

Indiana
2010
Ambient Air Monitoring
Network Plan



Indiana Department of Environmental Management
Office of Air Quality
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Acronyms

AQS	Air Quality System
BAM	Beta Attenuation Monitor
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
CSA	Combined Statistical Area
CO	Carbon Monoxide
DNPH	2,4-Dinitrophenylhydrazine
DV	Design Value
FDMS	Filter Dynamic Measurement System
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
GC/MS	Gas Chromatograph / Mass Spectrometry
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
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
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 2010 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, NO₂, O₃, particulate matter (PM₁₀ and PM_{2.5}), and SO₂. Other pollutants which do not have an ambient standard established for them are also monitored; toxics (VOCs), metals, carbonyls, PM_{2.5} speciated compounds, and ozone precursors. In addition meteorological data are also collected to support the monitoring and aid in analysis of the data.

Overview of Monitored Parameters

Criteria Pollutants

Carbon Monoxide (CO)

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

Lead (Pb)

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

Nitrogen Dioxide (NO₂)

NO₂ 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 O₃, 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 (PM₁₀)

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 (SO₂)

SO₂ 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, O₃ is the most encompassing. The most prevalent photochemical oxidant and an important contributor to "smog," O₃ 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}, O₃, SO₂, CO, NO, NO₂, NO_y, Pb, and meteorology. The monitoring plan for the NCore site is to accompany the Annual Network Review and be submitted to USEPA by July 1, 2009. The monitors at the site are to be operational by January 1, 2011.

Indiana's NCore Monitoring Plan is detailed in Appendix B. The parameter monitoring information is also included in each of the parameter discussions in this 2010 Indiana Ambient Air Monitoring Network Plan.

National Ambient Air Quality Standards (NAAQS)

NAAQS are identified for the criteria pollutants; CO, Pb, NO₂, O₃, particulate matter (PM₁₀ and PM_{2.5}), and SO₂. Measuring pollutant concentrations in outdoor air and comparing the measured concentrations to corresponding standards determine ambient air quality status of an area, attainment or nonattainment.

The NAAQS are broken down into primary and secondary standards. Primary standards are those established to protect public health. Secondary standards are those established to protect the public

welfare from adverse pollution effects on soils, water, vegetation, manmade materials, animals, weather, visibility, climate, property, and economy.

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

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

The design value for a site, a city, a county, or an MSA is the level of pollutant concentration when the rules of the NAAQS calculations are applied to that specific pollutant. For example, the O₃ 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 O₃, then it is an exceedance of the NAAQS and the area defined by that monitor would be classified as 'nonattainment'. If the design value is below the NAAQS then the area is in 'attainment' of the standard. This number basically tells you how polluted an area would be in relation to a NAAQS.

A listing of the NAAQS can be found at: <http://epa.gov/air/criteria.html>

Local Agencies

Prior to 2009, IDEM had contracts established with local agencies in different cities or counties in Indiana. One task performed by three (3) of these organizations was to collect air quality data in their jurisdiction or assist IDEM in collecting this information. The contracts were either not renewed after they expired on December 31, 2008, or they were cancelled early, on March 31, 2009 (if they were to expire on December 31, 2009).

If a local agency had collected its own data and was listed as the Reporting Agency, it was considered the PQAQO for those sites. A PQAQO is the organization responsible for all activities for a particular monitor. They conduct the calibrations and audits of the instrumentation and collect, validate, and submit the data. In past Network Reviews the individual parameter networks were divided according to the Reporting Agency. If they assisted IDEM in collecting data and IDEM was responsible for the reporting, then IDEM was considered the Reporting Agency or the PQAQO.

Table 1 lists the local agencies which were Reporting Agencies and the parameters for which they were responsible.

Evansville EPA had also assisted in the operation of all other sites located in Dubois, Gibson, Knox, Perry, Posey, Spencer, Vanderburgh, and Warrick Counties. Vigo APCD assisted in operating sites in Vigo County, IN and Clark County, IL. Indianapolis OES also provided assistance with the operation of PM_{2.5} speciation, toxics, and metals monitoring at Indpls – Washington Park.

With discontinuation of the contracts, the individual parameter networks now list IDEM as the sole Reporting Agency, or PQAQO, for all the sites in Indiana.

Table 1 - Local Agencies Listed as Reporting Agencies

Agency	Parameter	AQS #	Sites
Evansville EPA	PM ₁₀	181630006	Civic Center
		181630012	Mill Rd.
Vigo County APCD	PM ₁₀	181670018	Lafayette Ave.
Indianapolis OES	CO	180970072	Indpls – Illinois St.
	Pb	180970063	Indpls – Rockville Rd.
		180970075	Indpls - Quemetco
	O ₃	180110001	Whitestown
		180550001	Plummer
		180570005	Noblesville
		180590003	Fortville
		180630004	Avon
		180710001	Brownstown
		180810002	Trafalgar
		180970050	Indpls – Ft. Harrison
		180970057	Indpls – Harding St.
		181090005	Monrovia
		181450001	Fairland
	PM ₁₀	180970043	Indpls – West St.
		180970066	Indpls – English Ave.
		180970071	Indpls – Drover St
	PM _{2.5}	180970043	Indpls – West St.
		180970066	Indpls – English Ave.
		180970078	Indpls – Washington Park
		180970081	Indpls – W. 18 th St.
		180970083	Indpls – E. Michigan St.
	SO ₂	180970057	Indpls – Harding St.
	Met	180710001	Brownstown
		180970057	Indpls – Harding St.

Network Overview

Indiana has reviewed its current ambient air quality network and developed a proposed network to be implemented during 2010. Current and possible proposed NAAQS, site redundancy, siting problems, site access concerns, and other identified monitoring issues all contribute to any proposed network revisions.

The number of sites listed in the current monitoring network includes changes planned to have occurred during 2008 and were not, but are planned to be completed during 2009. These include the establishment of the Hamilton County site for PM_{2.5}, and the relocations of the Anderson PM_{2.5} site and the Evansville CO site. In addition, the Indpls-School 21 site was scheduled to be discontinued at the end of 2008. Meteorological monitoring was discontinued, but not toxics. The site was source-oriented on Citizen's Gas and Coke facility which has closed. Toxics monitoring will continue through 2009 to monitor background benzene levels.

The 2009 Network Review planned a new meteorological site to be installed at Bloomington with the PM_{2.5}, but siting limitations forced the cancellation.

Three (3) site relocations occurred in 2009 due to the discontinuation of the local agency contracts. The Evansville – Civic Center site (PM_{2.5} and lead) was relocated to the Evansville – Post Office. The Evansville – Mill Rd site (PM_{2.5}, PM_{2.5} speciation, PM₁₀, SO₂, O₃, NO₂, sulfate, and black carbon) were relocated to Evansville – Buena Vista. And the PM₁₀ and PM_{2.5} samplers were relocated from Indpls – English Ave. to Indpls – School 21. These relocations were reviewed and approved by USEPA.

Indiana's air monitoring network for 2010 consists of the sites and monitors listed in Table 2. All site changes which have occurred or plan to take place in 2009 are included along with the planned network modifications for 2010. Figure 1 is an overview of Indiana's current monitoring network and shows the locations where some form of monitoring takes place in 2010.

