Indiana
2011
Ambient Air Monitoring Network Plan
(Proposed)

Indiana Department of Environmental Management
Office of Air Quality
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Acronyms

APCD	Louisville Metropolitan Air Pollution Control District
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
HCDOES	Hamilton County (OH) Department of Environmental Services
HPLC	High Pressure Liquid Chromatography
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
LEADS	Leading Environmental Analysis and Display System
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standard
NAMS	National Air Monitoring Station
NATTS	National Air Toxics Trends Station
NCore	National Core multi-pollutant monitoring stations
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NO_y	Total Reactive Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Administration
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Station
Pb	Lead
$PM_{2.5}$	Particulate matter with a diameter less than or equal to 2.5 micrometers
PM_{10}	Particulate matter with a diameter less than or equal to 10 micrometers
$PM_{10-2.5}$	Particulate matter with a diameter less than or equal to 10 micrometers, and greater than or equal to 2.5 micrometers
ppm	parts per million
PQAO	Primary Quality Assurance Organization
PSD	Prevention of Significant Deterioration
PTFE	Polytetrafluoroethylene
QA	Quality Assurance
SASS	Speciation Air Sampling System
SHARP	Synchronized Hybrid Ambient Real-time Particulate
SLAMS	State or Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SPM	Special Purpose Monitor
STN $PM_{2.5}$	Speciation Trends Network
TSP	Total Suspended Particulate
TEOM	Tapered Element Oscillating Microbalance
ug/m^3	micrograms per cubic meter
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
VOC	Volatile Organic Compounds
VSCC	Very Sharp Cut Cyclone

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 2011 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 are listed in Appendix A.

Indiana's Air Monitoring Network

IDEM regulates air quality to protect public health and the environment in the State of Indiana. Air monitoring data are required by regulation and are used to determine compliance with 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.

Air Quality Data

IDEM presents two different types of air quality data, intermittent and continuous on IDEM's Internet website http://www.in.gov/idem/4652.htm. Annual and quarterly summary reports of pollutants collected by manual methods are available as well as hourly values from continuous monitors. The Leading Environmental Analysis and Display System **(**LEADS) provides on-line access to Indiana's continuous air quality monitoring network. It has been available to the public since July, 2007. LEADS offers access to near real-time data from sixty (60) continuous air monitoring sites across Indiana. This allows anyone to track pollutant and meteorological values throughout the day. In addition, past data back to 1998 are available as raw data and canned summary reports or user specified retrievals.

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 (O3)

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

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

NCore Monitoring

NCore is a multi-pollutant approach to monitoring. NCore sites are intended to support multiple objectives with a greater emphasis on assessment, research support and accountability than the traditional NAMS/SLAMS networks. NCore provides an opportunity to address new directions in monitoring and begin to fill measurement and technological gaps that have accumulated in the networks. Indiana is required to establish and operate one (1) urban NCore site. These sites are required to measure $PM_{2.5,}$ speciated $PM_{2.5}$, $PM_{10-2.5}$, O_3, SO_2, CO, NO, NO_2, NO_y, Pb, and meteorology.

National Ambient Air Quality Standards (NAAQS)

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

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

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

5-Year Network Assessment

A new requirement of USEPA, as per 40CFR Part 58.10(d), is to conduct a Network Assessment every five (5) years. The first assessment is currently being drafted and is due to USEPA by July 1, 2010. As this document is not yet finalized nor approved by USEPA, this Network Review will not use any preliminary results or conclusions of the assessment to modify the current network.

New USEPA Monitoring Requirements

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

Network Overview

Indiana has reviewed its current ambient air quality network and developed a proposed network to be implemented during 2011. Current NAAQS, data trends, site redundancy, siting problems, site access concerns, and other identified monitoring issues all contribute to any proposed network revisions.

The number of sites listed in the current monitoring network includes changes planned to have occurred during 2009 and were not, but are planned to be completed during 2010. These include the establishment of the Hamilton County site for $PM_{2.5}$, the southwest Marion County meteorological site, and the relocation of the Anderson $PM_{2.5}$ site.

One (1) site relocation occurred in 2010 due to the need to vacate the space at Noblesville – 10th St. The site was relocated less than a mile away at Noblesville – 191st St.

Indiana's air monitoring network for 2011 consists of the sites and monitors listed in Table 1. All site changes which have occurred or plan to take place in 2010 are included along with the planned network modifications for 2011. Figure 1 is an overview of Indiana's current monitoring network and shows the locations where some form of monitoring takes place in 2011.

Overall, the number of monitoring locations operated by the State is planned to decrease from eighty-five (85) sites to eighty-four (84) sites. The number of monitored parameters or monitoring systems will increase to one hundred ninety-one (191) from one hundred eighty-nine (189).

Table 1 – State Air Monitoring Network

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3PREC	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
180190006	Clark	Jeffersonville	Jeffersonville - Walnut St	PFAU, 719 Walnut St.					X		X		X							
180190008	Clark		Charlestown St. Park	Charlestown State Park, 12500 Highway 62, Charlestown	X						X									X
180190009	Clark	Clarksville	Clarksville	Falls of the Ohio State Park, 201 W. Riverside Dr.												X				
180350006	Delaware	Muncie	Muncie - Central HS	801 N. Walnut St.							X									
180350009	Delaware	Muncie	Muncie - Mt. Pleasant Blvd.	2601 W. Mt. Pleasant Blvd.											X					
180350010	Delaware	Albany	Albany	Albany Elem. Sch., 700 W. State St.	X															
180370004	Dubois	Jasper	Jasper - Sport	1401 12th Ave.																X
180372001	Dubois	Jasper	Jasper - Post Office	Post Office, 206 E. 6th St.					X		X		X							
180390007	Elkhart	Bristol	Bristol	Bristol Elem. Sch. 705 Indiana Ave.	X															
180390008	Elkhart	Elkhart	Elkhart - Prairie St.	2745 Prairie St.							X	Add	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.	Relocate															
180570006	Hamilton	Noblesville	Noblesville - 191st St.	Our Lady of Grace Catholic Church, 9900 E. 191st St.	Relocation															
18057____	Hamilton	Fishers									Add	Add								
180590003	Hancock	Fortville	Fortville	Fortville Municipal Bldg.	X															
180630004	Hendricks	Avon	Avon	7203 E. US Highway 36	X															
180650003	Henry		Mechanicsburg	Shenandoah HS, 7354 W. Hwy. 36, Middletown							X		X							X
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									

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
180890015	Lake	East Chicago	East Chicago - Post Office.	East Chicago Post Office, 901 E. Chicago Ave.			X													
180890022	Lake	Gary	Gary - IITRI	IITRI Bunker, 201 Mississippi St.	X	X		X	X		X	X	X	B. Carbon		X	X	X		X
180890023	Lake	East Chicago	East Chicago - Aldis St.	East Chicago Water Treatment Plant, 3330 Aldis St.					X						X	X			Add	
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									
180890032	Lake	Gary	Gary - 4th Ave.	Gary SouthShore RailCats, One Stadium Plaza											X				Add	
180890033	Lake	Gary	East Chicago - E. 135th St.	Abraham Lincoln Elem. Sch., E. 135th St.											X				Add	
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			Add	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 Elem. Sch.	400 E. Homer St.							X									
180950009	Madison	Anderson	Anderson - W. 5th St.	44 W. 5th St.							Relocate									
18095____	Madison	Anderson	Anderson - Eastside Elem.	Eastside Elem. Sch., 844 N. Scatterfield Rd.							Relocation	Add								
180950010	Madison		Emporia	East Elem. Sch., 893 E. US 36, Pendleton	X															
180970043	Marion	Indianapolis	Indpls - West St.	1735 S. West St.					X		X									
180970050	Marion	Indianapolis	Indpls - Ft. Harrison	Ft. Harrison St. Park, 5753 Glenn Rd.	X															
180970057	Marion	Indianapolis	Indpls - Harding St.	1321 S. Harding St.	X	X														X
180970063	Marion	Indianapolis	Indpls - Rockville Rd.	7601 Rockville Rd											X					
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,	X	X	X	X	Add	AddInt10 AddCon11	X	X	X	B. Carbon Sulfate	X	X		X	X	X
180970081	Marion	Indianapolis	Indpls - W. 18th St	School 90, 3351 W. 18th St.							X	X								
180970083	Marion	Indianapolis	Indpls - E. Michigan St	School 15, 2302 E. Michigan St.							X									
180970084	Marion	Indianapolis	Indpls - School 21	School 21, 2815 English Ave.					X		X					X				
18097____	Marion	Indianapolis		SW Marion County																Add
181050003	Monroe	Bloomington	Bloomington - Binford	Binford Elem. Sch., 2300 E. 2nd St.							X	X								
181090005	Morgan	Monrovia	Monrovia	Monrovia HS, 135 S Chestnut St	X															

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
181230009	Perry		Leopold	Perry Central HS, 19856 Old St. Rd 37, Leopold	X															
181270023	Porter	Portage	Portage - Hwy 12	Bethlehem Steel Waste Lagoon, Hwy. 12					X						Relocate				Relocate	
18127____	Porter	Burns Harbor													Relocation				Relocation	
181270024	Porter	Ogden Dunes	Ogden Dunes	Water Treatment Plant, 84 Diana Rd.	X				X		X	X				X				
181270026	Porter	Valparaiso	Valparaiso	Valparaiso Water Dept., 1000 Wesly St.	X															
181290003	Posey		St. Philips	2027 St. Phillips Rd., Evansville	X															X
181410010	St. Joseph		Potato Creek St. Park	Potato Creek St. Park, 25601 St. Rd. 4, N. Liberty	X															
181410015	St. Joseph	South Bend	S. Bend - Shields Dr.	2335 Shields Dr.	X			X			X	X								X
181411007	St. Joseph	Granger	Granger	Harris Twnshp Fire Sta, 12481 Anderson Rd.	Relocate															
18141____	St. Joseph			Granger Area	Relocation															
181450001	Shelby		Fairland	Triton Central MS, 4740 W. 600N, Fairland	X															
181470009	Spencer	Dale	Dale	David Turnham School, Dunn & Locust							X									
181570008	Tippecanoe	Lafayette	Lafayette - Greenbush St.	Cinergy Substation, 3401 Greenbush St.							X	X				X				
181630013	Vanderburgh		Inglefield	Scott Elem. School, 14940 Old State Rd.	X															
181630016	Vanderburgh	Evansville	Evansville - U. of E.	University of Evansville - Carson Center							X					X				
181630020	Vanderburgh	Evansville	Evansville - Post Office	800 Sycamore St.							X				X					
181630021	Vanderburgh	Evansville	Evansville - Buena Vista	1110 W. Buena Vista Rd.	X	X		X	X		X	X	X	B. Carbon Sulfate						
181630022	Vanderburgh	Evansville	Evansville - Lloyd	10 S. 11th Ave.			X													
181670018	Vigo	Terre Haute	Terre Haute - Lafayette Ave.	961 N. Lafayette Ave.	X	X			X		X	X								
181670023	Vigo	Terre Haute	Terre Haute - Devaney	Devaney Elementary School, 1011 S. Brown Ave.							Discontinue									
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	3488 Eble Rd., Newburgh	X															X
181830003	Whitley	Larwill	Larwill	Whitko Middle School, 710 N. State Rd. 5							X	X								X

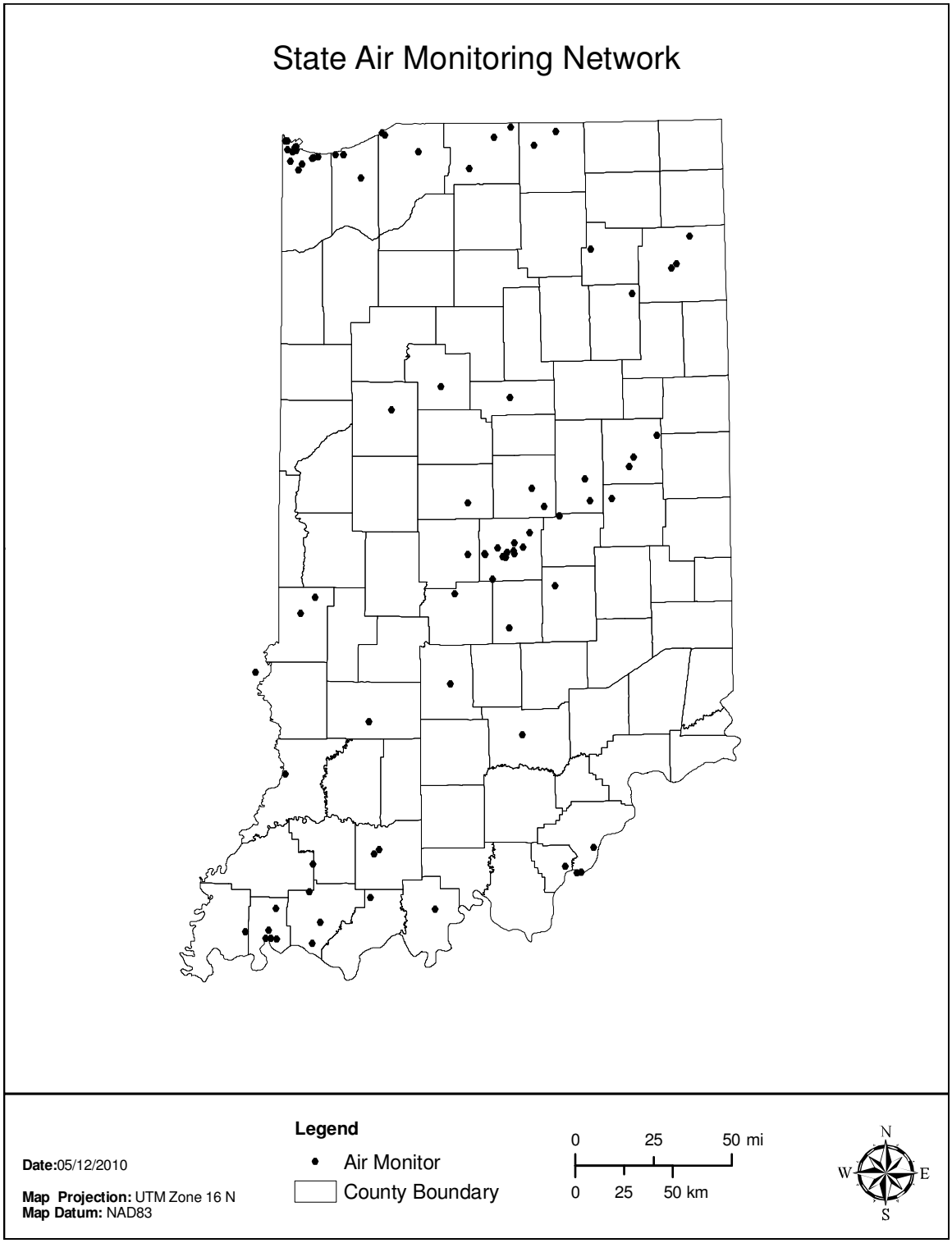
Number of Parameters

	Number of Monitoring Sites	Number of Monitored Parameters	O_3	SO_2	CO	NO_X	PM_{10}	$PM_{10-2.5}$	$PM_{2.5}$ (FRM)	$PM_{2.5}$ (Cont)	$PM_{2.5}$ (Spec)	$PM_{2.5}$ (Spec Cont)	LEAD	TOXICS (VOCs)	O_3 PREC	CAR-BONYLS	METALS	MET
Current Monitoring Network (2010)	85	189	42	8	6	5	15	1	37	15	8	5	10	10	1	2	6	18
Proposed Monitoring Network (2011)	84	191	42	8	6	5	16	2	36	16	8	5	10	10	1	2	6	18

Indicates a site where a change is to occur or occurred in 2010

Indicates a site where a change is planned for 2011

Figure 1 – State Air Monitoring Network 2011



Review Summary

The changes proposed for the 2011 Monitoring Network are:

- The addition of a continuous $PM_{2.5}$ monitor at Elkhart – Prairie St.
- The addition of a continuous $PM_{10-2.5}$ monitor at Indpls – Washington Park.
- Relocation of the Granger O3 site.
- Discontinuation of the Terre Haute – Devaney $PM_{2.5}$ monitor.

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 USEPA.

