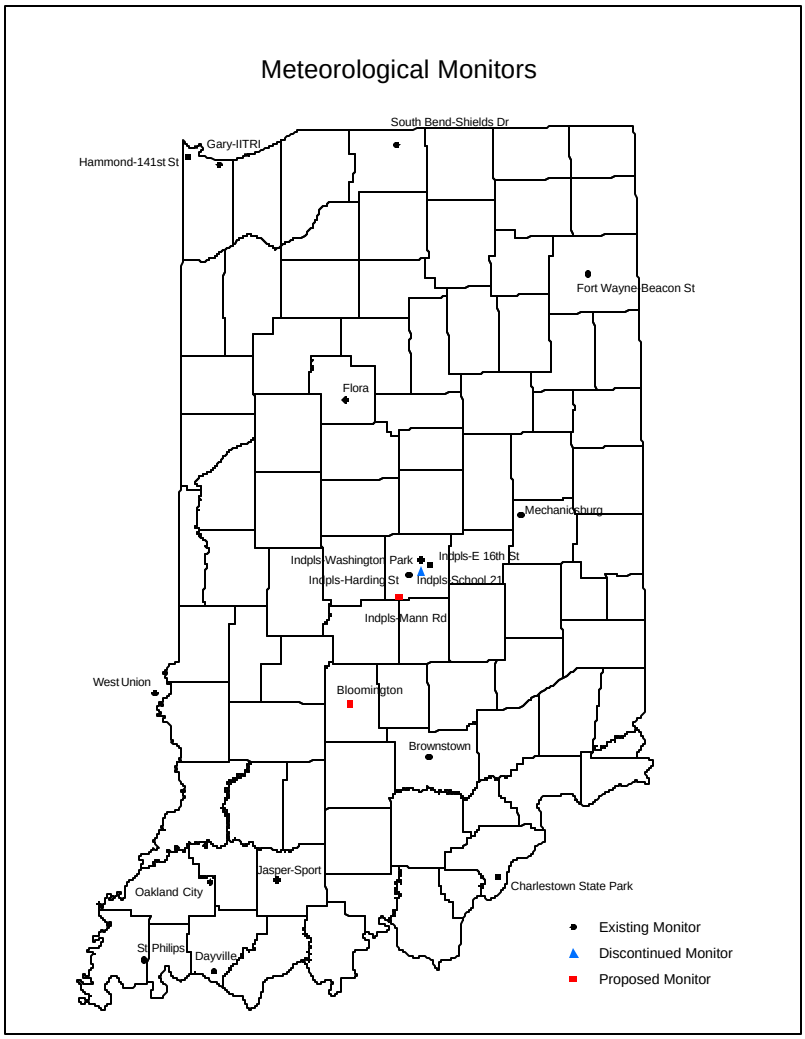
Monitoring Requirements

40 CFR Part 58 Appendix D, 3(b) specifies that the following meteorological parameters be measured for the design criteria for NCore sites; wind speed, wind direction, relative humidity, and ambient temperature. Meteorological data is generally not required for SLAMS or NAMS sites; however these data support the suitability of the site along with other data sets. Many factors determine the amount and types of meteorological data that are collected in Indiana. Some of the factors include the intended use of the data and the availability of representative meteorological data that is already being collected by the National Weather Service and Local Agencies in any given area of interest. Meteorological data are required to be collected at PAMS sites as per 40 CFR Part 58 Appendix D 5.1. This data will give the ability to observe more accurately what the atmosphere is doing at the lower boundary layer.

Monitoring Network

Meteorological data are collected at sixteen (16) sites across Indiana in 2008. Sites are established to provide coverage in all areas of the state where pollutant monitoring is conducted. Table 20 details the meteorological sites and the parameters collected.

Figure 17 - Meteorological Monitoring Network



Network Modifications

The number of meteorological monitoring sites will increase from sixteen (16) to seventeen (17) in 2009.

A new meteorological site will be deployed at Indianapolis –Mann Rd to have more information available to model dispersion in the event of a bioterrorism event.

Meteorological monitoring will be added at the Bloomington site because representative meteorological data from NOAA for this area are not readily available.

The meteorological monitoring will be discontinued at Indianapolis – School 21 at the end of 2008. The toxics monitoring at this site is also being discontinued at this time and the site met data will not be needed.

Table 21 - Meteorological Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Latitude	Longitude	61101/ 61102 WS / WD	62201 RH	64101 Baro Press	62101 Outside Temp	63302 UV Rad	63301 Solar Rad	61109 Vertical WS	65102 Precip	Site Change Proposed?
170230001	West Union	Clark Co., IL	West Union	416 S. St. Hwy 1	39.210883	-87.668416	¦	¦	¦	¦					No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon	41.094722	-85.101944	¦	¦		¦			¦		No
180150002	Flora	Carroll		Flora Airport, 481 S. 150 W	40.540556	-86.553056	¦	¦							No
180190008	Charlestown State Park	Clark		Charlestown State Park, 12500 Hwy 62, Charlestown	38.393833	-85.664167	¦	¦	¦	¦					No
180510012	Oakland City	Gibson		2205 S. 1350 E., Oakland City	38.322930	-87.318789	¦								No
180650003	Mechanicsburg	Henry		Shenandoah HS, 7354 W. Hwy. 36	40.011667	-85.523611	¦	¦		¦			¦		No
180370004	Jasper - Sport	Dubois	Jasper	Jasper Sport Complex - 1401 12th Ave.	38.369436	-86.959031	¦								No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	41.606667	-87.304722	¦	¦	¦	¦	¦	¦	¦		No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	41.639444	-87.493611	¦			¦					No
180970042	Indpls - Mann Rd	Marion	Indianapolis	8327 Mann Rd.	39.646254	-86.248784	¦								Add
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	39.789167	-86.060833	¦	¦		¦	¦	¦		¦	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	39.811097	-86.114469	¦	¦	¦	¦					No
180970084	Indpls - School 21	Marion	Indianapolis	IPS Sch 21, 2815 English Ave	39.759083	-86.115556	¦								Discontinue
	Bloomington	Monroe	Bloomington				¦								Add
181290003	St Philips	Posey		2027 S. St. Phillips Rd., Evansville	38.005278	-87.718333	¦	¦	¦	¦	¦	¦			No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	41.696692	-86.214683	¦	¦		¦			¦		No
181730011	Dayville	Warrick		2488 Eble Rd., Newburgh	37.954450	-87.321933	¦	¦		¦					No

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)

Site ID	Site Name	County	City	Address	Latitude	Longitude	WS / WD	RH	Baro Press	Outside Temp	UV Rad	Solar Rad	Vertical WS	Precip	Site Change Proposed?
180710001	Brownstown	Jackson		225 W & 300 N	38.920798	-86.080523	¦	¦		¦					No
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	39.749019	-86.186314	¦	¦	¦	¦					No

Appendix A.
Comment Submittal Information

The proposed 2009 Ambient Air Monitoring Network Plan was posted on the IDEM website at http://www.in.gov/idem/5342.htm for review and comment for thirty (30) days, from May 28 through June 27.

Comments could be emailed to

Steve Lengerich (slengeri@idem.in.gov)

or mailed to,

Steve Lengerich
100 North Senate Avenue
MC 61-50-2 Shadeland
Indianapolis, IN 46204-2251

or faxed to

317-308-3239

Comments

No comments were received during the review period.