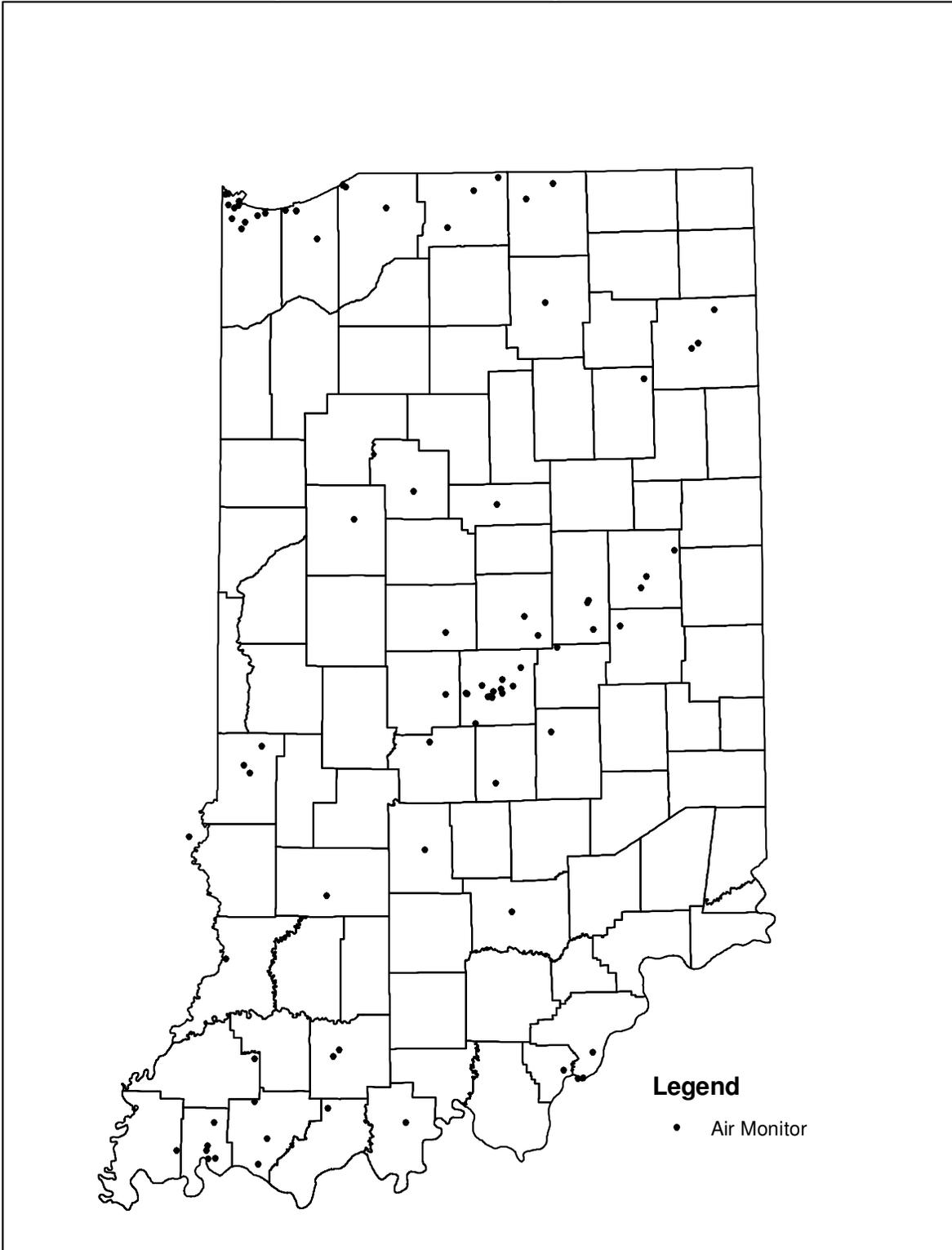
Overall, the number of monitoring locations operated by the State is planned to increase from eighty-two (82) sites to eighty-six (86) sites. The number of monitored parameters or monitoring systems will increase to one hundred eighty-four (184) from one hundred seventy-seven (177).

AQS#	COUNTY	CITY	SITE NAME	SITE ADDRESS	O ₃	SO ₂	CO	NO _x	PM ₁₀	PM _{2.5} (FRM)	PM _{2.5} (Cont)	PM _{2.5} (SPEC)	PM _{2.5} (Spec Cont)	LEAD	TOXICS (VOCs)	O ₃ PREC	CAR-BONYLS	METALS	MET
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														
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										
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														
18127___	Porter		Burns Harbor	Near Arcelor Mittal Burns Harbor										Add					
181290003	Posey		St. Phillips	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														
181410014	St. Joseph	South Bend	S. Bend - Nuner Sch.	Nuner Elem. Sch., 2716 Pleasant St.						Disc									
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 HS, 4774 W. 600N, Fairland	X														
181470009	Spencer	Dale	Dale	David Turnham School, Dunn & Locust						X									
181570008	Tippecanoe	Lafayette	Lafayette - Greenbush St.	Cinergy Substation, 3401 Greenbush St.						X	X				X				
181630006	Vanderburgh	Evansville	Evansville - Civic Center	Civic Center Courts Building						Relocate				Relocate					
181630020	Vanderburgh	Evansville	Evansville - Post Office	800 Sycamore St.						Relocation 3/11/09				Relocation 3/11/09					
181630012	Vanderburgh	Evansville	Evansville - Mill Rd.	Fire Station # 17, 425 W. Mill Rd.	Relocate	Relocate		Relocate	Relocate	Relocate	Relocate	Relocate	Relocate						
181630021	Vanderburgh	Evansville	Evansville - Buena Vista	1110 W. Buena Vista Rd.	Relocation 2009	Relocation 2009		Relocation 2009	Relocation 2009	Relocation 2009	Relocation 2009	Relocation 2009	Relocation 2009						
181630013	Vanderburgh		Inglefield	Scott Elem. School, 14940 Old State Rd.	X														
181630016	Vanderburgh	Evansville	Evansville - U. of E.	University of Evansville - Carson Center						X					X				
181630019	Vanderburgh	Evansville	Evansville - Harwood Sch.	Harwood Middle School, 3013 North 1st Ave.				Relocate											
181630022	Vanderburgh	Evansville	Evansville - Lloyd	10 S. 11th Ave.				Relocation 2009											
181670018	Vigo	Terre Haute	Terre Haute - Lafayette Ave.	961 N. Lafayette Ave.	X	X			X	X	X								
181670023	Vigo	Terre Haute	Terre Haute - Devaney Sch.	Devaney Elementary School, 1011 S. Brown Ave.						X									
181670024	Vigo		Sandcut	7597 Stevenson Rd., Terre Haute	X														
181730008	Warrick	Boonville	Boonville	Boonville HS, 300 N. 1st St.	X														
181730009	Warrick		Lynnville	Tecumseh HS, 5244 State Road 68, Lynnville	X														
181730011	Warrick		Dayville	2844 Eble Rd., Newburgh	X														X

		Number of Parameters																	
		Number of Monitoring Sites	Number of Monitored Parameters	O ₃	SO ₂	CO	NO _x	PM ₁₀	PM _{2.5} (FRM)	PM _{2.5} (Cont)	PM _{2.5} (SPEC)	PM _{2.5} (Spec Cont)	LEAD	TOXICS (VOCs)	O ₃ PREC	CAR-BONYLS	METALS	MET	
Current Monitoring Network (2009)		82	177	42	8	6	5	15	37	14	8	5	5	10	1	2	1	18	
Proposed Monitoring Network (2010)		86	184	42	8	6	5	15	37	15	8	6	9	10	1	2	1	19	

Indicates a site where a change is to occur or occurred in 2009.
Indicates a site where a change is planned for 2010.

Figure 1 - State Air Monitoring Network 2010



Review Summary

The changes proposed for the 2010 Monitoring Network are:

The addition of meteorological monitoring in Indianapolis at two (2) sites; southwest side, and Washington Park.

The addition of meteorological monitoring in Hamilton County (Fishers area).

The addition of sulfate at Gary ITRI.

The discontinuation of PM_{2.5} monitoring at South Bend-Nuner.

The addition of PM_{2.5} monitoring in Northeast Indiana (Kosciusko, Noble, or Whitley County)

The addition of lead monitoring at four (4) source-oriented sites.