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

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

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

1. The Air Quality System (AQS) site identification number.
2. The location, including street address and geographical coordinates.
3. The sampling and analysis method(s) for each measured parameter.
4. The operating schedules for each monitor.
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.
6. The monitoring objective and spatial scale of representativeness for each monitor.
7. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in §58.30.
8. The Metropolitan Statistical Area (MSA), Core Based Statistical Area (CBSA), Combined Statistical Area (CSA) or other area represented by the monitor.
9. The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58.
10. Any source-oriented monitors for which a waiver has been requested or granted by the USEPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.
11. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the USEPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

Network Review Description

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

Monitor Type – The name of the designated network:

° PAMS – *Photochemical Assessment Monitoring Station*: Sites established to obtain more comprehensive data of areas with high levels of ozone pollution by also monitoring NO_x and VOCs.

° SLAMS - *State or Local Ambient Monitoring Station*: The SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons. The USEPA must approve all SLAMS sites.
° STN – *$PM_{2.5}$ Speciation Trends Network*: A $PM_{2.5}$ speciation station designated to be part of the speciation trends network. This network provides chemical species data of fine particulates.
° Supplemental Speciation - Any $PM_{2.5}$ speciation station that is used to gain supplemental data and is not dedicated as part of the speciation trends network.
° SPM – *Special Purpose Monitor*: Any monitor included in the agency's network that does not count when showing compliance with the minimum requirements of this subpart and for siting monitors of various types.
° NCore – *National Core multi-pollutant monitoring station*: Sites that measure multiple pollutants at trace levels in order to provide support to integrated air quality management data needs. There is currently one NCore site for Indiana located in Indianapolis.
° 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, SHARP, and BAMs) operate continuously.
° Daily – a sample is taken every day; applies to manual method particulate samplers.
° 3 - Day - Manual method particulate samplers that run every third day.
° 6 - Day - Manual method particulate samplers that run every sixth day.

Sampling Method – Each ambient air monitor is classified by a specific method number. This method combines both the collection procedure along with the analysis performed on the sample. These numbers can be found in the USEPA "List of Designated Reference and Equivalent Methods" (see USEPA 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 2011; 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.

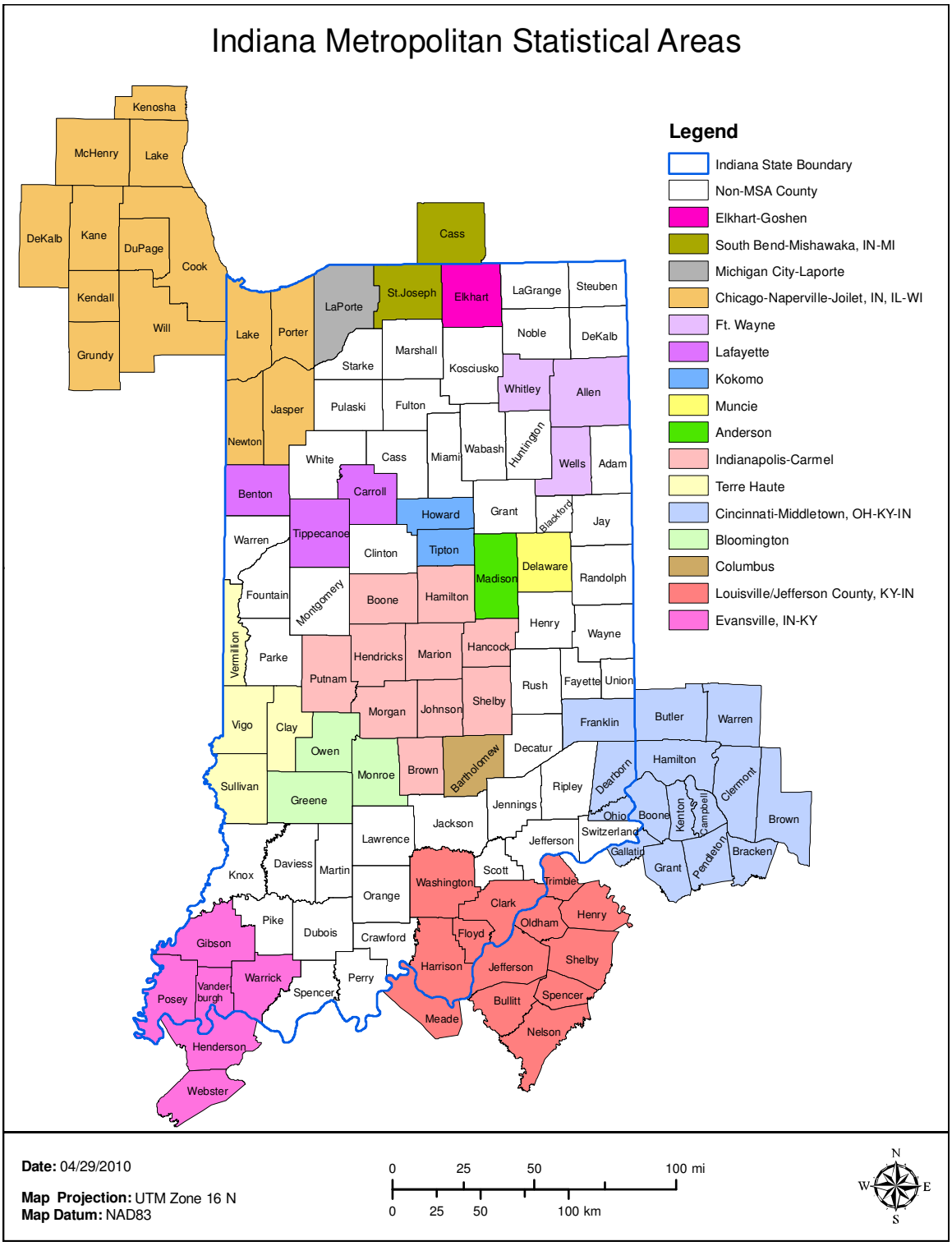
Appendix D of 40 CFR Part 58 deals with the network design criteria for ambient air quality monitoring. The overall design criteria, the minimum number of sites for each parameter, the type of sites, the spatial scale of the sites, and the monitoring objectives of the sites are detailed. In designing 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.

O3, PM10, and PM2.5 have minimum monitoring requirements based upon the population of an MSA. Even though the most recent official census (2000) numbers are to be used, Indiana has updated the populations in the tables with estimated 2009 populations obtained from the US Census Bureau. It is felt this is more accurate and provided a better estimate for network requirements, as the 2010 census is currently underway.

According to 2.(e) of this Appendix, "The EPA recognizes that State and local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator." The individual tables list the data, the requirements, and the current sites for the full multi agency MSAs. In the instances where it is more logical or desirable to divide the monitoring requirements, Indiana is entering into agreements with the neighboring agency or agencies to ensure that the minimum requirements for the MSA continue to be met and the resulting network provides adequate coverage.

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

Figure 2 – Indiana MSAs



Parameter Networks

Carbon Monoxide (CO)

Monitoring Requirements

40 CFR Part 58 Appendix D, 4.2 details the requirements for CO monitoring. 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 USEPA. Where SLAMS CO monitoring is ongoing, at least one site must be a "maximum concentration" site for that particular area under investigation. Microscale and middle scale measurements are useful classifications for SLAMS CO sites since most people have the potential for exposure on these scales. Maximum CO concentrations primarily occur in areas near major roadways and intersections with high traffic density and often poor atmospheric ventilation.

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

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

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 multi-pollutant 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, as displayed in Figure 3. The details of the current network, along with any changes planned in 2011, are listed in Table 2.

Network Modifications

There are no changes planned for the CO monitoring network in 2011.

Figure 3 – CO Monitoring Network

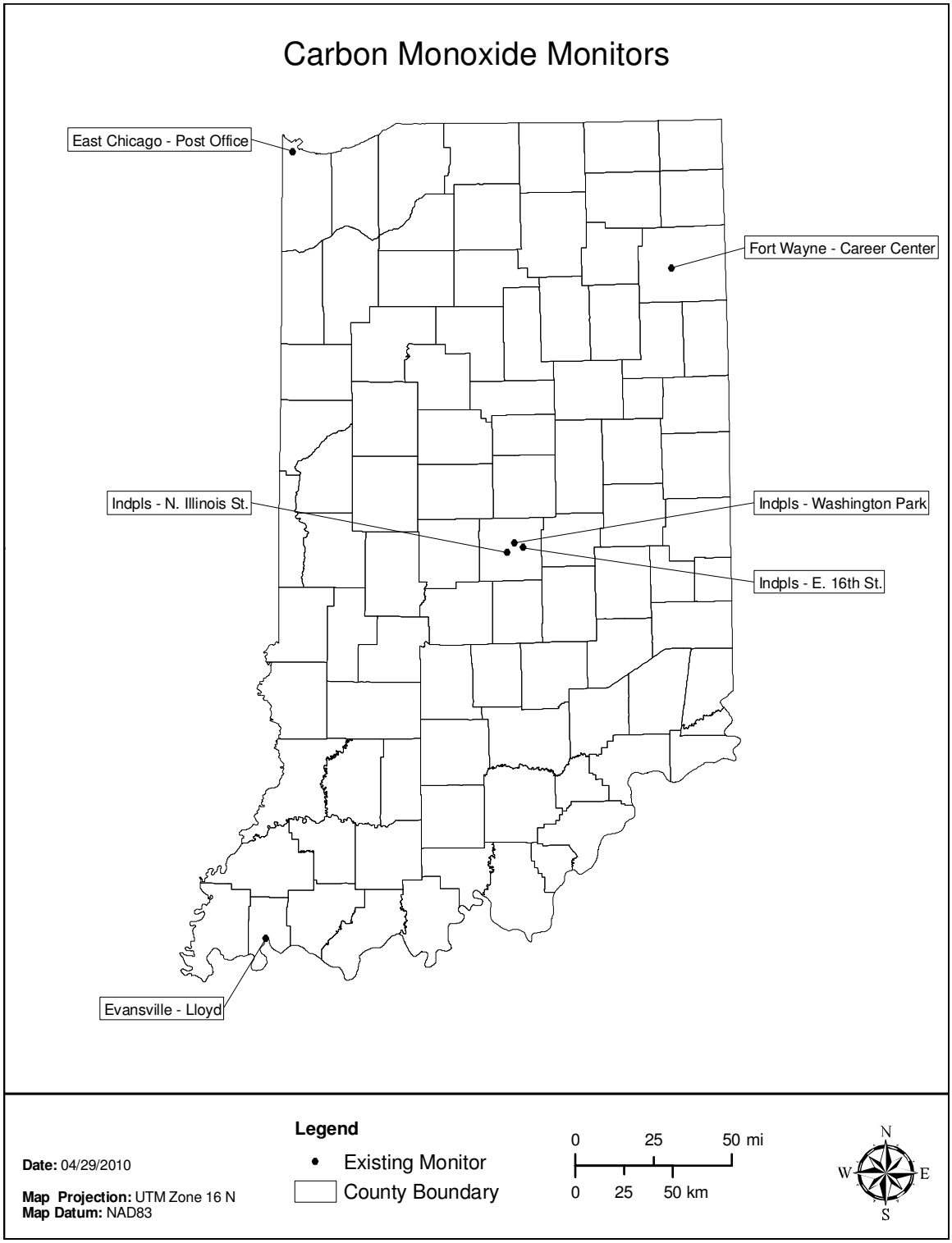


Table 2 – CO Monitoring Network

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

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180030011	Fort Wayne - Career Cntr.	Allen	Fort Wayne	Career Center, 203 E. Douglas St.	SLAMS	03/01/94	Continuous	054	Micro	Highest Conc	41.074167	-85.136667	Ft. Wayne	No
180890015	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
180970072	Indpls - Illinois St.	Marion	Indianapolis	50 N. Illinois St.	SLAMS	02/01/90	Continuous	054	Micro	Highest Conc	39.768056	-86.160000	Indianapolis-Carmel	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/02/90	Continuous	054	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	01/01/10	Continuous	093	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181630022	Evansville - Lloyd	Vanderburgh	Evansville	10 S. 11th Ave	SLAMS	09/10/09	Continuous	054	Micro	Highest Conc	37.977222	-87.596439	Evansville, IN-KY	No

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

Lead (Pb)

Revised Pb NAAQS and Monitoring

On October 15, 2008 USEPA promulgated a new Pb NAAQS and published revisions to 40 CFR Parts 50, 51, 53, and 58. The new standard sets the primary level at 0.15ug/m^3 over a rolling three (3) month mean concentration over a three (3) year period. The main monitoring emphasis places monitors near large Pb emitting sources.

Monitoring Requirements

40 CFR Part 58 Appendix D, 4.5 specifies that Pb monitoring must be conducted taking into account Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, the potential for population exposure, and logistics. At a minimum there must be one (1) source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each Pb source which emits 1.0 or more tons per year. Waivers may be granted if the state can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS. The source-oriented sites were operational by January 1, 2010.

In addition, one (1) non-source-oriented SLAMS site is required in each CBSA with a population equal to or greater than 500,000 people. These sites are to be operational by January 1, 2011. This requirement may change when new monitoring rules are promulgated later this year. The revised rules may require one (1) population oriented site located at the NCore site.

Collocated samplers are required at 15% of the sites operated by a PQAO or a minimum of one (1) per network. Indiana is required to operate one (1) collocated site.

Monitoring Scale

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

Monitoring Methodology

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

Monitoring Network

The Pb monitoring network in Indiana currently consists of ten (10) sites. These sites are displayed in Figure 4, and detailed in Table 3. Indiana deployed its required source-oriented sites as defined in the "2010 Indiana Lead Monitoring Plan" submitted to USEPA in 2009. The sites were established at the beginning of 2010.

Network Modifications

Indiana's current network meets the non-source-oriented SLAMS site requirements for the number of sites.

The Portage – Hwy 12 site was established as an interim site for Arcelor-Mittal Burns Harbor. The preferred site is located on the Port of Indiana – Burns Harbor, much closer to the source and in a higher modeled isopleths. A Memorandum of Understanding between IDEM and the Port of Indiana is currently under negotiation. Once finalized, the site will be moved.

Indiana has been collecting Pb data at Indpls – Washington Park since 1999. This site will be designated as a population oriented site to meet the requirement. As Indpls – Washington Park is also Indiana's NCore site, the NCore requirement would also be met if the new regulations are promulgated as proposed.