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-PM₁₀ 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 planned and funded for Indiana to be set up in the Indianapolis area.
- ° QA Collocated – An audit monitor that is located adjacent to another monitor of the same type used to report air quality for the site. The audit monitor is used solely for Quality Assurance purposes.

Operating Schedule - specifies how often a sample is taken.

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

Sampling Method – Each ambient air monitor is classified by a specific method number. This method combines both the collection procedure along with the analysis performed on the sample. These numbers can be found in the 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 2010; relocation, discontinuation, or addition.

Monitoring Requirements

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

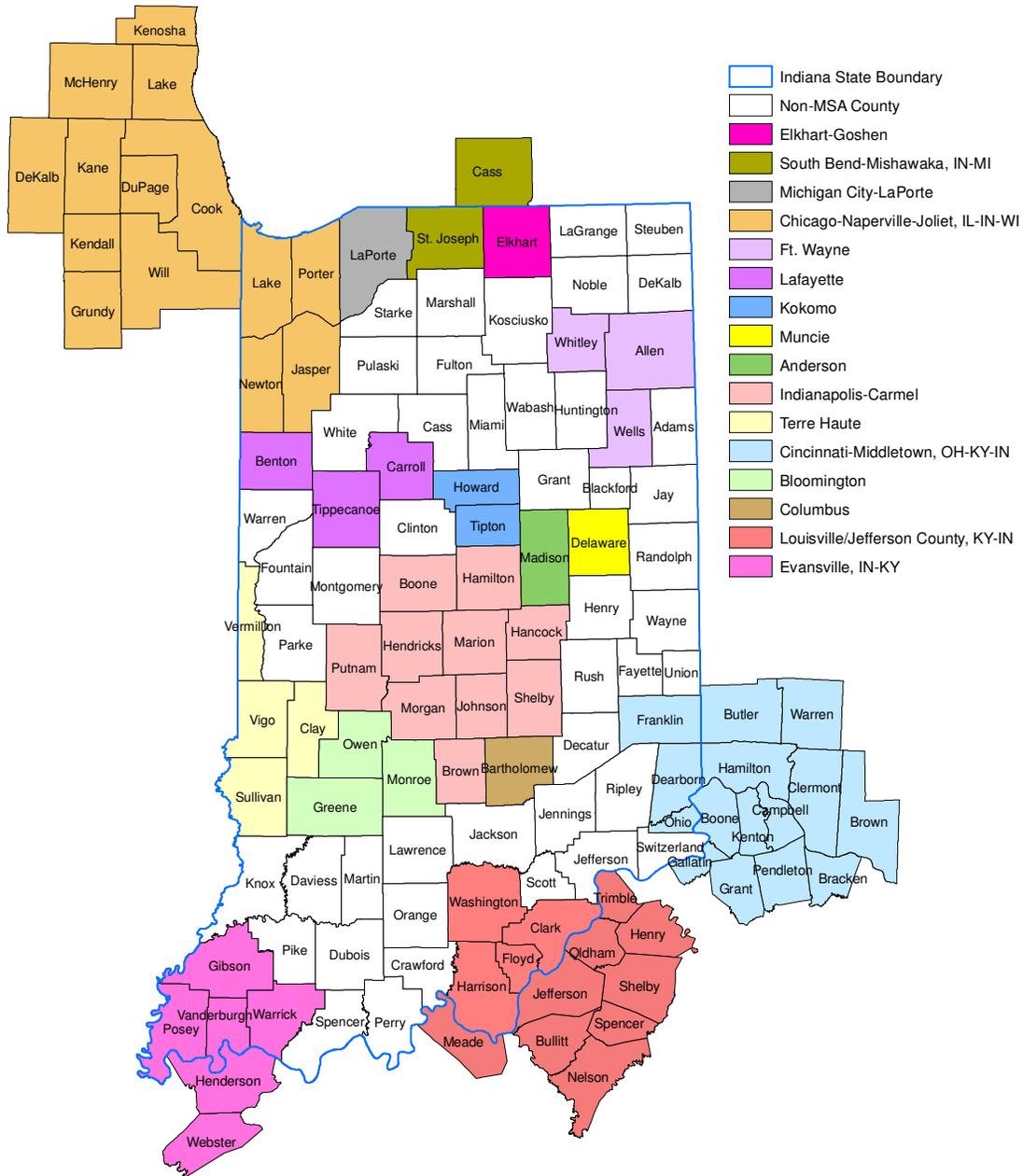
Appendix C of 40 CFR Part 58 specifies the criteria pollutant monitoring methods which must be used in SLAMS and NCore stations. All criteria pollutant monitoring in Indiana follows the methods specified in this appendix.

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

The placement of a monitoring probe, its spacing from obstructions, and probe materials are outlined in Appendix E of 40 CFR Part 58, which deals with the placement of the monitoring probe, its 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

Indiana Metropolitan Statistical Areas



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. Included in the six (6) is the NCore site at Indpls – Washington Park (180970078) and the relocation of Evansville – Harwood (181630019) to Evansville – Lloyd (181630022), identified in last year’s review. These monitors will begin operating in 2009. The details of the current network, along with any changes planned in 2010, are listed in Table 3.

Network Modifications

There are no changes planned for the CO monitoring network in 2010.

Figure 3 – CO Monitoring Network

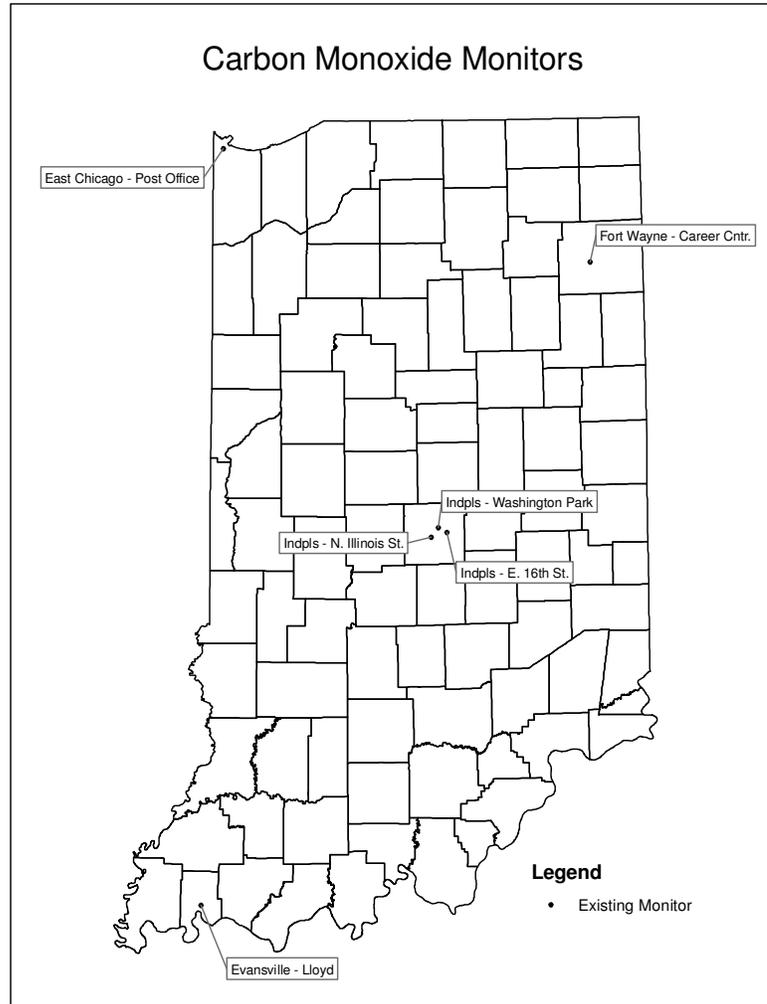


Table 3 - CO Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
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 Illinois St.	NAMS	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.	NAMS	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	2009	Continuous	093	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181630019	Evansville - Harwood	Vanderburgh	Evansville	3013 N. 1st Ave	SLAMS	10/01/03	Continuous	054	Micro	Highest Conc	38.006517	-87.574117	Evansville, IN-KY	Relocate
181630022	Evansville - Lloyd	Vanderburgh	Evansville	10 S. 11th Ave	SLAMS	2009	Continuous	054	Micro	Highest Conc	37.977222	-87.596439	Evansville, IN-KY	Relocation

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/m³ 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.

A Pb monitoring plan is to be submitted to USEPA by July 1, 2009 as part of the annual network plan. The details of Indiana's Lead Monitoring Plan are in Appendix C. The overall Pb review and network follows in this section.

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 are to be 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.

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 new 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 five (5) sites. The Evansville – Civic Center (181630006) site was relocated to the Evansville – Post Office (181630020) in March 2009. With the implementation of the new Pb source monitoring, there will be nine (9) sites in 2010.

Network Modifications

One (1) site currently in operation, East Chicago – Aldis St. (180890023), will be designated as a source-oriented site as part of the new Pb network requirements. Four (4) additional sites will be needed to complete the source-oriented network. New sites will be needed in Muncie near Exide Technologies, in East Chicago near Mittal Steel West, in Gary near US Steel, and in Burns Harbor near Arcelor-Mittal Burns Harbor. Exact locations of these proposed sites are not yet determined. Site searching will continue with final site locations determined later in 2009, and the monitoring to begin January 1, 2010. The proposed Pb Monitoring Network is displayed in Figure 4 and detailed in Table 4.

Figure 4 – Lead Monitoring Network

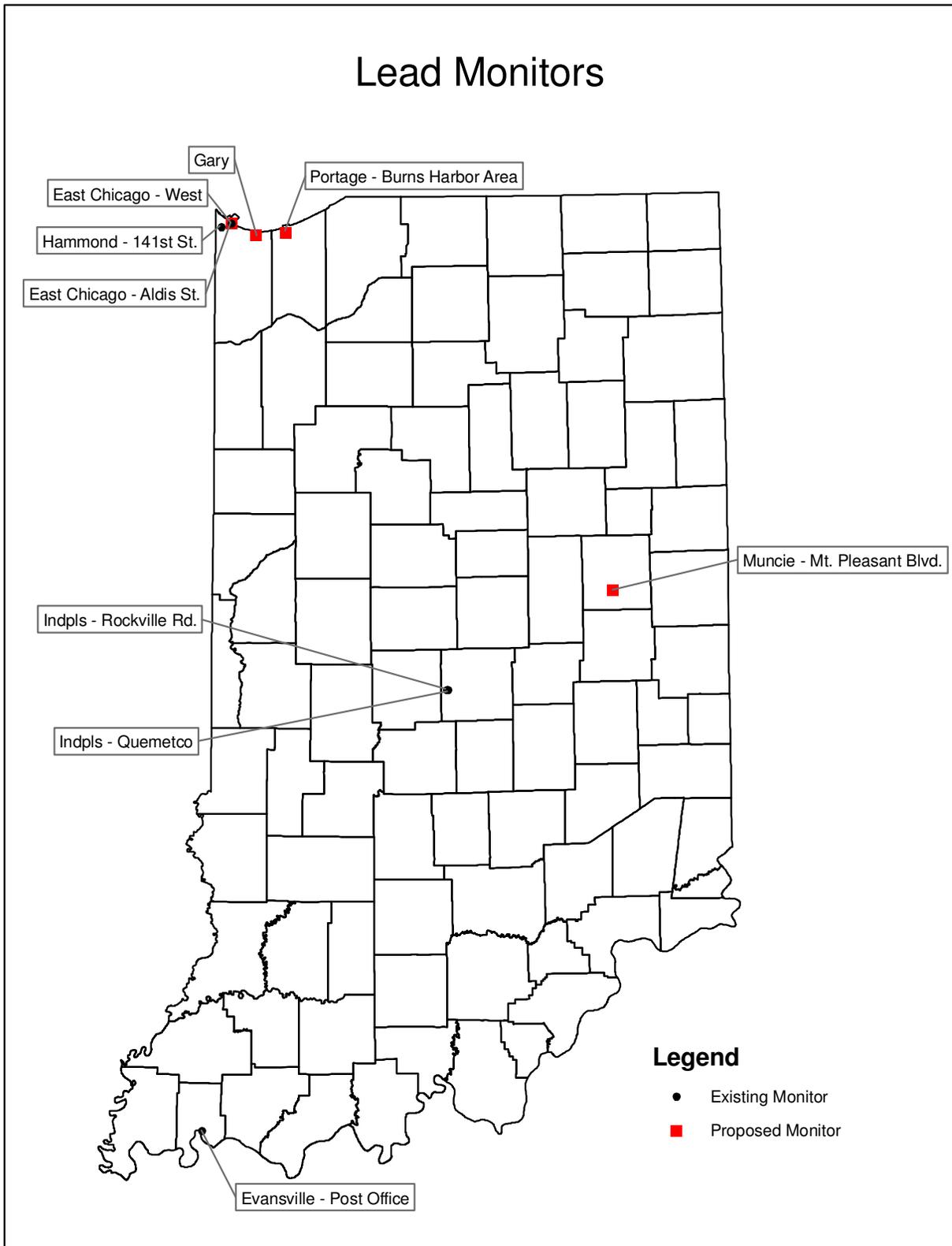


Table 4 - Lead Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management															
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Source Oriented?	Site Change Proposed?
180350009	Muncie - Mt. Pleasant Blvd.	Delaware	Muncie	2601 W. Mt Pleasant Blvd.	SLAMS	Proposed 01/01/10	6-Day	803	Middle	Source Oriented			Muncie	Yes Exide	Add
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
		Lake	East Chicago	Near Mittal Steel West	SLAMS	Proposed 01/01/10	6-Day	803	Middle	Source Oriented			Chicago-Naperville-Joliet, IL	Yes Mittal West	Add
		Lake	Gary	Near US Steel	SLAMS	Proposed 01/01/10	6-Day	803	Middle	Source Oriented			Chicago-Naperville-Joliet, IL	Yes US Steel	Add
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
		Porter		Near Arcelor Mittal Steel	SLAMS	Proposed 01/01/10	6-Day	803	Middle	Source Oriented			Chicago-Naperville-Joliet, IL	Yes Arcelor Mittal	Add
181630020	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	Special Purpose	01/01/77	6-Day	803	Middle	Pop Exp	37.971667	-87.567222	Evansville, IN-KY	No	Relocate
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	Relocation
MONITORING METHOD: 803 - HI-VOL SAMPLER/ATOMIC ABSORPTION ANALYSIS															

Oxides of Nitrogen (NO, NO₂, NO_x, NO_y)