Figure 4 – Lead Monitoring Network

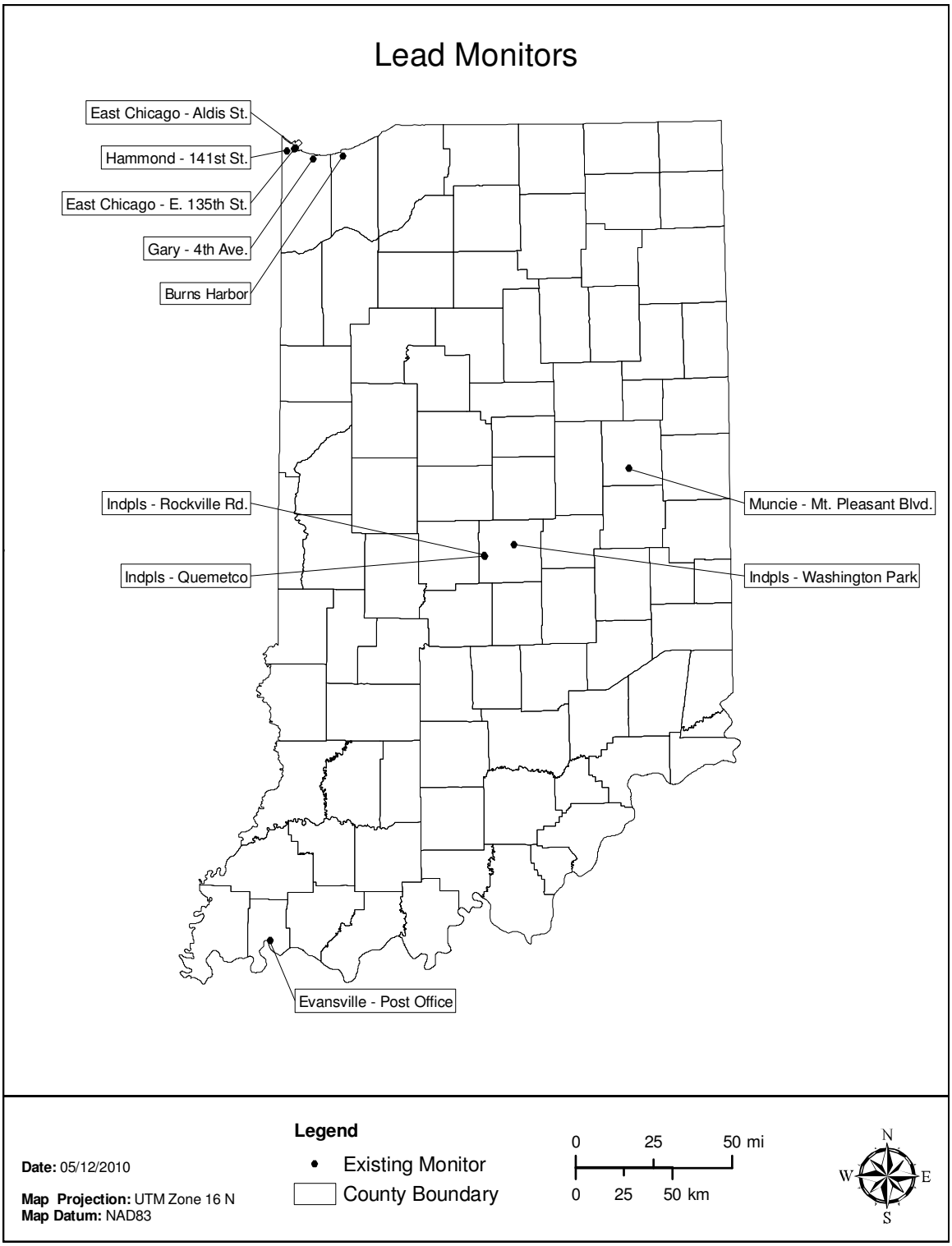


Table 3 – Lead Monitoring Network

Parameter Code: 12128 **Pb - Lead**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Source Oriented?	Site Change Proposed?
180350009	Muncie - Mt. Pleasant Blvd.	Delaware	Muncie	2601 W. Mt. Pleasant Blvd.	SLAMS	01/02/10	6-Day	803	Middle	Source Oriented	40.158417	-85.415021	Muncie	Yes Exide	No
180890023	East Chicago - Aldis St.	Lake	East Chicago	Water Filtration Plant, 3330 Aldis St.	SLAMS	01/01/97	6-Day	803	Middle	Source Oriented	41.652778	-87.439444	Chicago-Naperville-Joliet, IL	Yes Mittal East	No
180890032	Gary - 4th. Ave	Lake	Gary	Gary SouthShore RailCats, One Stadium Plaza	SLAMS	01/02/10	6-Day	803	Middle	Source Oriented	41.603582	-87.332658	Chicago-Naperville-Joliet, IL	Yes US Steel	No
180890033	East Chicago - E. 135th St.	Lake	East Chicago	Abraham Lincoln Elem. Sch., E. 135 th St.	SLAMS	01/02/10	6-Day	803	Middle	Source Oriented	41.649064	-87.447256	Chicago-Naperville-Joliet, IL	Yes Mittal West	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	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	No
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	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	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	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	SLAMS / NCORE	04/18/99	6-Day	803	Middle	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No	Add
181270023	Portage - Hwy. 12	Porter	Portage	Bethlehem Steel Waste Lagoon, Hwy 12	SLAMS	01/02/10	6-Day	803	Middle	Source Oriented	41.616618	-87.146959	Chicago-Naperville-Joliet, IL	Yes Arcelor Mittal	Relocate
18127____	Burns Harbor	Porter			SLAMS	01/01/11	6-Day	803	Middle	Source Oriented			Chicago-Naperville-Joliet, IL	Yes Arcelor Mittal	Relocation
181630006	Evansville - Post Office	Vanderburgh	Evansville	800 Sycamore St	Special Purpose	03/11/09	6-Day	803	Middle	Pop Exp	37.975278	-87.567778	Evansville, IN-KY	No	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 USEPA. If NO_2 monitoring is ongoing, at least one site should be a "maximum concentration" monitoring site.

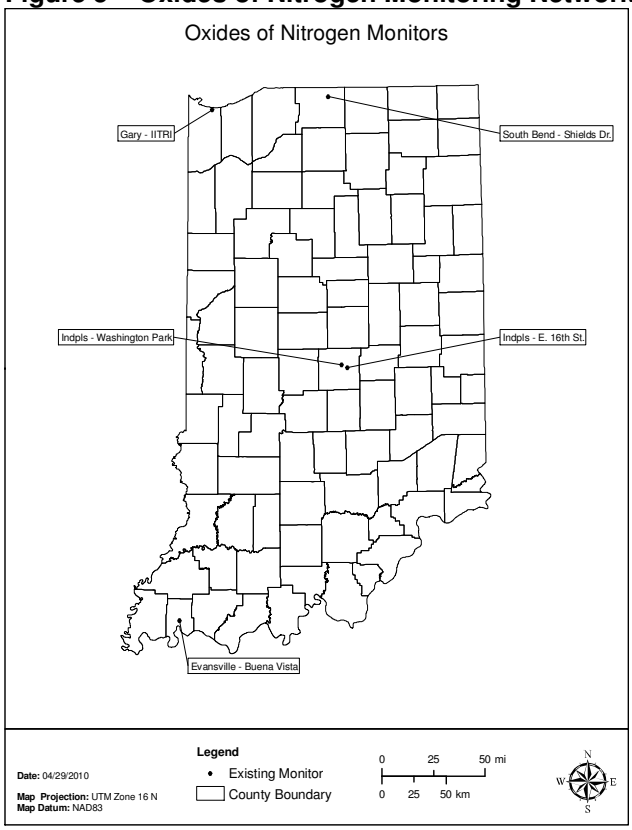
40 CFR Part 58.10 (a)(3) requires NCore monitoring to be operational by January 1, 2011. 40 CFR Part 58 Appendix D 3(b) and 40 CFR Part 58 Appendix D, 4.3 state that NO/NO_y measurements will be included at the NCore multi-pollutant monitoring sites and the PAMS program. These NO/NO_y measurements will produce conservative estimates for NO_2 that can be used to ensure tracking continued compliance with the NO_2 NAAQS. NO/NO_y monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding O_3 photochemistry.

The February 9, 2010 Federal Register amended 40 CFR Parts 50 and 58 establishing a new NO_2 NAAQS for one (1) hour concentrations, and new monitoring requirements to be implemented by January 1, 2013. As these requirements are several years away, IDEM will not address them at this time. Preliminary site survey work will begin later this year.

Monitoring Methodology

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

Figure 5 – Oxides of Nitrogen Monitoring Network



Monitoring Network

Indiana operates four (4) NO_2 monitors and one (1) trace level monitor. The current network, along with any changes planned in 2011, is listed in Table 4.

Network Modifications

There are no changes planned for the NO_2 monitoring network in 2011.

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

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

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
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	01/01/10	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
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/08/09	Continuous	074	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No

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

Ozone (O_3)

Monitoring Requirements

Table D-2 in 40CFR Part 58 Appendix D details the number of O_3 sites required in each MSA. The number of sites is based on the population of an MSA and if the design value exceeds 85% of the standard (0.064 ppm) for that area. Table 5 lists the requirements stated in Part 58. Table 6 lists the requirements as they relate to Indiana. There are five (5) MSAs which cross state lines. Except for Cincinnati, Indiana meets the requirement for the full MSA, in the multi-agency MSAs. An agreement will be drafted between the Hamilton County Department of Environmental Services (Cincinnati, OH) and IDEM to specify that Hamilton County will fulfill the O3 monitoring requirements in this MSA. In the absence of an agreement, Indiana would be required to operate two (2) sites in the Cincinnati MSA and twenty-one (21) monitoring sites overall.

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 from the highest site in the area. If this value is greater than 0.075ppm then the area is considered to be in nonattainment of the NAAQS. If the air quality improves and the design value is 0.075ppm or less, then the area may be reclassified as a maintenance area. The design values for all sites for the most recent sampling period (2007 – 2009) along with the current O_3 designation status (based on previous NAAQS of 0.08 ppm) are illustrated in Figure 6.

Monitoring Methodology

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

Monitoring Network

Currently there are forty-two (42) monitoring sites in Indiana's O_3 monitoring network as displayed in Figure 7. The O_3 monitoring network with any changes proposed for 2011 is in Table 7.

Network Modifications

The Granger site (181411007) was to be relocated prior to the 2010 monitoring season because of siting criteria issues. This task was not accomplished. The site search will be conducted during the remainder of 2010 with the anticipated start at the new site of April 1, 2011.

Table 5 – SLAMS Minimum O_3 Monitoring Requirement

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

Table 6 – SLAMS O_3 Sites Required for Indiana

MSA	MSA Population (2009 est.)	Design Value (ppm) (2007-2009)	# of Sites Required per CFR	Current No. of Sites	2011 No. of Sites
Anderson	131,417	0.069	1	1	1
Bloomington	185,598	0.074	1	1	1
Chicago-Naperville-Joliet, IL-IN-WI	9,580,567	0.074 [1]	3	24 [1]	
Chicago-Naperville-Joliet, IL-IN-WI	9,580,567	0.073 [2]	3	5 [2]	5
Cincinnati-Middletown, OH-KY-IN	2,171,896	.082 [1]	2	10 [1]	
Cincinnati-Middletown, OH-KY-IN	2,171,896	No Data [2]	2	0 [2]	0
Columbus	76,063	No Data	0	0	0
Elkhart-Goshen	200,502	0.07	1	1	1
Evansville, IN-KY	351,911	0.076 [1]	2	7 [1]	
Evansville, IN-KY	351,911	0.076 [2]	2	6 [2]	6
Fort Wayne	414,315	0.071	2	2	2
Indianapolis-Carmel	1,743,658	0.077	2	11	11
Kokomo	98,787	No Data	0	0	0
Lafayette	196,329	0.068	1	1	1
Louisville-Jefferson County, KY-IN	1,258,577	0.077 [1]	2	7 [1]	
Louisville-Jefferson County, KY-IN	1,258,577	0.077 [2]	2	2 [2]	2
Michigan City-LaPorte	111,063	0.068	1	2	2
Muncie	115,192	0.069	1	1	1
South Bend-Mishawaka, IN-MI	317,538	0.075 [1]	1	4 [1]	
South Bend-Mishawaka, IN-MI	317,538	0.071 [2]	1	3 [2]	3
Terre Haute	169,825	0.066	1	2	2
Non MSA					
Clark, IL		0.066		1	1
Huntington		0.066		1	1
Jackson		0.07		1	1
Perry		0.072		1	1
	DV ≥ 85% of NAAQS				
	[1] Information for full MSA				
	[2] Information for Indiana's portion of MSA				
# of sites needed if Indiana meets all multi-state MSA requirements			21		
		Sites in Indiana Network		42	42

Figure 6 – O3 Design Values (2007 – 2009)