Monitoring Requirements

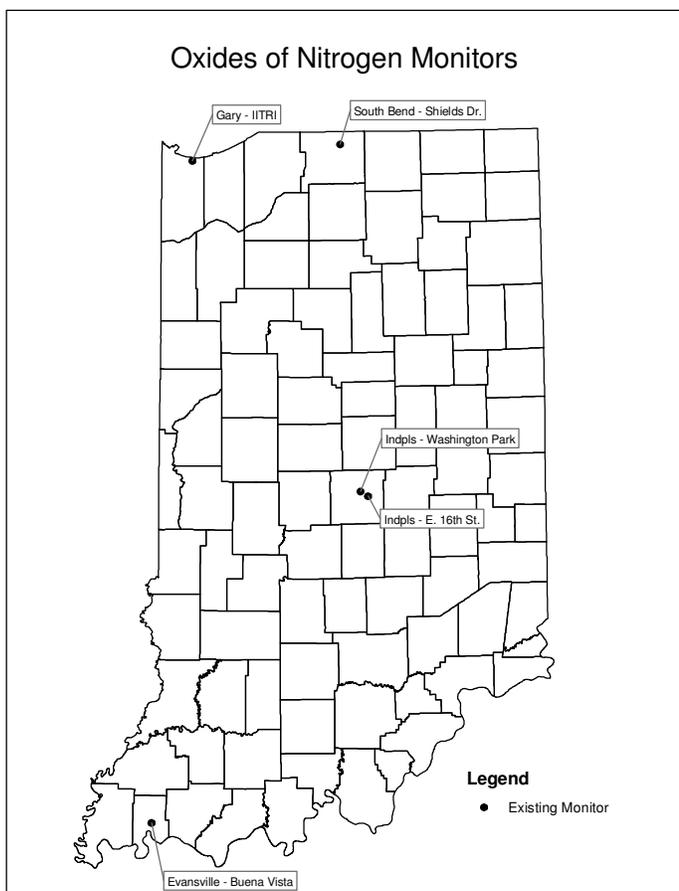
40 CFR Part 58 Appendix D, 4.3 details the requirements for NO₂ monitoring. There are no minimum requirements for the number of NO₂ monitoring sites. Continued operation of current NO₂ SLAMS using FRM or FEM is required until discontinuation is approved by the USEPA. If NO₂ monitoring is ongoing, at 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 NO₂ that can be used to ensure tracking continued compliance with the NO₂ NAAQS. NO/NO_y monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding O₃ photochemistry.

Monitoring Methodology

The NO, NO₂ 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) NO₂ monitors and one trace level monitor. The site Evansville-Mill Rd. (181630012), will be moved to Evansville-Buena Vista (181630021) during the 3rd quarter of 2009. The current network, along with any changes planned in 2010, is listed in Table 5.

Network Modifications

There are no changes planned for the NO₂ monitoring network in 2010.

Table 5 - Oxides of Nitrogen (NO, NO₂, NO_x, NO_y) Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	06/27/95	Continuous	074	Neigh	Highest Conc	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	SLAMS	04/02/90	Continuous	074	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	2009	Continuous	099	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	Continuous	074	Neigh	Pop Exp	41.696692	-86.214683	South Bend-Mishawaka	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 W. Mill Rd.	SLAMS	03/01/91	Continuous	074	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	07/01/05	Continuous	074	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation

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

Ozone (O₃)

Monitoring Requirements

Table D-2 in 40CFR Part 58 Appendix D details the number of O₃ sites required in each MSA. The number of sites is based on the population of an MSA and the design value for that area. Table 6 lists the requirements stated in Part 58. Table 7 lists the requirements as they relate to Indiana. There are five (5) MSAs which cross state lines. The number of sites required in each MSA is for the total area, not just Indiana's portion. If all the required sites in the multi-state MSAs were outside of Indiana, then the number of required sites for the state would be eleven (11). If all the required sites in the multi-state MSAs were in Indiana, then the number of required sites would be nineteen (19). The number of O₃ sites in Indiana far exceeds the number required as depicted in these tables.

Table 6 - SLAMS Minimum O₃ Monitoring Requirement

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

Table 7 - SLAMS O₃ Sites Required for Indiana

MSA	MSA Population	Design Value (ppm) (2006-2008)	# of Sites Required per CFR	Current No. of Sites	2010 No. of Sites
Anderson	133,358	0.072	1	1	1
Bloomington	175,506	0.077	1	1	1
Chicago-Naperville-Joliet, IL-IN-WI	9,098,316	0.077*	3#	5	5
Cincinnati-Middletown, OH-KY-IN	2,009,632	No Data	2#	0	0
Columbus	71,435	No Data	0	0	0
Elkhart-Goshen	182,791	0.072	1	1	1
Evansville, IN-KY	342,815	0.080*	1#	6	6
Fort Wayne	390,156	0.073	2	2	2
Indianapolis-Carmel	1,525,104	0.078	2	11	11
Jasper	52,511	No Data	0	0	0
Kokomo	101,541	No Data	0	0	0
Lafayette	178,541	0.072	1	1	1
Louisville-Jefferson County, KY-IN	1,161,975	0.081*	1#	2	2
Michigan City-LaPorte	110,106	0.070	1	2	2
Muncie	118,769	0.071	1	1	1
South Bend-Mishawaka, IN-MI	316,663	0.073	1#	3	3
Terre Haute	170,943	0.070	1	2	2
Non MSA					
Clark, IL		0.065		1	1
Huntington		0.070		1	1
Jackson		0.074		1	1
Perry		0.077		1	1
		DV ≥ 85% of NAAQS			
	* Design Value is from Indiana sites				
	# Number of sites required for entire MSA				
Min. # of Sites Required for Indiana if all multi-state MSA sites are not in Indiana			11		
Max. # of sites required for Indiana if all multi-state MSA sites are in Indiana			19		
Sites in Indiana Network				42	42

Monitoring Season

Table D-3 of Appendix D of Part 58 defines the O₃ monitoring season for all of the states. Indiana's monitoring season is from April 1 to September 30. Indiana operates one (1) site in Illinois (West Union) and two (2) sites (Charlestown State Park and New Albany) in the Louisville MSA. As the monitoring season extends through October in Illinois and Kentucky, Indiana operates these three (3) sites through October as well.

Data

The design value for an area, usually a county or an MSA, is determined by the three (3) year average of the 4th highest daily 8-hour maximum. If this value is greater than 0.075ppm 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 (2006 – 2008) along with the current O₃ designation status are illustrated in Figure 6.

Figure 6 – O₃ Design Values (2006-2008)

Monitoring Methodology

All monitoring sites in Indiana use O₃ 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 it. Any light that is not absorbed by the ozone is then converted into an electrical signal proportional to the ozone concentration.

Monitoring Network

Currently there are forty-two (42) monitoring sites in Indiana's O₃ monitoring network. Included in this total is the relocation of Evansville – Mill Rd. (181630012) to Evansville – Buena Vista (181630021), scheduled to be completed in the 3rd quarter of 2009. USEPA has reviewed this move. According to the number of sites required and the number of sites currently operating, as indicated in Table 7, the Indiana monitoring network far exceeds the minimum requirements for the number of sites. The O₃ monitoring network with the changes proposed for 2010 is in Table 8.

Network Modifications

The Granger site (181411007) will be relocated because of siting criteria issues. The site search will be conducted during the remainder of 2009 with the anticipated start at the new site of April 1, 2010.

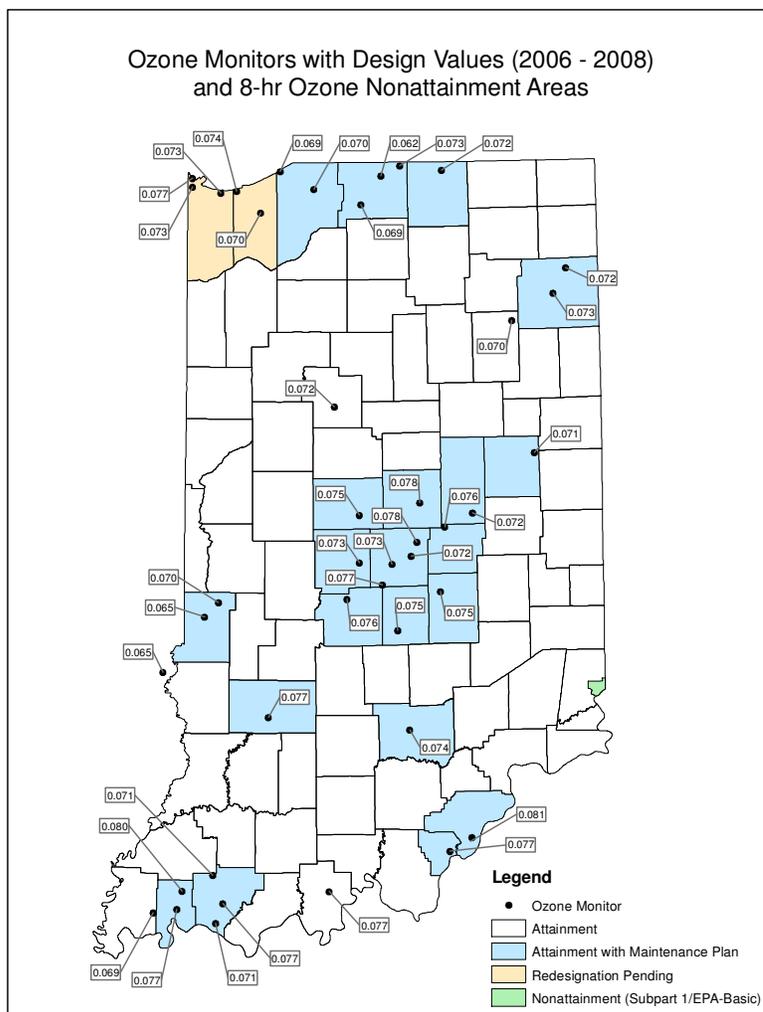


Figure 7 – O₃ Monitoring Network

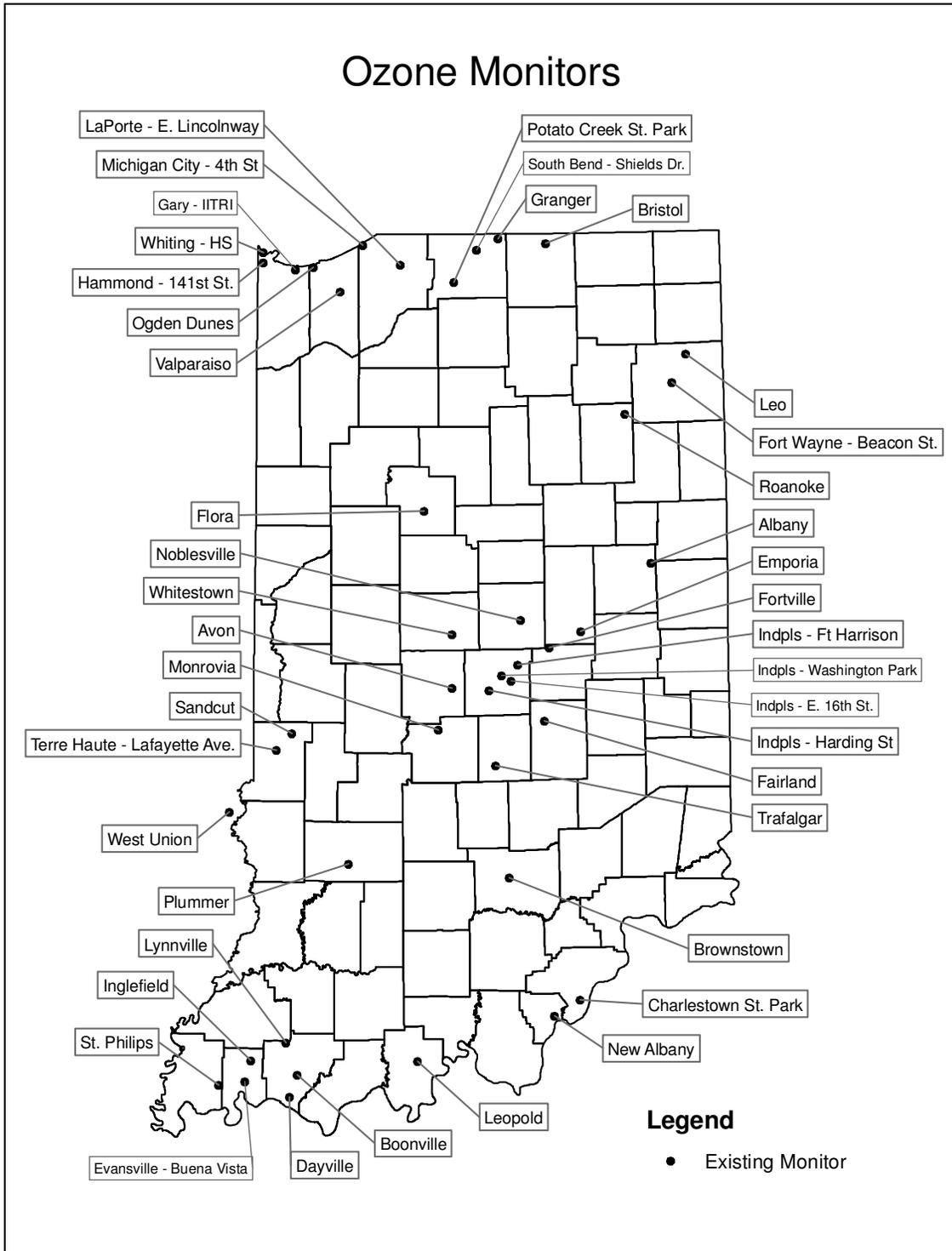


Table 8 – O₃ Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180030002	Leo	Allen	Leo	Leo HS, 14600 Amstutz Rd.	SLAMS	04/01/86	Continuous	047	Urban	Highest Conc	41.221667	-85.017222	Ft. Wayne	No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 N. Beacon St.	NAMS	07/01/79	Continuous	047	Neigh	Pop Exp	41.094722	-85.101944	Ft. Wayne	No
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	Other	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	NAMS	05/04/07	Continuous	047	Urban	Highest Conc	38.393833	-85.664167	Louisville/Jefferson Co.	No
180350010	Albany	Delaware	Albany	Albany Elem. Sch., 706 W. State St.	Other	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	Other	04/03/00	Continuous	047	Regional	Upwind Bkgrd	38.985578	-86.990120	Bloomington	No
180570005	Noblesville	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	No
180590003	Fortville	Hancock	Fortville	Fortville Municipal Bldg., 714 E Broadway	SLAMS	06/01/87	Continuous	047	Urban	Highest Conc	39.935008	-85.840513	Indianapolis-Carmel	No
180630004	Avon	Hendricks	Avon	7203 E. US 36, Avon	SLAMS	04/01/00	Continuous	047	Urban	Pop Exp	39.758967	-86.397148	Indianapolis-Carmel	No
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	Other	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.	Other	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
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	NAMS	12/01/79	Continuous	047	Urban	Highest Conc	39.858961	-86.021341	Indianapolis-Carmel	No
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	SLAMS	03/01/82	Continuous	047	Neigh	Pop Exp	39.749019	-86.186314	Indianapolis-Carmel	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	NAMS	04/02/90	Continuous	047	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
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, 18677 Old St Rd 37, Leopold	Other	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.	Other	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.	NAMS	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.	NAMS	06/01/79	Continuous	047	Urban	Highest Conc	41.742583	-86.110556	South Bend-Mishawaka	Relocate
181450001	Fairland	Shelby		Triton Central HS, 4774 W. 600N , Fairland	SLAMS	04/01/00	Continuous	047	Urban	General Bkgrd	39.611293	-85.873582	Indianapolis-Carmel	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	10/01/82	Continuous	047	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	2009	Continuous	047	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation
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	Other	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		2488 Eble Rd., Newburgh	SLAMS	04/01/05	Continuous	047	Urban	Highest Conc	37.954450	-87.321933	Evansville, IN-KY	No
170230001	West Union	Clark, IL		416 S. Hwy 1, West Union, IL	Other	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 (PM₁₀)

Monitoring Requirements

The requirements for the design of the PM₁₀ 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 9 lists the sites required per MSA along with the design value in the proper category for each MSA. The design values are from the Indiana sites only and do not address the values collected in other parts of the multi-state MSAs. Also listed are the number of monitoring sites operated currently and the number proposed to operate in 2010. In an area which requires PM₁₀ monitoring, if no site is listed or less than the required number of sites is listed in a multi-state MSA, that requirement is addressed by other states listed in the MSA or a combination of sites in Indiana and the other states.