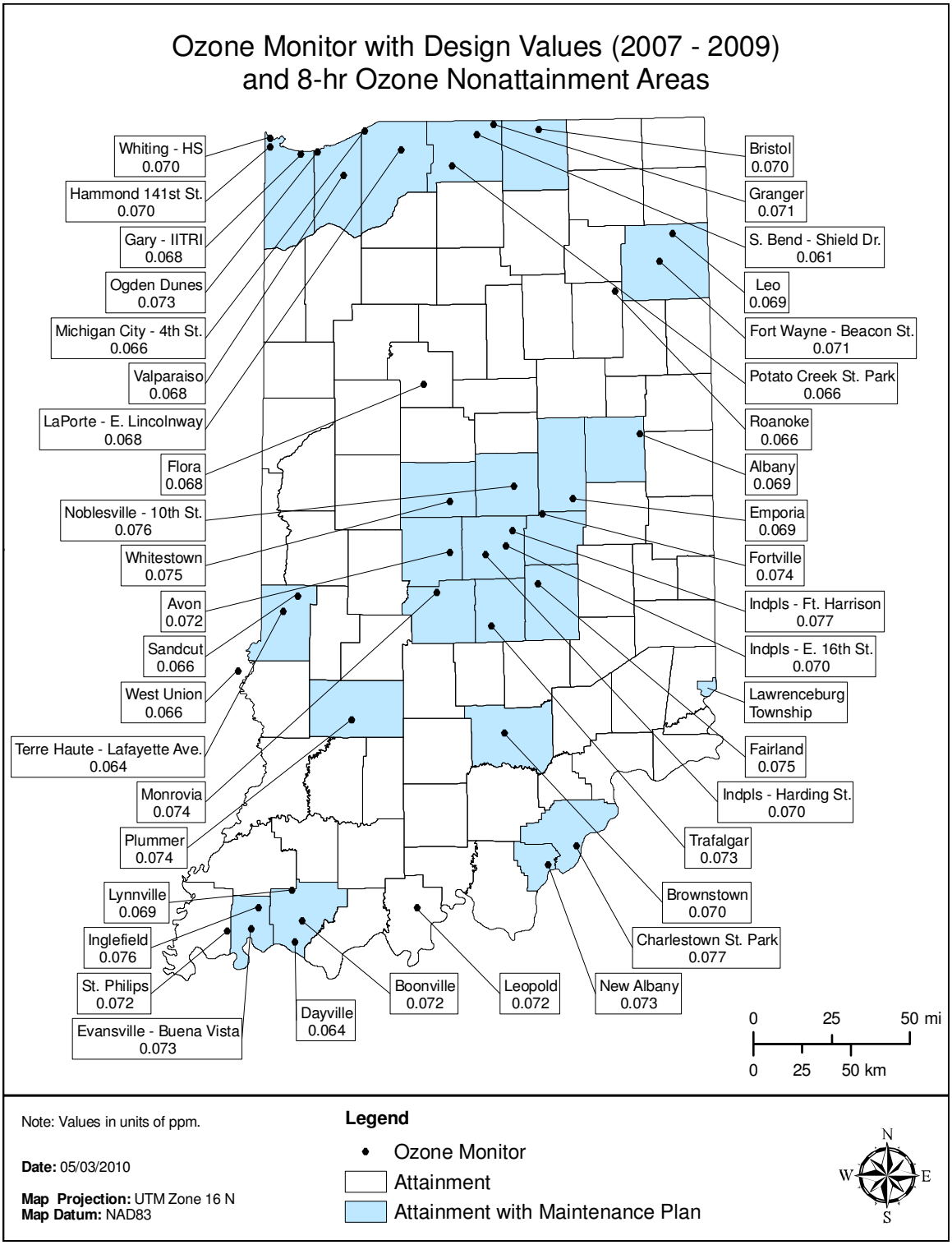


Figure 7 – O3 Monitoring Network

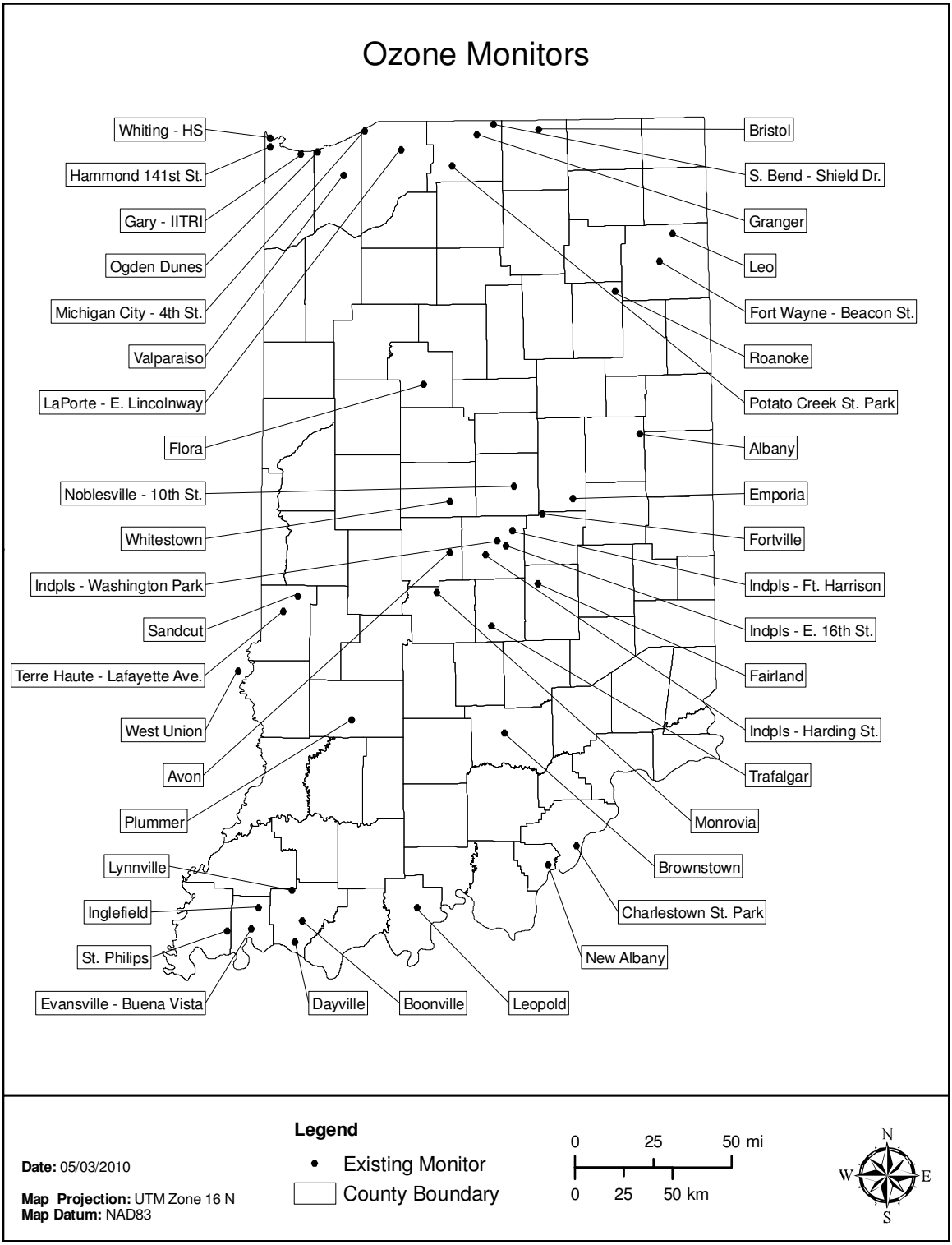


Table 7 – Ozone Monitoring Network

Parameter Code: 44201 **O_3 - Ozone**

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
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.	SLAMS	07/01/79	Continuous	047	Neigh	Pop Exp	41.094722	-85.101944	Ft. Wayne	No
180110001	Whitestown	Boone		Perry - Worth Elem Sch., 3900 E. 300 S, Lebanon	SLAMS	04/01/01	Continuous	047	Urban	Highest Conc	39.997484	-86.395172	Indianapolis-Carmel	No
180150002	Flora	Carroll		Flora Airport, 481 S. 150 W., Flora	SLAMS	04/01/01	Continuous	047	Urban	Pop Exp	40.540556	-86.553056	Lafayette	No
180190008	Charlestown St. Park	Clark		Charlestown State Park, 12500 Hwy 62, Charlestown	SLAMS	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.	SLAMS	04/01/01	Continuous	047	Urban	Pop Exp	40.300000	-85.245556	Muncie	No
180390007	Bristol	Elkhart	Bristol	Bristol Elem Sch., 705 Indiana Ave.	SLAMS	04/01/02	Continuous	047	Urban	Pop Exp	41.718050	-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	Highest Conc	38.308056	-85.834167	Louisville/Jefferson Co.	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 - 10th St.	Hamilton	Noblesville	White River Christian Church 1685 N. 10th St.	SLAMS	04/19/07	Continuous	047	Urban	Highest Conc	40.065194	-86.008061	Indianapolis-Carmel	Relocate
180570006	Noblesville - 191st St.	Hamilton	Noblesville	Our Lady of Grace Catholic Church, 9900 E. 191st St.	SLAMS	2010	Continuous	047	Urban	Highest Conc	40.068297	-85.992451	Indianapolis-Carmel	Relocation
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
180690002	Roanoke	Huntington	Roanoke	Roanoke Elem. Sch., 423 W. Vine St.	SLAMS	04/14/00	Continuous	047	Urban	Upwind Bkgrd	40.960556	-85.380000	Non-MSA County	No
180710001	Brownstown	Jackson		225 W & 300 N, Brownstown	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
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	Highest Conc	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

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180950010	Emporia	Madison		East Elem. Sch., 893 E. US 36, Pendleton	SLAMS	04/05/93	Continuous	047	Urban	Pop Exp	40.002500	-85.656944	Anderson	No
180970050	Indpls - Ft Harrison	Marion	Indianapolis	5753 Glenn Rd	SLAMS	12/01/79	Continuous	047	Urban	Highest Conc	39.858961	-86.021341	Indianapolis-Carmel	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
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/02/90	Continuous	047	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	04/01/09	Continuous	047	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
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
181230009	Leopold	Perry		Perry Central HS, 19856 Old St Rd 37, Leopold	SLAMS	04/01/04	Continuous	047	Urban	Highest Conc	38.113101	-86.603611	Non-MSA County	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	11/01/83	Continuous	047	Urban	Highest Conc	41.617500	-87.199167	Chicago-Naperville-Joliet, IL	No
181270026	Valparaiso	Porter	Valparaiso	Valpo Water Department, 1000 Wesley St.	SLAMS	04/01/98	Continuous	047	Urban	Pop Exp	41.510278	-87.038611	Chicago-Naperville-Joliet, IL	No
181290003	St Philips	Posey		2027 South St. Phillips 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	Upwind Bkgrd	41.551667	-86.370556	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/06/06	Continuous	047	Neigh	Pop Exp	41.696692	-86.214683	South Bend-Mishawaka	No
181411007	Granger	St Joseph	Granger	Harris Twshp Fire Station, 12481 Anderson Rd.	SLAMS	06/01/79	Continuous	047	Urban	Highest Conc	41.742583	-86.110556	South Bend-Mishawaka	Relocate
	Granger	St Joseph	Granger		SLAMS	2011	Continuous	047	Urban	Highest Conc			South Bend-Mishawaka	Relocation
181450001	Fairland	Shelby		Triton Central MS, 4740 W. 600N , Fairland	SLAMS	04/01/00	Continuous	047	Urban	General Bkgrd	39.611293	-85.873582	Indianapolis-Carmel	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/08/09	Continuous	047	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
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	SLAMS	04/01/01	Continuous	047	Urban	Pop Exp	39.560556	-87.313056	Terre Haute	No
181730008	Boonville	Warrick	Boonville	Boonville HS, 300 N. 1st St.	SLAMS	04/16/91	Continuous	047	Urban	Highest Conc	38.051944	-87.278333	Evansville, IN-KY	No
181730009	Lynnville	Warrick		Tecumseh HS, 5244 State Rd 68, Lynnville	SLAMS	05/02/91	Continuous	047	Urban	Highest Conc	38.194444	-87.341389	Evansville, IN-KY	No
181730011	Dayville	Warrick		3488 Eble Rd., Newburgh	SLAMS	04/01/07	Continuous	047	Urban	Highest Conc	37.954450	-87.321933	Evansville, IN-KY	No
170230001	West Union	Clark, IL		416 S. Hwy 1, West Union, IL	Special Purpose	04/01/01	Continuous	047	Urban	General Bkgrd	39.210883	-87.668416	Non-MSA County	No

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

Particulate Matter (PM_{10})

Monitoring Requirements

The requirements for the design of the PM_{10} monitoring network are listed in 40 CFR Part 58 Appendix D 4.6. Indiana must operate the minimum number of sites as defined by the MSA population and the past design value of the area. Table 8 lists the sites required per MSA along with the design value in the proper category for each MSA. The current and proposed networks are also listed. There are five (5) MSAs which cross state lines. Indiana meets the requirement for the number of sites for the full MSA, in the multi-agency MSAs, except for Cincinnati and Louisville. IDEM will draft agreements with between HCDOES for Cincinnati and with APCD for Louisville to specify the sites which will operate in each district to fulfill the PM_{10} monitoring requirements in these MSAs. In the absence of an agreement, Indiana would be required to operate two (2) to four (4) sites in each MSA.

Collocated samplers are required at fifteen percent (15%) of the sites in the network to determine monitoring precision. IDEM is required to operate two (2) collocated samplers.

Monitoring Methodology

Intermittent PM_{10} samples are collected on a pre-weighed 46.2 mm Teflon filter. Air is drawn through an inlet designed to pass only particles smaller than 10 microns in diameter and across the filter for 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 as displayed in Figure 8. Concentrations at all sites except for two source-oriented sites in Northwest Indiana, Gary – IITRI (180890022) and Portage – Hwy 12 (181270023), are well under 50% of the daily NAAQS of 150ug/m^3. Table 9 details the current PM_{10} network and the modifications planned for 2011.

Network Modifications

As part of the NCore implementation, $PM_{10-2.5}$ was established at Indpls – Washington Park (180970079) in 2010. Collection of this parameter also provides PM_{10} data. No network modifications are planned in 2011.

Table 8 – PM_{10} Site Requirements

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

MSA	Population	MSA Design Value			# of Sites 2010	# of Sites 2011
Chicago-Naperville-Joliet, IL-IN-WI	9,580,567			115 [4,6] / 93 [5,6]	16	
Chicago-Naperville-Joliet, IL-IN-WI	9,580,567			115 [4,7] / 59 [5,7]	7	7
Cincinnati-Middletown, OH-KY-IN	2,171,896			51 [6]	5	
Cincinnati-Middletown, OH-KY-IN	2,171,896			No Data [7]	0	0
Indianapolis-Carmel	1,743,658			56	4	4
Louisville-Jefferson County, KY-IN	1,258,577			57 [6]	3	
Louisville-Jefferson County, KY-IN	1,258,577			51 [7]	1	1

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

MSA	Population	MSA Design Value			# of Sites 2010	# of Sites 2011
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 2010	# of Sites 2011
Evansville, IN-KY	351,109			44 [6]	1	
Evansville, IN-KY	351,109			44 [7]	1	1
Fort Wayne	414,315			No Data	0	0
South Bend-Mishawaka, IN-MI	317,538			No Data	0	0
South Bend-Mishawaka, IN-MI	317,538			No Data	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 2010	# of Sites 2011
Anderson	131,417			No Data	0	0
Bloomington	185,598			No Data	0	0
Elkhart-Goshen	200,502			No Data	0	0
Kokomo	98,787			No Data	0	0
Lafayette	196,329			No Data	0	0
Michigan City-LaPorte	111,063			No Data	0	0
Muncie	115,192			No Data	0	0
Terre Haute	169,825			46	1	1

Non MSA		Design Value			# of Sites 2010	# of Sites 2011
Jasper	53,678			47	1	1

[1] Exceeds NAAQS by 20% (180ug/m3).
[2] Exceeds 80% of NAAQS (120 ug/m3).
[3] <80% of NAAQS (120 ug/m3).
[4] Design value from source oriented site (not indicative of entire MSA).
[5] Design value from population oriented sites.
[6] Information for full MSA
[7] Information for Indiana's portion of MSA

Figure 8 – PM10 Monitoring Network

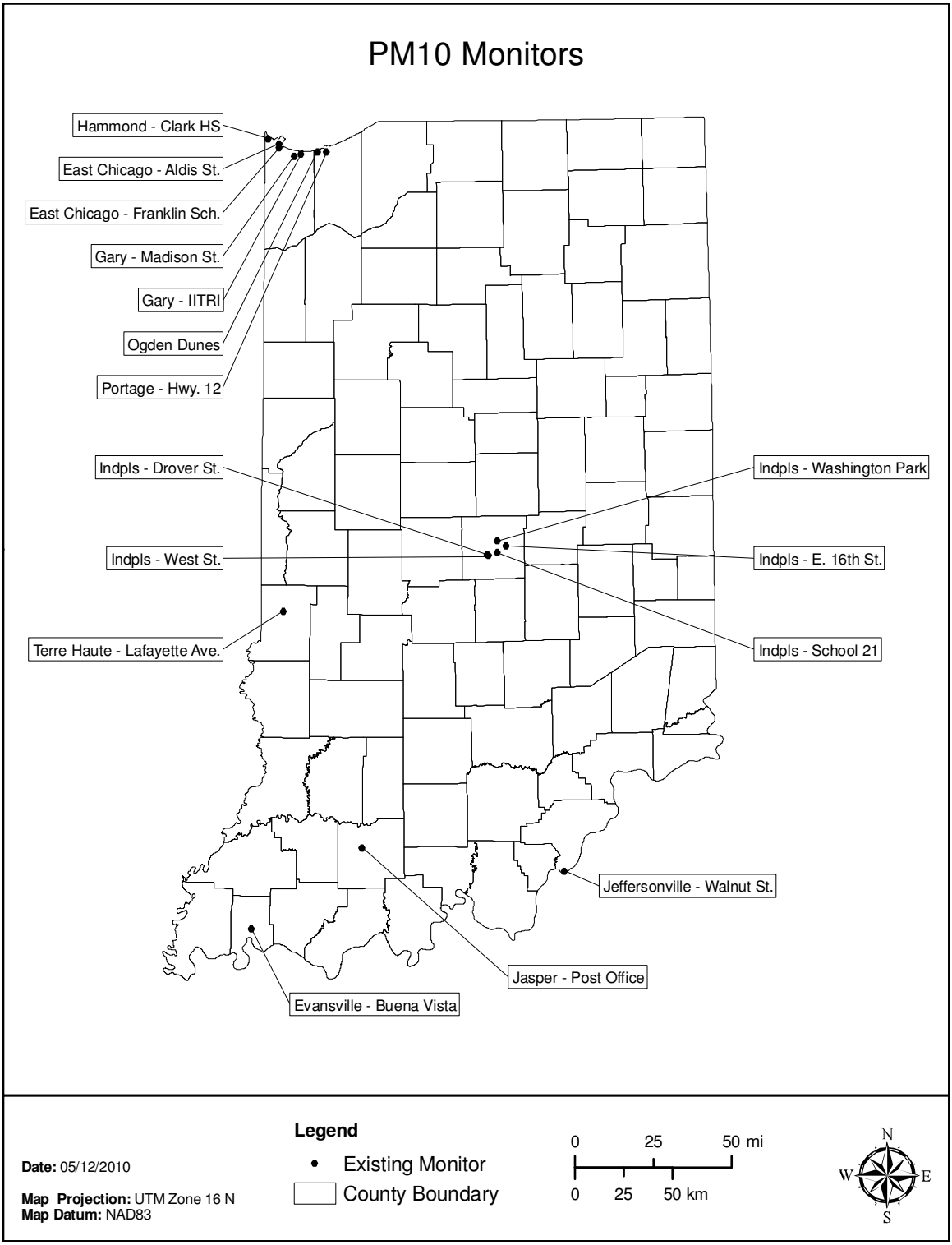


Table 9 – PM_{10} Monitoring Network

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

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180190006	Jeffersonville - Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	SLAMS	06/26/03	6-Day	127	Neigh	Pop Exp	38.277675	-85.740153	Louisville/Jefferson 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
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	127	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	Hammond - Clark HS	Lake	Hammond	Clark HS., 1921 Davis St.	SLAMS	10/01/87	6-Day	127	Middle	Pop Exp	41.678333	-87.508333	Chicago-Naperville-Joliet, IL	No
180970043	Indpls - West St.	Marion	Indianapolis	1735 S. West St.	SLAMS	10/29/86	6-Day	127	Middle	Source Oriented	39.744957	-86.166496	Indianapolis-Carmel	No
180970071	Indpls - Drover St.	Marion	Indianapolis	National Printing Plate, 1415 Drover St.	SLAMS	03/03/87	6-Day	127	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	127	Middle	Quality Assurance	39.747931	-86.175812	Indianapolis-Carmel	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
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	NCORE	01/01/11	6-Day	127	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	Add
180970084	Indpls - School 21	Marion	Indianapolis	IPS Sch 21, 2815 English Ave.	SLAMS	02/16/09	6-Day	127	Middle	Source Oriented	39.759083	-86.115556	Indianapolis-Carmel	No
181270023	Portage - Hwy 12	Porter	Portage	Bethlehem Steel Waste Lagoon, Hwy 12	SLAMS	10/01/95	Continuous	079	Neigh	Highest Conc	41.616618	-87.146959	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
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/10/09	6-Day	127	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	07/01/88	6-Day	127	Neigh	Pop Exp	39.486111	-87.401389	Terre Haute	No

PM10 MONITORING METHODS: 079 - R & P TEOM 1400, 1400 A
127 - R&P 2025A Sequential

Fine Particulate Matter ($PM_{2.5}$)

Monitoring Requirements

40CFR Part 58, Appendix D 4.7 details the number of $PM_{2.5}$ sites required in each MSA. The number of sites is based on the population of an MSA and if the design value for that area is greater or less than 85% of either NAAQS. Table 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. Indiana meets the minimum number of sites for each MSA within Indiana's boundaries. There are five (5) MSAs which cross state lines. Except for Cincinnati, Indiana meets the requirement for the number of sites for the full MSA, in the multi-agency MSAs. An agreement will be drafted between the Hamilton County Department of Environmental Services (DOES) (Cincinnati, OH) and IDEM to specify that DOES will fulfill the PM2.5 monitoring requirements in this MSA. In the absence of an agreement, Indiana would be required to operate three (3) sites in the Cincinnati MSA, and seventeen (17) monitoring sites overall.

In addition, 40 CFR, Appendix D, 4.7.2 states that "State, or where appropriate, local agencies must operate continuous fine particulate analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 (Table 11) of this appendix. At least one required FRM/FEM monitor in each MSA must be collocated." As these requirements are applied to Indiana, eleven (11) would be required. Indiana meets this requirement in all MSAs except Cincinnati, Louisville, and Elkhart. Indiana will address the requirement in Elkhart, and enter into agreements with DOES regarding the Cincinnati MSA and with the Louisville Metro Air Pollution Control District (APCD) regarding the Louisville MSA.

Collocated samplers are required at 15% of the FRM/FEM sites operated by each PQAO. IDEM is the sole PQAO for Indiana and plans to operate thirty-six (36) sites. Indiana is required to have five (5) collocated samplers.

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

Monitoring Methodology

Intermittent $PM_{2.5}$ is sampled by drawing air through a specially designed inlet that excludes particles larger than 2.5 microns in diameter. The remaining particles are collected on a Teflon™ Microfiber filter that is weighed before and after the sampling period to determine the particulate mass. Indiana has converted all samplers to the R&P 2025 Sequential Samplers (FEM) (EQPM-0202-145) to collect intermittent data. The normal sampling schedule varies, as determined by the regulations: four (4) 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 one of the following monitors: Met One BAM 1020 PM2.5 (FEM) (EQPM-0308-170), Thermo Scientific TEOM 1400a with Series 8500C FDMS (EQPM-0609-181), or Thermo Scientific Model 5030 SHARP (EQPM-0609-184). The BAM 1020 collects fine particulate through a sampling inlet onto a filter tape, using a beta ray transmission to measure the amount of particulate concentration collected during a specific sampling period. The TEOM 1400a collects the particulate on a filter attached to an oscillating microbalance. The concentration of the particulate is proportional to the change in the oscillating frequency. The SHARP 5030 collects the particulate onto a filter tape and uses a beta ray transmission to measure the amount of particulate concentration, similar to the BAM 1020 FEM. In addition, it also has an optical assembly that senses the light scattered by the aerosol and is constantly referenced to the measurement of the mass sensor.

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

MSA	MSA Population	Annual Design Value (ug/m^3) (2006-2008)	Daily Design Value (ug/m^3) (2006-2008)	# of Sites Required per CFR	Current No. of Sites	2010 No. of Sites
Anderson	133,358	12.6	29	1	1	1
Bloomington	175,506	No Data	No Data	0	1	1
Chicago-Naperville-Joliet, IL-IN-WI	9,098,316	13.4*	33*	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	12.8	30	1	1	1
Evansville, IN-KY	342,815	13.7	30	1	4	4
Fort Wayne	390,156	12.3	30	1	1	1
Indianapolis-Carmel	1,525,104	14.6	35	3	6	6
Jasper	52,511	13.6	30	1	1	1
Kokomo	101,541	12.4	30	1	1	1
Lafayette	178,541	12.2	29	0	1	1
Louisville-Jefferson County, KY-IN	1,161,975	15.3*	35*	3#	3	3
Michigan City-LaPorte	110,106	11.5	29	0	1	1
Muncie	118,769	12.3	28	0	1	1
South Bend-Mishawaka, IN-MI	316,663	12*	28	0#	2	1
Terre Haute	170,943	13.2	30	1	2	2
Non MSAs						
Knox Co. - State Background Site		12.9	30	1	1	1
Henry Co. -State Transport Site		11.9	28	1	1	1
Spencer Co.		13	27	0	1	1
Kosciusko Co.				0	0	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				12		
Max. # of sites required for Indiana if all multi-state MSA sites are in Indiana				21		
		Sites in Indiana Network			37	37

Monitoring Network

In 2010 the Indiana $PM_{2.5}$ monitoring network consists of thirty-seven (37) monitoring sites. The number of monitoring sites includes the operational sites at the beginning of the year, one (1) new site deployed at Larwill (181830003), plus one (1) site scheduled to begin sampling during the

year, southeast Hamilton County (Fishers area). Permission to locate a site at one of the schools of the Hamilton Southeastern School District was withdrawn and survey work continues. It is anticipated that this site will be established prior to the end of 2010.

The relocation of the Anderson monitoring site from W. 5th St. to Eastside Elementary had been scheduled for 2009. Budget issues at the end of 2009 and procurement concerns in early 2010 caused a further delay in moving the site. This site is planned to be operational by July 1, 2010.

Continuous monitors will be collecting data at sixteen (16) of the site locations in 2011.

Data / Design Value

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. The continuous data are used for AQI calculations and AIRNow mapping. The continuous data will continue to be compared to the intermittent data to determine when it would be applicable to use it for NAAQS comparison purposes.

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) ug/m^3 to determine attainment/nonattainment of the daily standard.

The design values for all sites for the most recent sampling period (2007 - 2009) along with the designation status of areas for $PM_{2.5}$ are on the maps in Figure 9. Currently all counties in Indiana meet the NAAQS for $PM_{2.5}$.

Network Modifications

$PM_{2.5}$ monitoring will be conducted at thirty-seven (37) sites in 2010 and at thirty-six (36) sites in 2011. The $PM_{2.5}$ monitoring network with the changes proposed for 2011 is in Table 12. A map of the 2011 network is in Figure 10.

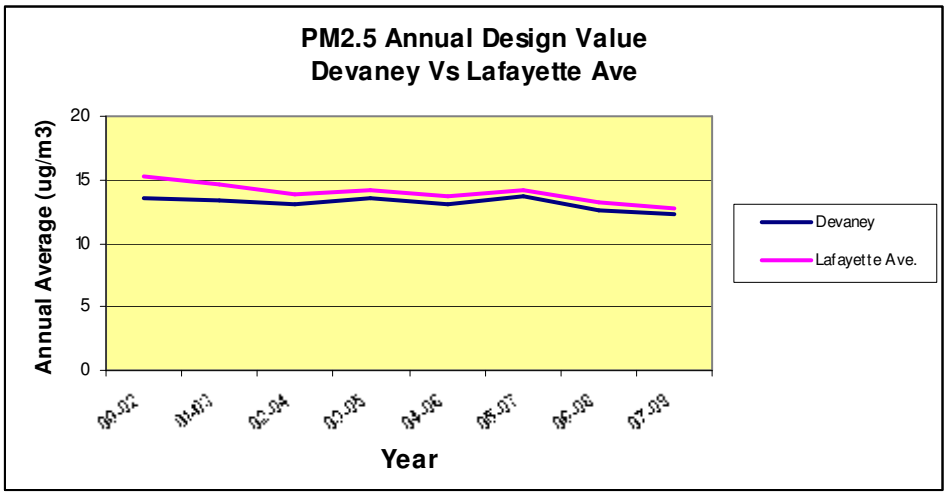
The Terre Haute – Devaney (181670023) site will be discontinued at the end of 2010. A summary of the data from the two (2) Terre Haute sites is in Table 12 and graphs of the design values since 2000-2009 are in Figures 9 and 10. The concentrations at both sites have been trending downward since the sites were established. Terre Haute - Devaney's annual design value has always been lower than Terre Haute – Lafayette Ave. (181670018) and the daily design values have been within one (1) ug/m3 since 2002-2004.

Table 12 – Terre Haute Sites Data Comparison

	Annual Average		98th percentile Value			Design Value			
Year	**Devaney**	**Lafayette Ave.**	**Devaney**	**Lafayette Ave.**	**Year**	**Devaney**	**Lafayette Ave.**	**Devaney**	**Lafayette Ave.**
2000	13.8	15.7	28.7	34.2					
2001	13.4	15.2	30.1	38.4		Annual		Daily	
2002	13.4	14.6	38.1	40.2	**00-02**	13.5	15.2	32	38
2003	13.4	14.1	35.4	35.3	**01-03**	13.4	14.6	35	38
2004	12.1	12.7	30.4	26.9	**02-04**	13.0	13.8	35	34
2005	15.1	15.4	42.5	43.1	**03-05**	13.5	14.1	36	35
2006	12.2	13.0	29.1	31.0	**04-06**	13.1	13.7	34	34
2007	13.7	14.1	32.1	31.0	**05-07**	13.7	14.2	35	35
2008	12	12.4	27.5	26.3	**06-08**	12.6	13.2	30	29
2009	11.4	11.8	22.4	24.9	**07-09**	12.3	12.8	27	27

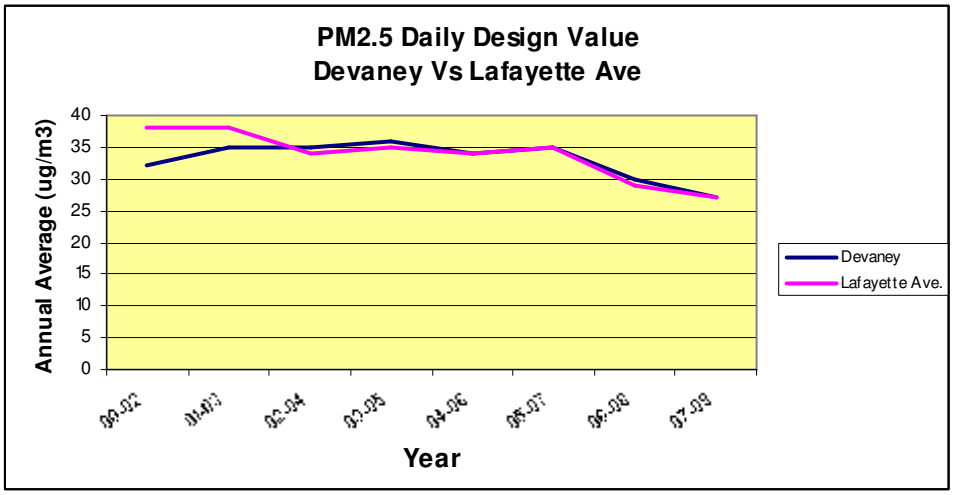
Due to the current daily design value, 32 ug/m3, at the Elkhart – Prairie St. (180390008) site, it is necessary to install a continuous monitor. This will be accomplished by January 1, 2011.

Figure 9 – Terre Haute Annual Design Value Comparison



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. Four (4) sites, listed in Table 13 operated on a daily sampling in 2010. Each year the data are evaluated to determine which sites must collect daily data. The design

Figure 10 – Terre Haute Daily Design Value Comparison



values from the 07-09 period will determine the sites to collect daily samples in 2011. Only Gary Burr St. is required to collect daily samples. Indpls – Washington Park and Indpls – W. 18th St. will continue sampling daily to continue to collect comparison data for the continuous monitors operating at these sites. Jeffersonville – Walnut St. will also collect daily samples to continue to collect more data for the Jeffersonville Special Study.

Table 13 – Daily Sampling Frequency

	Unrounded Design Value			Daily Sampling		
Site	**05-07**	**06-08**	**07-09**	**2009**	**2010**	**2011**
Jeffersonville - Walnut St	39.47	35.33	32.07	X	X	X
Indpls – West St.	39.9	35.3	32.23	X	X	
Indpls – Washington Park	36.5	31.97	30.23	X	X	X
Indpls – W. 18th St.	39.2	34.13	31.57	X	X	X
Gary - Burr St	36.37	32.6	33.73			X
+/-5% of NAAQS = 33.25ug/m^3 to 36.75ug/m^3				X - Required Site X - Other Daily Site		
2009 & 2010 sampling determined by 06-08 design value						
2011 sampling determined by 07-09 design value						