Collocated samplers are required at 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 PM₁₀ 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 PM₁₀ 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 fifteen (15) monitoring sites in the State. 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/m³. Table 10 details the current PM₁₀ network and the modifications planned for 2010.

Network Modifications

Site relocations in Indianapolis and Evansville were not addressed in the 2009 Network Plan, but were performed due to monitoring activities in these cities shifting to IDEM. Indpls-English Ave (180970066) was moved to Indpls-School 21 (180970084) in February 2009 to improve operator access. Evansville – Mill Rd. is being moved to the new Evansville – Buena Vista site (181630021). These site relocations have been approved by USEPA.

With the dissolution of the local agency monitoring contracts and IDEM now being the Reporting Agency for all of the PM₁₀ sites, only two (2) sites require collocated samplers. IDEM will operate three (3) collocated sites; Indpls – E. 16th St. (180970073), Indpls – Drover St. (180970071), and Gary – Madison St. (180890031). The collocated sampler at Evansville – Mill Rd. (181630012) was discontinued on December 31, 2008 and the one at Terre Haute – Lafayette Ave. (181670018) was discontinued on March 31, 2009. These had been required when Evansville EPA and Vigo County APCD were Reporting Agencies.

No other network modifications are planned in 2010.

Table 9 – PM₁₀ Site Requirements

CFR Requirement	MSA Population	# of Required Sites	High Conc. ¹	Medium Conc. ²	Low Conc. ³	# of Sites 2009	# of Sites 2010
	> 1,000,000		6-10	4-8	2-4		
MSA	Population	MSA Design Value					
Chicago-Naperville-Joliet, IL-IN-WI	9,098,316		115 ⁴	60 ⁵		7	7
Cincinnati-Middletown, OH-KY-IN	2,009,632					0	0
Indianapolis-Carmel	1,525,104			56		4	4
Louisville-Jefferson County, KY-IN	1,161,975			52		1	1

CFR Requirement	MSA Population	# of Required Sites	High Conc. ¹	Medium Conc. ²	Low Conc. ³	# of Sites 2009	# of Sites 2010
	500,000 - 1,000,000		4-8	2-4	1-2		
MSA	Population	MSA Design Value					
No MSAs in this category							

CFR Requirement	MSA Population	# of Required Sites	High Conc. ¹	Medium Conc. ²	Low Conc. ³	# of Sites 2009	# of Sites 2010
	250,000 - 500,000		3-4	1-2	0-1		
MSA	Population	MSA Design Value					
Evansville, IN-KY	342,815			48		2	1
Fort Wayne	390,156					0	0
South Bend-Mishawaka, IN-MI	316,663					0	0

CFR Requirement	MSA Population	# of Required Sites	High Conc. ¹	Medium Conc. ²	Low Conc. ³	# of Sites 2009	# of Sites 2010
	100,000 - 250,000		1-2	0-1	0		
MSA	Population	MSA Design Value					
Anderson	133,358					0	0
Bloomington	175,506					0	0
Elkhart-Goshen	182,791					0	0
Kokomo	101,541					0	0
Lafayette	178,541					0	0
Michigan City-LaPorte	110,106					0	0
Muncie	118,769					0	0
Terre Haute	170,943			42		1	1

Non MSA		Design Value			# of Sites 2009	# of Sites 2010
Jasper				48	1	1

¹ Exceeds NAAQS by 20% (180 ug/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.