Unanticipated Network Changes

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

Figure 11 – $PM_{2.5}$ Site Design Values

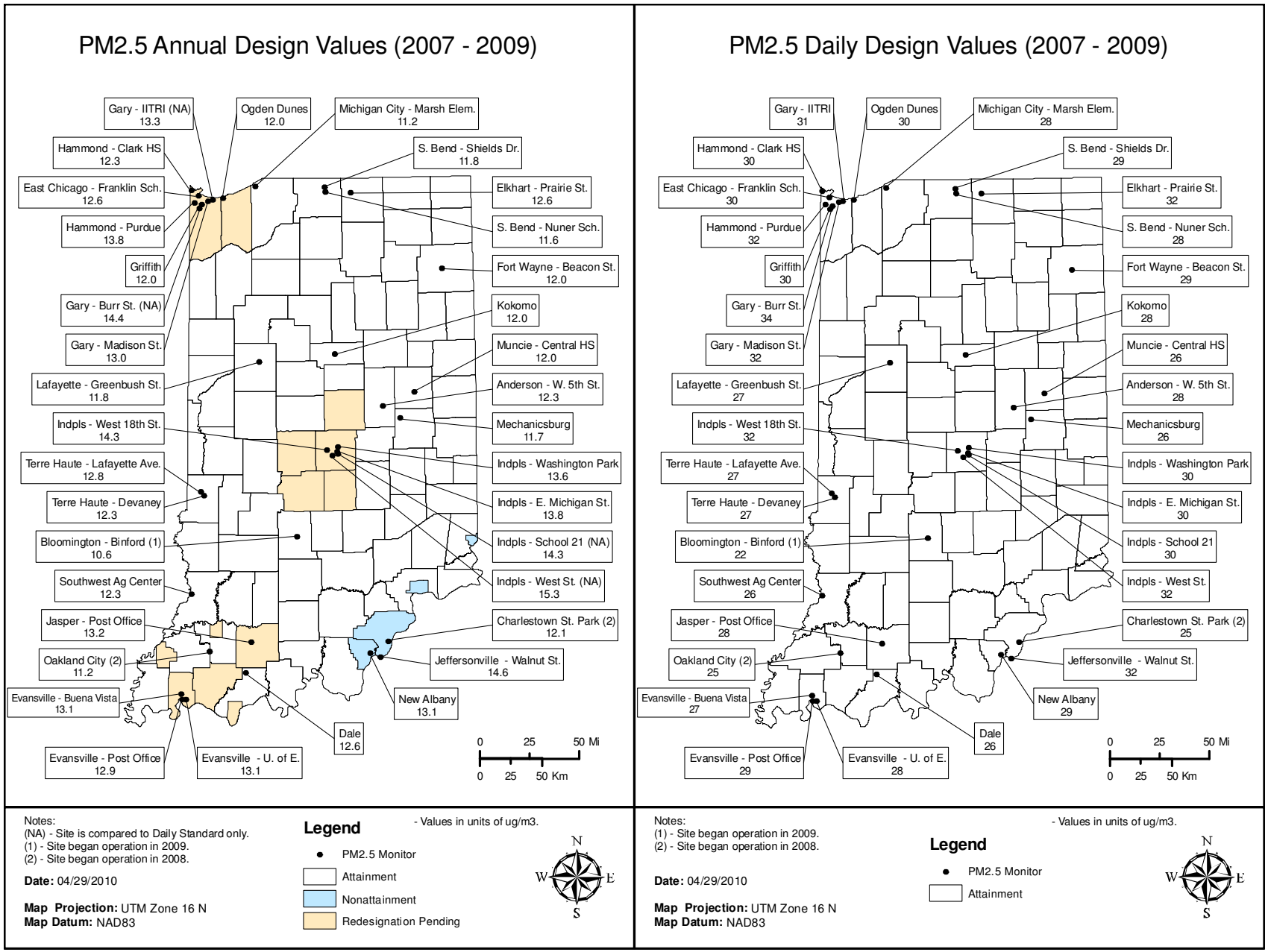


Figure 12 – $PM_{2.5}$ Monitoring Network 2011

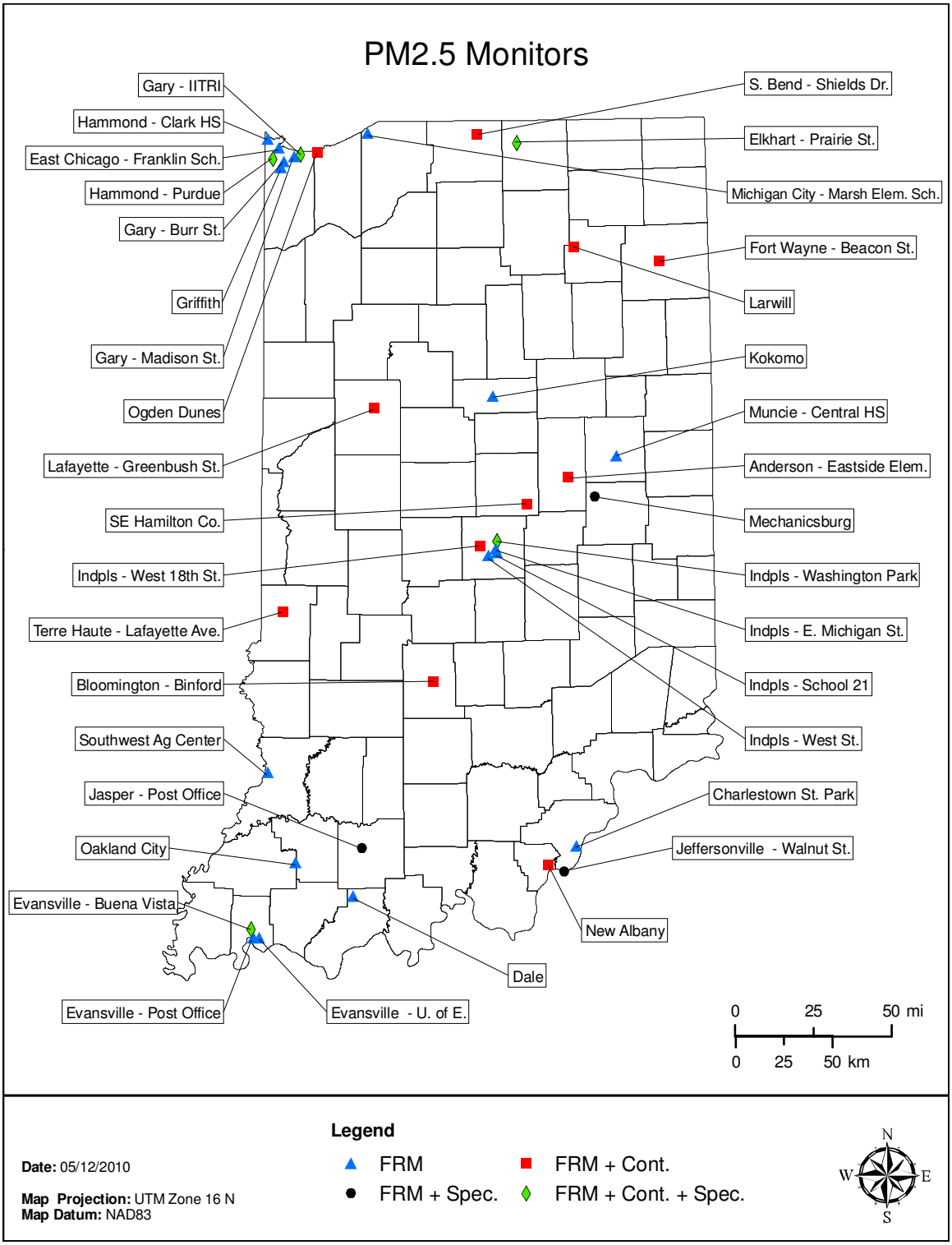


Table 14 – $PM_{2.5}$ Monitoring Network

$PM_{2.5}$ Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management

Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	NAAQS Comparable	MSA	Site Change Proposed?
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	SLAMS	01/01/99	3-Day	145	Neigh	Pop Exp	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	181	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	145	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	145	Urban	Pop Exp	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	145	Neigh	Pop Exp	40.201111	-85.388056	Yes	Muncie	No
180372001	Jasper - Post Office	Dubois	Jasper	Post Office, 206 E. 6th St.	SLAMS	01/01/00	3-Day	145	Neigh	Pop Exp	38.391389	-86.929167	Yes	Non-MSA County	No
180390008	Elkhart - Prairie St.	Elkhart	Elkhart	2745 Prairie St.	SLAMS	01/01/08	3-Day	145	Neigh	Pop Exp	41.656905	-85.968371	Yes	Elkhart-Goshen	No
180390008	Elkhart - Prairie St.	Elkhart	Elkhart	2745 Prairie St.	Special Purpose	2010	Continuous		Neigh	Pop Exp	41.656905	-85.968371	No	Elkhart-Goshen	Add
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	01/18/99	3-Day	145	Neigh	Pop Exp	38.308056	-85.834167	Yes	Louisville/Jefferson Co.	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	QA Collocated	01/18/99	6-Day	145	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	181	Neigh	Pop Exp	38.308056	-87.834167	No	Louisville/Jefferson Co.	No
180510012	Oakland City	Gibson		2205 S. 1350 E., Oakland City	Special Purpose	01/18/08	3-Day	145	Urban	Pop Exp	38.322930	-87.318789	Yes	Evansville, IN-KY	No
18057____		Hamilton			SLAMS	2010	3-Day	145	Urban	Pop Exp			Yes	Indianapolis-Carmel	Add
18057____		Hamilton			Special Purpose	2010	Continuous		Urban	Pop Exp			No	Indianapolis-Carmel	Add
180650003	Mechanicsburg	Henry		Shenandoah HS, 7354 W. Hwy. 36, Pendleton	SLAMS	09/26/00	3-Day	145	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	145	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	145	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	145	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	145	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	181	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	1-Day	145	Middle	Source & Pop Exp	41.573056	-87.405833	Yes**	Chicago-Naperville-Joliet, IL	Op Sched

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?
180890027	Griffith	Lake	Griffith	Eldon Ready Elem Sch, 1345 N. Broad St.	SLAMS	02/18/00	3-Day	145	Neigh	Pop Exp	41.546667	-87.426389	Yes	Chicago-Naperville-Joliet, IL	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	3-Day	145	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	145	Neigh	Quality Assurance	41.598505	-87.342991	No	Chicago-Naperville-Joliet, IL	No
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	SLAMS	02/11/99	3-Day	145	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	184	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	145	Middle	Pop Exp	41.678333	-87.508333	Yes	Chicago-Naperville-Joliet, IL	No
180910011	Michigan City - Marsh Elem. Sch.	La Porte	Michigan City	Marsh Elem. Sch., 400 E. Homer St.	SLAMS	12/17/99	3-Day	145	Neigh	Pop Exp	41.706944	-86.891111	Yes	Michigan City-LaPorte	No
180950009	Anderson - W. 5th St.	Madison	Anderson	Anderson Fire Station, 44 W. 5th St.	SLAMS	03/19/99	3-Day	145	Middle	Pop Exp	40.111944	-85.680000	Yes	Anderson	Relocate
18095____	Anderson - Eastside Elem.	Madison	Anderson	Eastside Elementary Sch., 844 N. Scatterfield Rd.	SLAMS	2010	3-Day	145	Middle	Pop Exp			Yes	Anderson	Relocation
18095____	Anderson - Eastside Elem.	Madison	Anderson	Eastside Elementary Sch., 844 N. Scatterfield Rd.	Special Purpose	2010	Continuous		Middle	Pop Exp			Yes	Anderson	Add
180970043	Indpls - West St.	Marion	Indianapolis	1735 South West Street	SLAMS	01/24/99	3-Day	145	Middle	Pop Exp	39.744957	-86.166496	Yes**	Indianapolis-Carmel	Op Sched
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	SLAMS	03/07/99	1-Day	145	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	181	Neigh	Pop Exp	39.811097	-86.114469	No	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch 90, 3351 W. 18th St.	SLAMS	01/22/99	3-Day	145	Neigh	Pop Exp	39.788903	-86.214628	Yes	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch 90, 3351 W. 18th St.	QA Collocated	02/11/99	6-Day	145	Neigh	Quality Assurance	39.788903	-86.214628	No	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch 90, 3351 W. 18th St.	Special Purpose	11/01/07	Continuous	181	Neigh	Pop Exp	39.788903	-86.214628	No	Indianapolis-Carmel	No
180970083	Indpls - E. Michigan St.	Marion	Indianapolis	Thomas Gregg Sch 15, 2302 E. Michigan St.	SLAMS	01/22/99	3-Day	145	Neigh	Pop Exp	39.774944	-86.122053	Yes	Indianapolis-Carmel	No
180970084	Indpls - School 21	Marion	Indianapolis	2815 English Ave.	SLAMS	02/16/09	3-Day	145	Middle	Pop Exp	39.759083	-86.115556	Yes**	Indianapolis-Carmel	No
181050063	Bloomington - Binford	Monroe	Bloomington	Binford Elementary Sch, 2300 E. 2nd St.	SLAMS	04/01/09	3-Day	145	Neigh	Pop Exp	39.159444	-86.504722	Yes	Bloomington	No
181050063	Bloomington - Binford	Monroe	Bloomington	Binford Elementary Sch, 2300 E. 2nd St.	Special Purpose	04/01/09	Continuous	184	Neigh	Pop Exp	39.159444	-86.504722	No	Bloomington	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/27/99	3-Day	145	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	181	Neigh	Pop Exp	41.617500	-87.199167	No	Chicago-Naperville-Joliet, IL	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	3-Day	145	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	145	Neigh	Quality Assurance	41.696692	-86.214683	No	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	Special Purpose	06/01/06	Continuous	170	Neigh	Pop Exp	41.696692	-86.214683	No	South Bend-Mishawaka	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?
181470009	Dale	Spencer	Dale	David Turnham School, Dunn & Locust	SLAMS	02/01/00	3-Day	145	Urban	Regional Trans	38.167500	-86.983333	Yes	Non-MSA County	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	SLAMS	10/01/02	3-Day	145	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	145	Neigh	Quality Assurance	40.431639	-86.852500	No	Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	Special Purpose	04/01/05	Continuous	170	Neigh	Pop Exp	40.431639	-86.852500	No	Lafayette	No
181630016	Evansville - U of E	Vanderburgh	Evansville	Carson Center, Walnut St.	SLAMS	06/05/99	3-Day	145	Neigh	Pop Exp	37.974444	-87.532222	Yes	Evansville, IN-KY	No
181630020	Evansville - Post Office	Vanderburgh	Evansville	800 Sycamore St	SLAMS	03/11/09	3-Day	145	Neigh	Pop Exp	37.975278	-87.567778	Yes	Evansville, IN-KY	No
181630020	Evansville - Post Office	Vanderburgh	Evansville	800 Sycamore St	QA Collocated	03/11/09	6-Day	145	Neigh	Quality Assurance	37.975278	-87.567778	No	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/10/09	3-Day	145	Neigh	Pop Exp	38.013333	-87.577778	Yes	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/14/09	Continuous	170	Neigh	Pop Exp	38.013333	-87.577778	No	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	03/19/99	3-Day	145	Neigh	Pop Exp	39.486111	-87.401389	Yes	Terre Haute	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	Special Purpose	07/02/03	Continuous	170	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	3-Day	145	Neigh	Pop Exp	39.456111	-87.370556	Yes	Terre Haute	No
181830003	Larwill	Whitley	Larwill	Whitko Middle School, 710 N. State Rd. 5	SLAMS	04/08/10	3-Day	145	Regional	Regional Transport	41.169646	-171.258585	Yes	Ft. Wayne	No
181830003	Larwill	Whitley	Larwill	Whitko Middle School, 710 N. State Rd. 5	Special Purpose	04/08/10	Continuous	170	Regional	Regional Transport	41.169646	-85.629292	No	Ft. Wayne	No

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

MONITORING METHODS: *145 - R & P 2025* *170 - MET ONE BAM - FEM*
184 - Thermo SHARP *181 - FDMS TEOM*

Sulfur Dioxide (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 USEPA. With SLAMS SO_2 monitoring, at least one of the SO_2 monitoring sites must be a maximum concentration site for that specific area. The appropriate spatial scales for SO_2 SLAMS monitoring are the microscale, middle, and possibly neighborhood scales. Data associated with microscale and middle scale monitoring include assessing the effects of control strategies to reduce concentrations, especially for 3 and 24 hour averaging times, and monitoring air pollution episodes. Neighborhood SO_2 monitoring is implemented when there is a need to collect air quality data as part of an ongoing SO_2 stationary source impact investigation. Such locations would include suburban areas adjacent to SO_2 stationary sources or for determining background concentrations verses human population response to SO_2 exposure. SLAMS sites are expected to provide data that are useful in specific compliance actions, maintenance plan agreements and measuring specific stationary sources for SO_2.

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 multi-pollutant monitoring sites. Multi-point NCore monitoring sites provide data for metropolitan area trends analyses, a general control strategy, and progress tracking.

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.

Monitoring Network

Indiana operates eight (8) SO_2 monitors located throughout the state, as displayed in Figure 13. The current network, along with any changes planned in 2011, is listed in Table 15.

Network Modifications

No changes are planned for the Indiana SO_2 monitoring network in 2011.

Figure 13 – SO_2 Monitoring Network

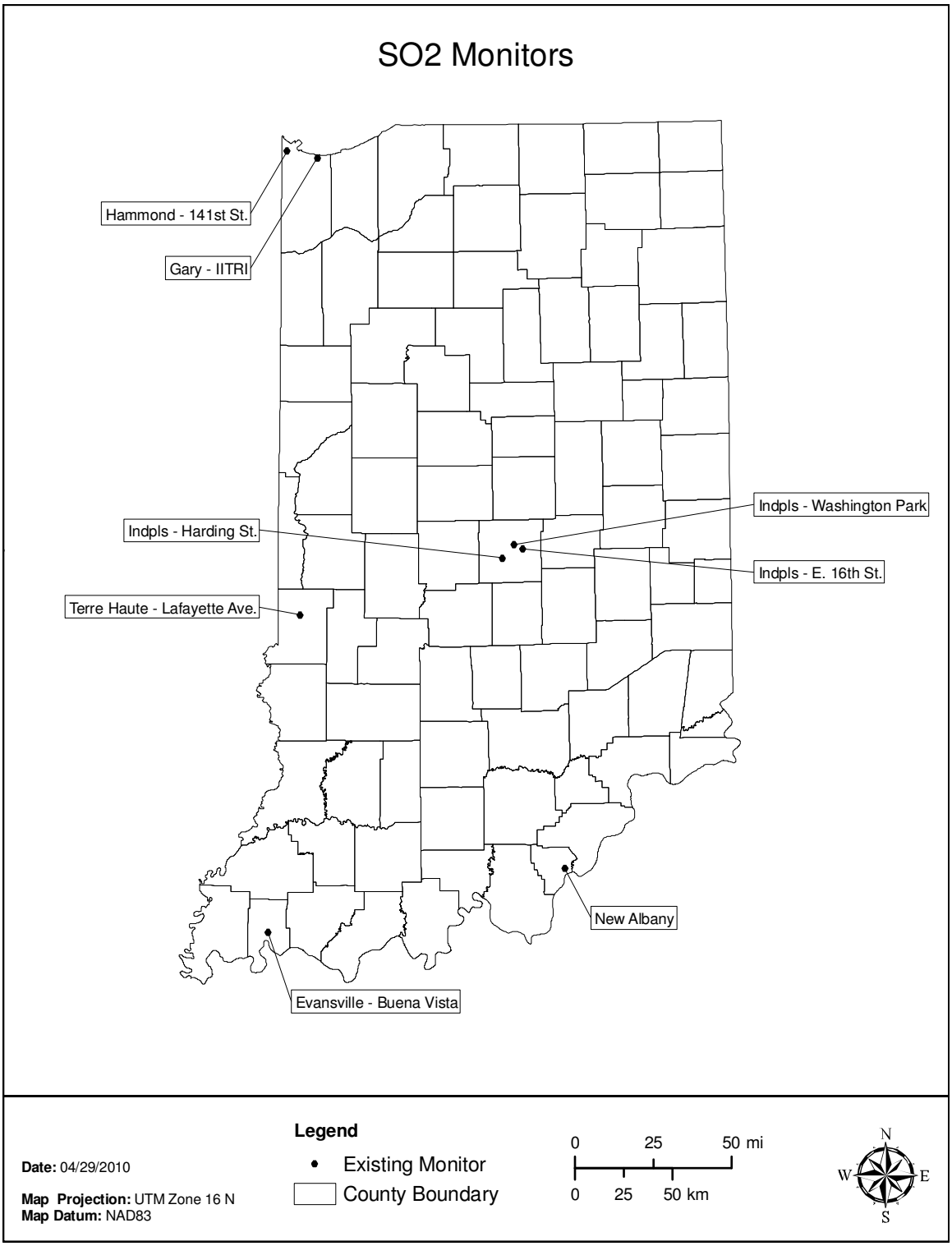


Table 15 – SO_2 Monitoring Network

Parameter Code: 42401 **SO_2 - Sulfur Dioxide**

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	SLAMS	08/01/75	Continuous	060	Neigh	Highest Conc	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	SLAMS	03/04/82	Continuous	060	Neigh	Highest Conc	39.749019	-86.186314	Indianapolis-Carmel	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	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	01/01/10	Continuous	100	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/08/09	Continuous	060	Neigh	Pop Exp	38.013333	-87.577778	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

SO2 MONITORING METHOD: 060 - THERMO ELECTRON 43C, 43i
100 - TELEDYNE INSTR. 100EU

$PM_{2.5}$ Speciation

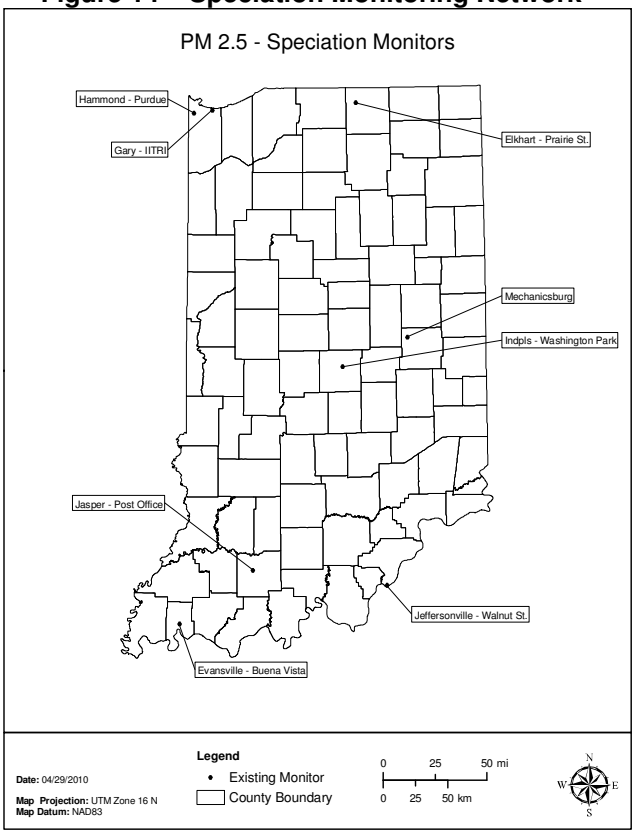
Monitoring Requirements

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 thirty-three (33) 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 14 – Speciation Monitoring Network



The Met One SASS is used to collect Mass-$PM_{2.5}$, trace elements, Cations-$PM_{2.5}$, Nitrate-$PM_{2.5}$, and Sulfate-$PM_{2.5}$ data. The URG-3000N sampler is used to collect organic and elemental carbon data. Samples are collected on a 1/6 day sampling frequency at all sites except Indpls - Washington Park, which samples every third day.

Indiana also operates continuous speciation monitors at three (3) different locations. A Magee Model AE21 Aethalometer, using optical absorption analysis methodology, is used for sampling black carbon at Indpls - Washington Park and Gary - IITRI, and a Magee Model AE22, using optical absorption analysis methodology, is used for sampling black carbon at Evansville - Buena Vista. A Thermo Electron Model 5020 Sulfate Particulate Analyzer, using Catalytic Thermal Reduction and Pulsed Fluorescence analysis, monitors sulfates at Indpls - Washington Park and Evansville - Buena Vista.

Monitoring Network

The Indiana speciation network consists of eight (8) sites across the state. The current network, along with any changes planned for 2011, is listed in Table 16.

Network Modifications

No changes are planned for the speciation network in 2011.

Table 16 – $PM_{2.5}$ Speciation Monitoring Network

PM2.5 Speciation (Sulfate, Nitrate, Carbon, etc.)

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.	Suplmntl Speciation	07/01/08	6-Day	811, 812, 833	Neigh	Pop Exp	38.277675	-85.740153	Louisville/Jefferson Co.	No
180372001	Jasper - Post Office	Dubois	Jasper	Post Office, 206 E. 6th St	Suplmntl Speciation	01/04/05	6-Day	811, 812, 833	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, 833	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, 833	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	04/01/05	Continuous Black Carbon	866	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
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	866	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
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Suplmntl Speciation	07/12/09	6-Day	811, 812, 833	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Special Purpose	07/08/09	Continuous Black Carbon	867	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	No
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Special Purpose	07/08/09	Continuous Sulfate	875	Neigh	Pop Exp	38.013333	-87.577778	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
833 - URG MASS450 QUARTZ WINS / ANALYSIS METHOD: STN TOT
866 - MAGEE AETHALOMETER AE21 / ANALYSIS METHOD: OPTICAL ABSORPTION
867 - MAGEE AETHALOMETER AE22 / ANALYSIS METHOD: OPTICAL ABSORPTION
875 - THERMO ELECTRON 5020 / CATALYTIC THERMAL REDUCT, PULSED FLUORESCENCE

PAMS Ozone Precursors (VOCs)

Monitoring Requirements

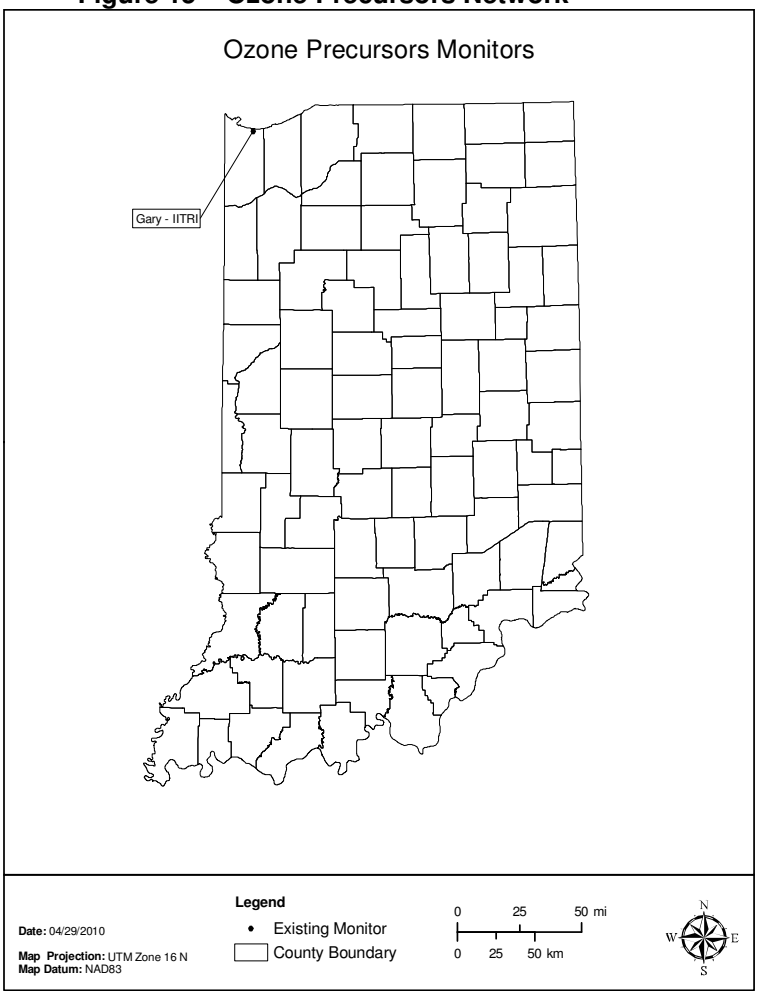
Ozone precursor monitoring is required as part of the PAMS program. The specific requirements are addressed in Table D-6 of 40 CFR Part 58 Appendix D. According to the Modified Network Plan for the Chicago Nonattainment Area, Indiana operates one (1) type 2 PAMS site. A type 2 site requires measurements 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 15 – 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 2011.

Table 17 – Ozone Precursor Monitoring Network

Ozone Precursors

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

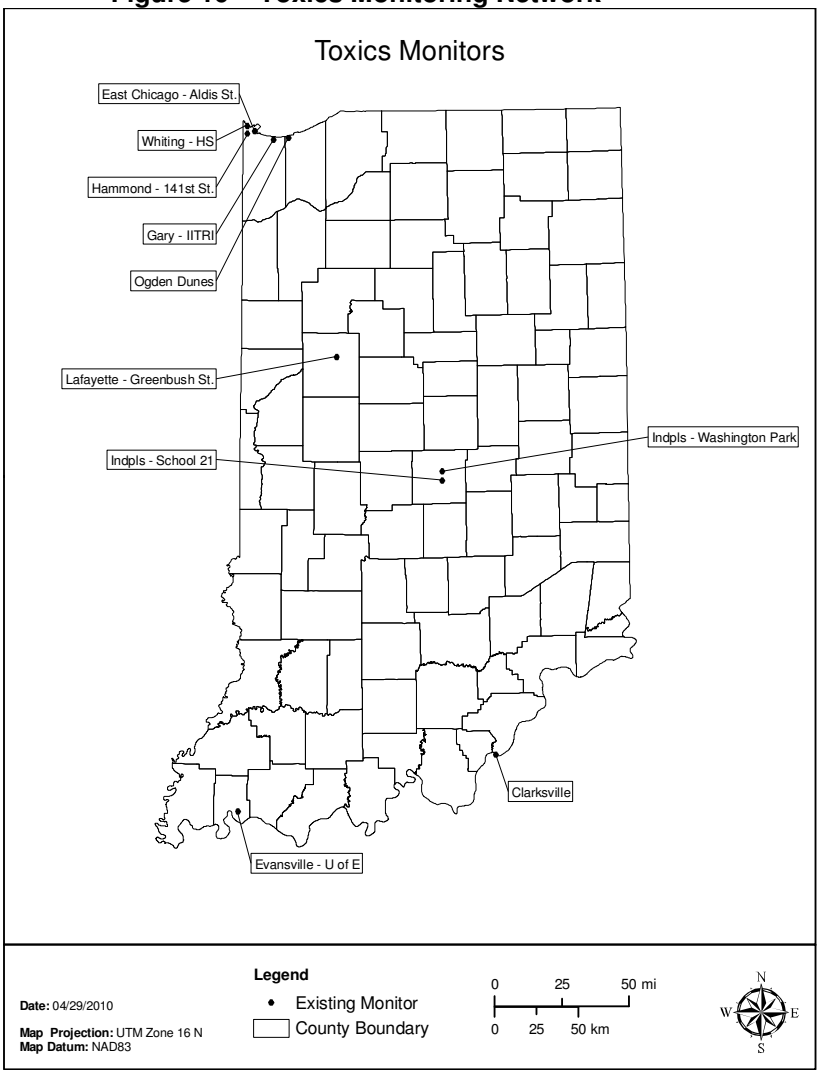
There are no requirements for toxics monitoring listed in 40 CFR Part 58.

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 USEPA'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 using either the Meriter MCS-1-R or the ATEC 2200 Air Toxic Samplers and analyzed using a GC/MS to determine the concentration of the compounds found in the sample obtained. 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 (180970084) site.

Figure 16 – Toxics Monitoring Network



Monitoring Network

In 2010, Indiana will operate ten (10) sites. The Indpls - School 21 site was scheduled to be discontinued. The site was source-oriented on Citizen's Gas and Coke. This facility has closed, but cleanup work continues. Toxics monitoring will continue during the cleanup phase to monitor background benzene levels. The current network, along with any changes planned in 2011, is listed in Table 18.

Network Modifications

No changes are planned for the toxics monitoring network in 2011.

Table 18 – Toxics Monitoring Network

Toxics - VOC

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?
180190009	Falls of the Ohio	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
180890022	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
180890023	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
180890030	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
180892008	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
180970078	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
180970084	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	No
181270024	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
181570008	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
181630016	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

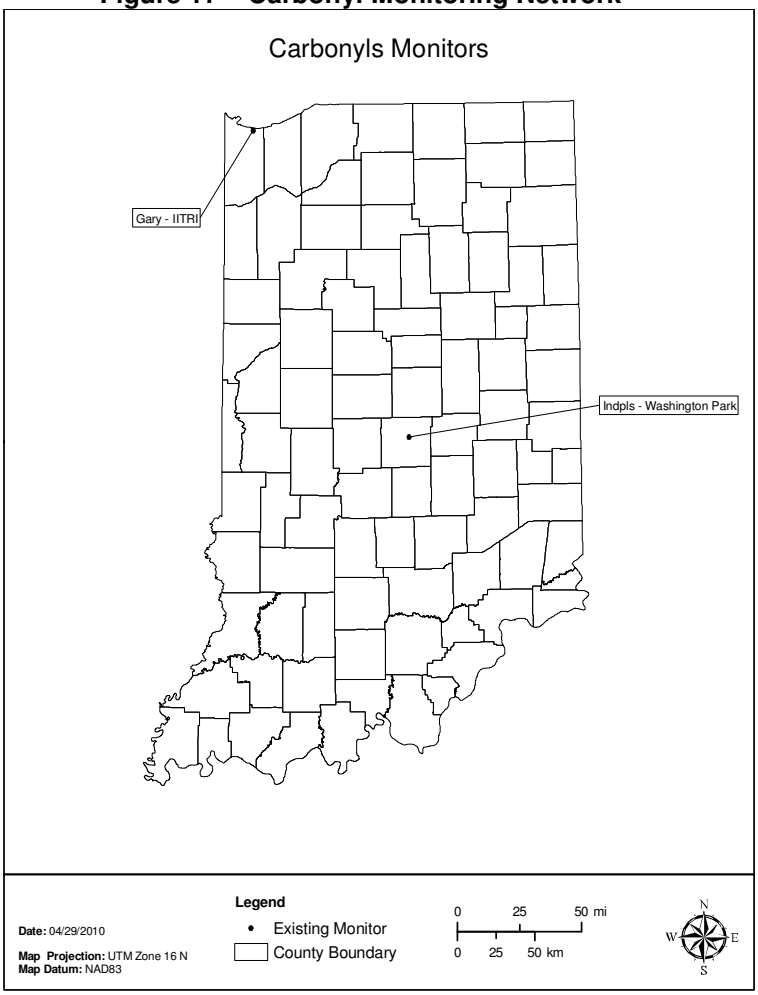
Monitoring Requirements

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 USEPA's Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Compendium of Method. Currently Indiana uses the ATEC 2200 2C for 1/6 day sampling at Indpls - Washington Park (180970078) and the ATEC 8000 Automated Sampler for 1/6 day sampling at the Gary - IITRI (180890022) PAMS site. Samples are collected by drawing a known volume of air through a cartridge filled with silica gel coated with activated DNPH. These samples are analyzed using HPLC with a UV absorption detector.

Figure 17 – Carbonyl Monitoring Network



Monitoring Network

Indiana currently operates two (2) carbonyl monitoring sites. Gary - IITRI collects data for the PAMS program. Indpls - 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 2011.

Table 19 – Carbonyl Monitoring Network

Carbonyls

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	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

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

Metals

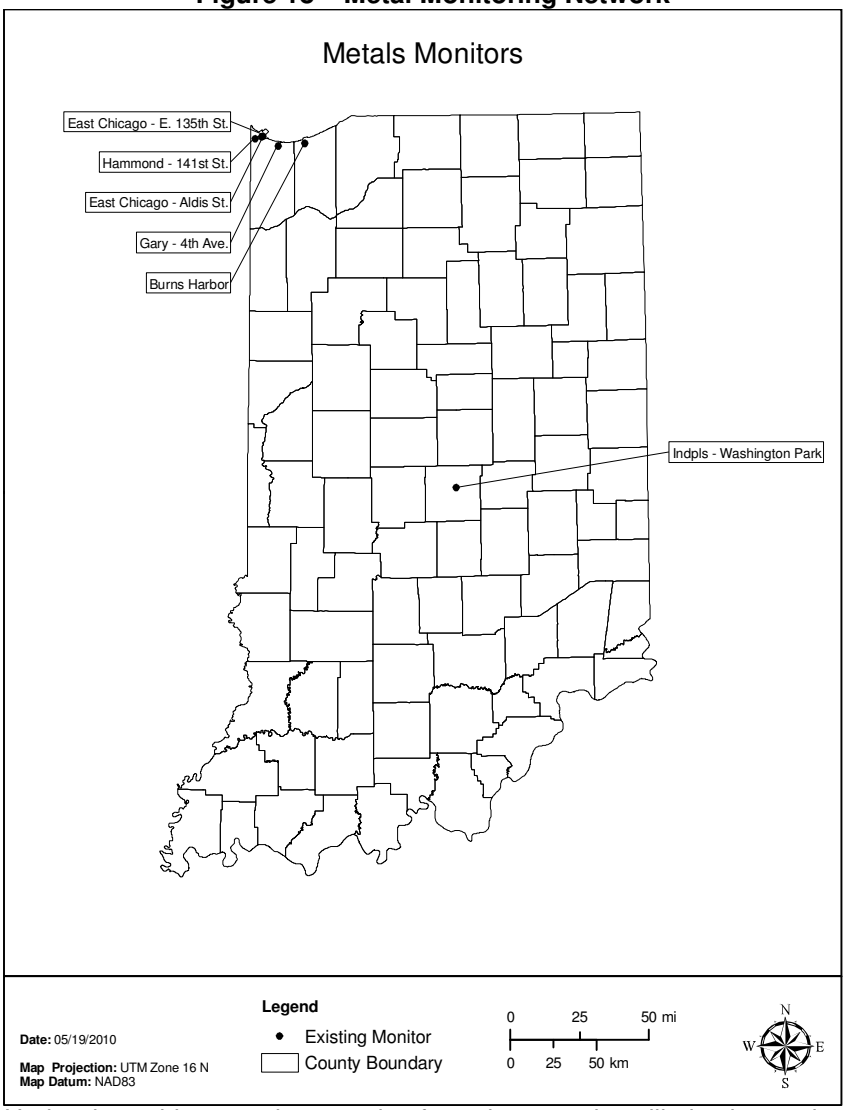
Monitoring Requirements

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 18 – Metal Monitoring Network



Monitoring Network

There are six (6) sites that monitor TSP metals in Indiana. Arsenic, beryllium, cadmium, chromium, lead, manganese, and nickel are monitored at Indpls – Washington Park. Due to concern over possible elevated manganese values reported in the School Air Toxics monitoring program in 2009, it was decided to analyze all the Pb samples collected in Lake and Porter Counties for manganese. These five (5) sites; Gary – 4th Ave., East Chicago – Aldis St., East Chicago – E. 135th St., Hammond – 141st St., and Portage – Highway 12, began reporting the additional metals data on January 2, 2010. When the Portage – Highway 12 site is relocated to Burns Harbor later this year, the samples from the new site will also be analyzed. These sites are detailed in Table 20.

Network Modifications

No changes are planned for the metals monitoring network in 2011.

Table 20 – Metals Monitoring Network

Metals

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?
180890023	East Chicago - Aldis St. *	Lake	East Chicago	Water Filtration Plant, 3330 Aldis St.	Special Purpose	01/02/10	6-Day	107	Middle	Source Oriented	41.652778	-87.439444	Chicago-Naperville-Joliet, IL	No
180890032	Gary - 4th. Ave *	Lake	Gary	Gary SouthShore RailCats, One Stadium Plaza	Special Purpose	01/02/10	6-Day	107	Middle	Source Oriented	41.603582	-87.332658	Chicago-Naperville-Joliet, IL	No
180890033	East Chicago - E. 135th St. *	Lake	East Chicago	Abraham Lincoln Elem. Sch., E. 135 th St.	Special Purpose	01/02/10	6-Day	107	Middle	Source Oriented	41.649064	-87.447256	Chicago-Naperville-Joliet, IL	No
180892008	Hammond - 141st St. *	Lake	Hammond	1300 E. 141st Street	Special Purpose	01/02/10	6-Day	107	Middle	Pop Exp	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
180892008	Hammond - 141st St. *	Lake	Hammond	1300 E. 141st Street	QA Colocated	01/02/10	6-Day	107	Middle	Quality Assurance	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	Special Purpose	04/18/99	6-Day	107	Middle	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181270023	Portage - Hwy. 12 *	Porter	Portage	Bethlehem Steel Waste Lagoon, Hwy 12	Special Purpose	01/02/10	6-Day	107	Middle	Source Oriented	41.616618	-87.146959	Chicago-Naperville-Joliet, IL	Relocate
18127____	Burns Harbor *	Porter			Special Purpose	2010	6-Day	107	Middle	Source Oriented			Chicago-Naperville-Joliet, IL	Relocation

Metals Monitored

Manganese
Nickel
Arsenic
Beryllium
Cadmium
Chromium

* Manganese Only

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

Meteorological Monitoring

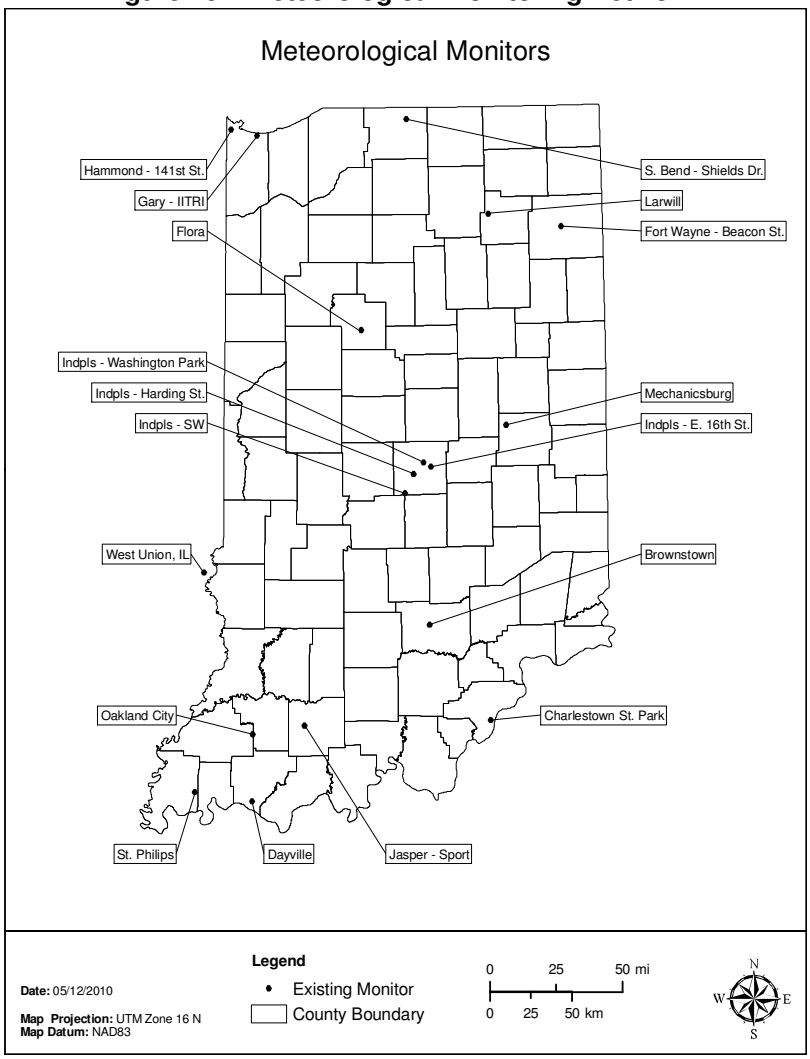
Monitoring Requirements

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 monitoring 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 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 eighteen (18) sites across Indiana in 2010. This includes sites which will be installed during the remainder of 2010. Sites are established to provide coverage in all areas of the state where pollutant monitoring is conducted. Table 21 details the meteorological sites and the parameters collected.

Figure 19 – Meteorological Monitoring Network



Network Modifications

The number of meteorological monitoring sites will stay the same in 2011.

A new meteorological site will be deployed on the southwest side of Indianapolis to have more information available to model dispersion in the event of a bioterrorism event. This site was expected to be operational during 2009; however, due to siting problems the original site could not be used necessitating the search for another location. This site is expected to be operational during 2010.

Table 21 – Meteorological Monitoring Network

Meteorological Parameters by Site

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
180370004	Jasper - Sport	Dubois	Jasper	Jasper Sport Complex - 1401 12th Ave.	38.369436	-86.959031	■								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
180710001	Brownstown	Jackson		225 W & 300 N	38.920798	-86.080523	■	■		■					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
	Indpls - Decatur Twnshp	Marion	Indianapolis				■	■		■					Add
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	39.749019	-86.186314	■	■	■	■					No
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
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		3488 Eble Rd., Newburgh	37.954450	-87.321933	■	■	■	■					No
181830003	Larwill	Whitley	Larwill	Whitko Middle School, 710 N. State Rd. 5	41.169646	-85.629292	■								No

NCore

Monitoring Requirements

40 CFR Part 58 Appendix D 3. requires each state to operate at least one NCore site and lists the minimum parameters which must be measured at that site. Currently the required parameters are; continuous and intermittent $PM_{2.5}$, $PM_{2.5}$ speciation, $PM_{10-2.5}$ particle mass, CO, O_3, SO_2, NO/NO_y, wind speed, wind direction, relative humidity, and ambient temperature.

40 CFR Part 58.10 (3) requires the NCore Monitoring Plan to be submitted to USEPA by July 1, 2009. The station is to be operational by January 1, 2011.

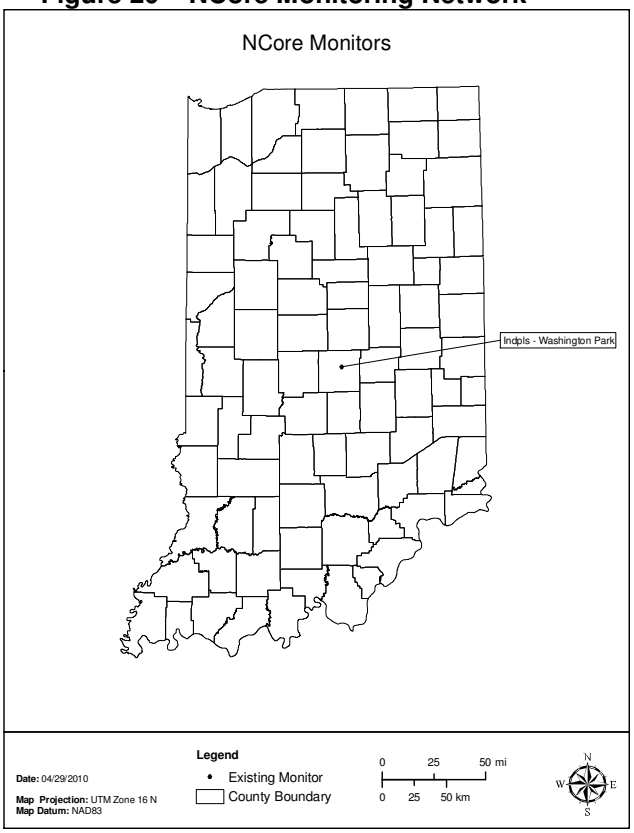
Monitoring Network

Indiana submitted its NCore Monitoring Plan to USEPA on July 1, 2009. Indpls – Washington Park (180970078) was the proposed location. Approval was granted by USEPA on October 30, 2009. All the required parameters will be installed collecting data by July 1, 2010. The details for all the NCore parameters are listed in Table 22. Except for $PM_{10-2.5}$, the parameters are also listed in the individual parameter sections.

With the installation of the second Thermo Electron 2025, $PM_{10-2.5}$ concentrations will be collected. In addition PM_{10} data will also be available and reported. The installation of the Met One BAM-1020 System at the beginning of 2011 will provide hourly information for these two (2) parameters as well.

Other parameters have also been collected at Indpls – Washington Park over the past ten (10) years. These are listed in Table 23, as well as in the individual parameter sections.

Figure 20 – NCore Monitoring Network



Network Modifications

Continuous $PM_{10-2.5}$ and continuous PM_{10} will be added January 1, 2011.

Table 22 – NCore Required Parameters

Parameter	Monitor Type	Start Date	Sampler or Monitor	Method Code	Analysis Method	Sample Frequency
CO – trace level	NCore / Index	1/1/2010	Teledyne API 300EU	93	Automated reference method utilizing trace level non-dispersive infrared analysis.	Continuous
NO	NCore	3/10/2010	Teledyne API 200EU	99	Automated reference method utilizing chemiluminescence analysis.	Continuous
NO_y	NCore	3/10/2010	Teledyne API 200EU	99	Automated reference method utilizing chemiluminescence analysis.	Continuous
O_3	NCore / Index	4/1/2009	Thermo Electron 49i	47	Automated equivalent method utilizing uv photometry analysis.	Continuous
SO_2 – trace level	NCore / Index	1/1/2010	Teledyne API 100EU	100	Automated equivalent method utilizing Trace Level UV Fluorescence Analysis	Continuous
Intermittent $PM_{2.5}$	NCore	3/7/1999	Thermo Electron 2025	145	Manual reference method utilizing gravimetric analysis.	1/1 day
Continuous $PM_{2.5}$	NCore / Index	1/1/2004	Thermo Electron 1400A TEOM with FDMS and 'c' drier [1]	760	Automated equivalent method* utilizing tapered element oscillating microbalance/gravimetric analysis	Continuous
Intermittent $PM_{10-2.5}$	NCore	7/1/2010	Thermo Scientific Partisol-Plus Model 2025 Sequential sampler pair	176	Manual reference method utilizing gravimetric analysis.	1/1 day
Continuous $PM_{10-2.5}$	NCore	Proposed 1/1/2011	Met One Instruments BAM-1020 System	185	Automated equivalent method utilizing beta ray transmission	Continuous
$PM_{2.5}$ Speciation	Trends Speciation / NCore	12/13/2000	Met One SASS & URG 3000N	811 / 812 / 833	Multi-species manual collection method utilizing thermal optical, ion chromatography, gravimetric, and x-ray fluorescence analyses.	1/3 day
WS/WD	NCore	10/11/2009	RM Young 05305-AQ	20	Air quality measurements approved instrumentation for wind speed and wind direction	Continuous
OT/RH	NCore	10/11/2009	RM Young 41372VF	040 / 020	Air quality measurements approved instrumentation for humidity and temperature	Continuous

[1] This method will be changed with the installation of the Met One Instruments BAMS-1020 System for PM10-2.5.

Table 23 – Additional Parameters Collected at NCore Site

Parameter	Designation	Start Date	Sampler or Monitor	Method Code	Analysis Method	Sample Frequency
Intermittent PM_{10}	SLAMS	7/1/2010	Thermo Electron 2025	145	Manual reference method utilizing gravimetric analysis.	1/1 day
Continuous PM_{10}	SLAMS	Proposed 1/1/2011	Met One Instruments BAM-1020 System	185	Automated equivalent method utilizing beta ray transmission	Continuous
NO_z	Special Purpose	3/10/2010	Teledyne API 200EU	99	Automated reference method utilizing chemiluminescence analysis.	Continuous
Continuous Sulfate	Special Purpose	1/1/2006	Thermo Electron 5020 SPA	875	Catalytic thermal reduction fluorescence	Continuous
Continuous Black Carbon	Special Purpose	10/1/2003	Magee AE21	861	Optical Absorption	Continuous
Toxics	Special Purpose	4/18/1999	Meriter MCS-1-R	126 / 150	SS 6l canister with cryogenic GC/MS	1/6 day
Carboynls	Special Purpose	4/18/1999	ATEC 2200 2C	102	Silica DNPH cartridge w/KI O3 scrubber with HPLC (TO-11A)	1/6 day
Lead	SLAMS or NCore	4/18/1999	High Volume Sampler	803	Atomic Absorption with graphite furnace	1/6 day
Metals	Special Purpose	4/18/1999	High Volume Sampler	107	Atomic Absorption with graphite furnace	1/6 day
Precipitation	Other	10/11/2009	RM Young 52202E	14	Air quality measurements approved instrumentation for rainfall	Continuous
BP	Other	10/11/2009	Met One 594	11	Air quality measurements approved instrumentation for barometric pressure	Continuous

Appendix A
Comment Submittal Information

The proposed 2011 Ambient Air Monitoring Network Plan is posted on the IDEM website at http://www.in.gov/idem/5342.htm for review and comment for thirty (30) days, from May 21 through June 20, 2010.

Comments should be emailed to

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