Figure 8 – PM₁₀ Monitoring Network

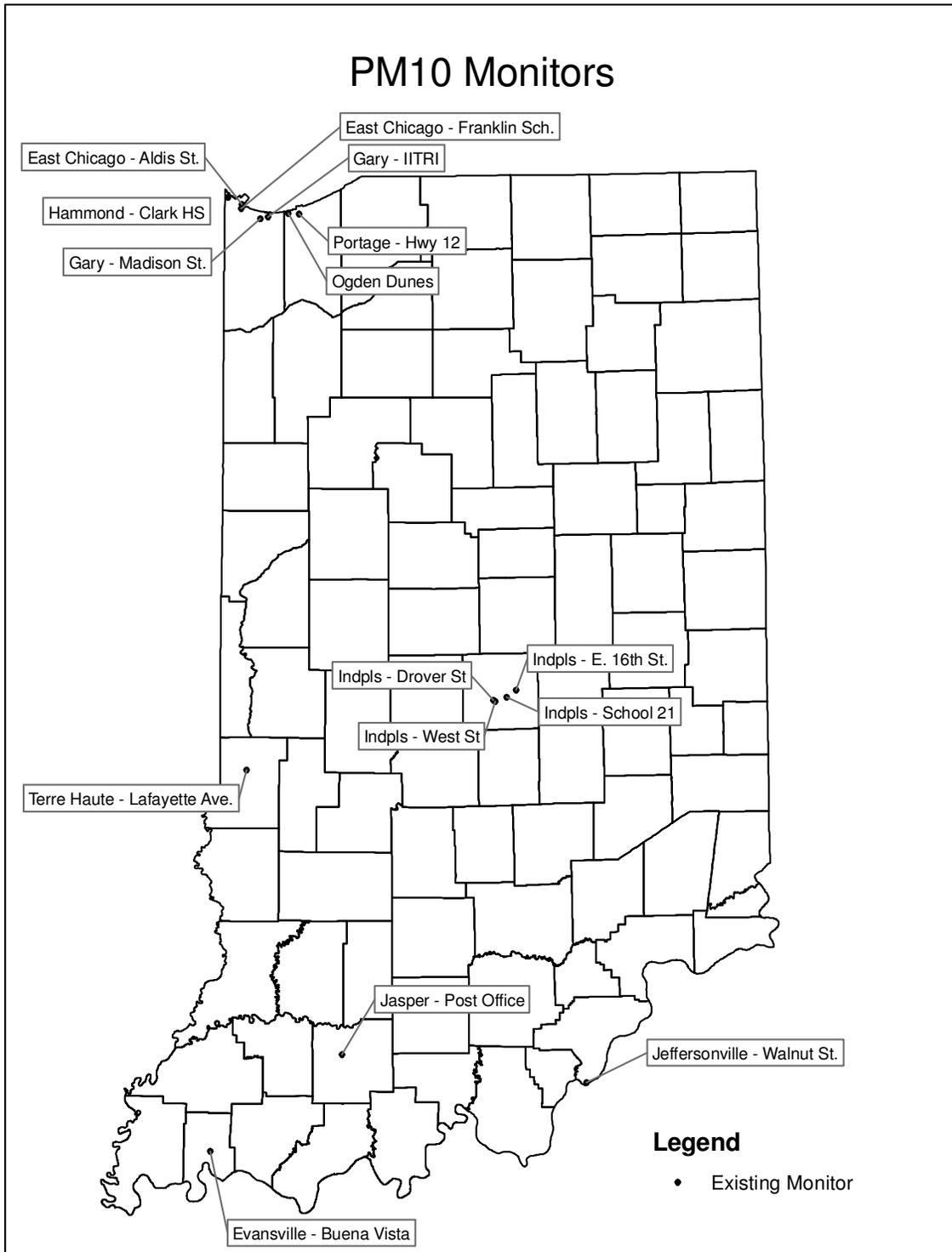


Table 10 – PM₁₀ Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180190006	Jeffersonville - Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	SLAMS	06/26/03	6-Day	127	Neigh	Pop Exp	38.277675	-85.740153	Louisville/Jefferson Co.	No
180372001	Jasper - Post Office	Dubois	Jasper	Jasper Post Office, 206 E. 6th St.	SLAMS	07/01/87	6-Day	127	Neigh	Highest Conc	38.391389	-86.929167	Non-MSA County	No
180890006	East Chicago - Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	10/01/87	6-Day	127	Middle	Highest Conc	41.636111	-87.440833	Chicago-Naperville-Joliet, IL	No
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.	NAMS	10/29/86	6-Day	127	Middle	Source Oriented	39.744957	-86.166496	Indianapolis-Carmel	No
180970066	Indpls - English Ave.	Marion	Indianapolis	Seal Products Bldg., 3302 English Ave.	NAMS	03/01/87	6-Day	127	Middle	Source Oriented	39.760437	-86.108848	Indianapolis-Carmel	Relocate
180970084	Indpls - School 21	Marion	Indianapolis	IPS Sch 21, 2815 English Ave.	NAMS	02/16/09	6-Day	127	Middle	Source Oriented	39.759083	-86.115556	Indianapolis-Carmel	Relocation
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
181270023	Portage - Hwy 12	Porter	Portage	Bethlehem Steel Waste Lagoon, Hwy 12	SLAMS	10/01/95	Continuous	079	Neigh	Highest Conc	41.616667	-87.145833	Chicago-Naperville-Joliet, IL	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	SLAMS	01/01/89	6-Day	127	Neigh	Pop Exp	41.617500	-87.199167	Chicago-Naperville-Joliet, IL	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 W. Mill Rd	SLAMS	07/01/03	6-Day	127	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	2009	6-Day	127	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation
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 the design value for that area. Table 11 (Table D-5 of Appendix D) lists the minimum requirements as stated in Part 58. Table 12 lists the requirements as they relate to Indiana. There are five (5) MSAs which cross state lines. The number of sites required in each MSA in the table is for the total area, not just Indiana's portion. If all the required sites in the multi-state MSAs were outside of Indiana, then the number of required sites for the state would be twelve (12). If all the required sites in the multi-state MSAs were in Indiana, then the number of required sites would be twenty-one (21). In the Cincinnati MSA eleven (11) sites are operated in the Ohio and Kentucky portions of the MSA to satisfy the requirements there. Five (5) sites in the Kentucky portion of the Louisville MSA, along with two (2) sites in Indiana, satisfy the Louisville MSA requirement. The number of sites in Indiana's portion of the Chicago, Evansville, and South Bend MSA exceed the requirements for each entire MSA. The number of sites in Indiana's monitoring network is actually much higher. There are currently thirty-seven (37) operational sites.

In addition, 40 CFR, Appendix D, 4.7.2 states that "State, or where appropriate, local agencies must operate continuous fine particulate analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of Appendix D" (Table 11). As these requirements are applied to Indiana, between six (6) and eleven (11) would be required in the state. Currently, thirteen (13) sites operate in Indiana, exceeding this requirement.

Collocated samplers are required at 15% of the FRM/FEM sites operated by each PQAQO. IDEM is the sole PQAQO for Indiana. Indiana is required to have six (6) collocated samplers.

Table 11 - SLAMS Minimum PM_{2.5} Monitoring Site Requirements

Number of Sites per MSA and Design Value		
MSA Population	3 yr DV ≥ 85% of either NAAQS	3 yr DV < 85% of either NAAQS
> 1,000,000	3	2
500,000 - 1,000,000	2	1
50,000 - 500,000	1	0
	also	
	Statewide Background Site	1
	Statewide Transport Site	1
85% of Daily NAAQS = 29.75ug/m ³		
85% of Annual NAAQS = 12.75ug/m ³		

Monitoring Methodology

PM_{2.5} is sampled by drawing air through a specially designed inlet that excludes particles larger than 2.5 microns in diameter. The particles are collected on a Teflon™ Microfiber filter that is weighed before and after the sampling period to determine the particulate mass. Indiana uses R&P 2025 Sequential Samplers (FRM) to collect intermittent data. The normal sampling schedule varies, as determined by the regulations: 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, Met One BAM 1020 FEM, R&P TEOM 1400a, R&P 1400a with FDMS version b, R&P 1400a with FDMS w/C drier, or Thermo SHARP 5030. 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 upgraded version of this monitor has received FEM status. 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 'b' and 'c' version of this monitor operate the same internally. The air being sampled is conditioned and dried differently in each version in an attempt to provide more accurate data. 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. 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. Continuous data are used for mapping purposes only and not for attainment or nonattainment designations.

Table 12 - 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 2009 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, plus two (2) sites scheduled to begin sampling during the year, Bloomington and Hamilton County (Fishers area). Bloomington became operational in April 2009. Survey work for the Hamilton County site will begin in July, with an anticipated start date of January 1, 2010.

The relocation of the Anderson monitoring site from W. 5th St. to Eastside Elementary was postponed until 2009 due to problems encountered with procuring a site. This site is planned to be operational during the third quarter.

With the absence of a local agency contract with the Evansville EPA, the City of Evansville requested that IDEM either enter into a lease agreement for Evansville – Civic Center (181630006) and Evansville – Mill Rd. (181630012) or relocate the monitoring equipment to another location. IDEM opted to relocate to new sites as close as possible to the existing sites. The collocated samplers at the Civic Center were relocated to the Evansville – Post Office (181630020), approximately 200 meters to the north. This was accomplished in March 2009. The Mill Rd. relocation to Evansville – Buena Vista (181630021) will be accomplished during the 3rd quarter of 2009. This site is approximately one (1) mile to the southwest of the Mill Rd. location.

Due to operator access issues at Indpls – English Ave (180970066) the site was moved to Indpls – School 21 (180970084) in February 2009.

The relocation of the Evansville sites and the Indianapolis site were reviewed and approved by USEPA.

Continuous monitors will be collecting data at fourteen (14) of the site locations by the end of 2009. The data from the continuous monitors are used for comparison to the intermittent sampling data, calculation of the AQI, forecasting, and for AIRNow mapping. The data are not used for air quality attainment or nonattainment designations.

Data

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

A site's annual design value is calculated by averaging the weighted annual averages from a site over a three (3) year period. The highest site design value in an MSA is generally determined to be the design value for the area. It is compared to the NAAQS to determine attainment/nonattainment for the area. Similarly, a site's daily design value is obtained by averaging the 98th percentile values from a three (3) year period. This value is then compared to the daily NAAQS, thirty-five (35) ug/m³ to determine attainment/nonattainment of the daily standard. The daily NAAQS was revised from sixty-five (65) ug/m³ to thirty-five (35) ug/m³ in 2006.

The design values for all sites for the most recent sampling period (2006 - 2008) along with the designation status of areas for PM_{2.5} are on the maps in Figure 9. Attainment/nonattainment designations for Indiana counties are currently under review by USEPA. Indiana has requested all areas of Indiana be designated attainment for the daily NAAQS, based on 2006-2008 data.

Network Modifications

PM_{2.5} monitoring will be conducted at thirty-seven (37) sites in 2010. The PM_{2.5} monitoring network with the changes proposed for 2010 is in Table 15. A map of the 2010 network is in Figure 10.

The South Bend – Nuner (181410014) site will be discontinued at the end of 2009. This site produces data, shown in Table 13, which is duplicative of the South Bend – Shields Dr. (181410016) site. Shields Dr. was established in 2007 after the site at Angela and Eddy (181411008) was moved. The data are combined for the two sites. The annual design values between Nuner and Shields Dr. are the same for the past three (3) years and within 1ug/m³ for the daily design value. In addition the annual averages and highest 24-hour concentrations track very well. These data values are calculated when both sites have data. The correlation of the data between the two sites is 0.86.

Figure 9 – PM_{2.5} Site Design Values

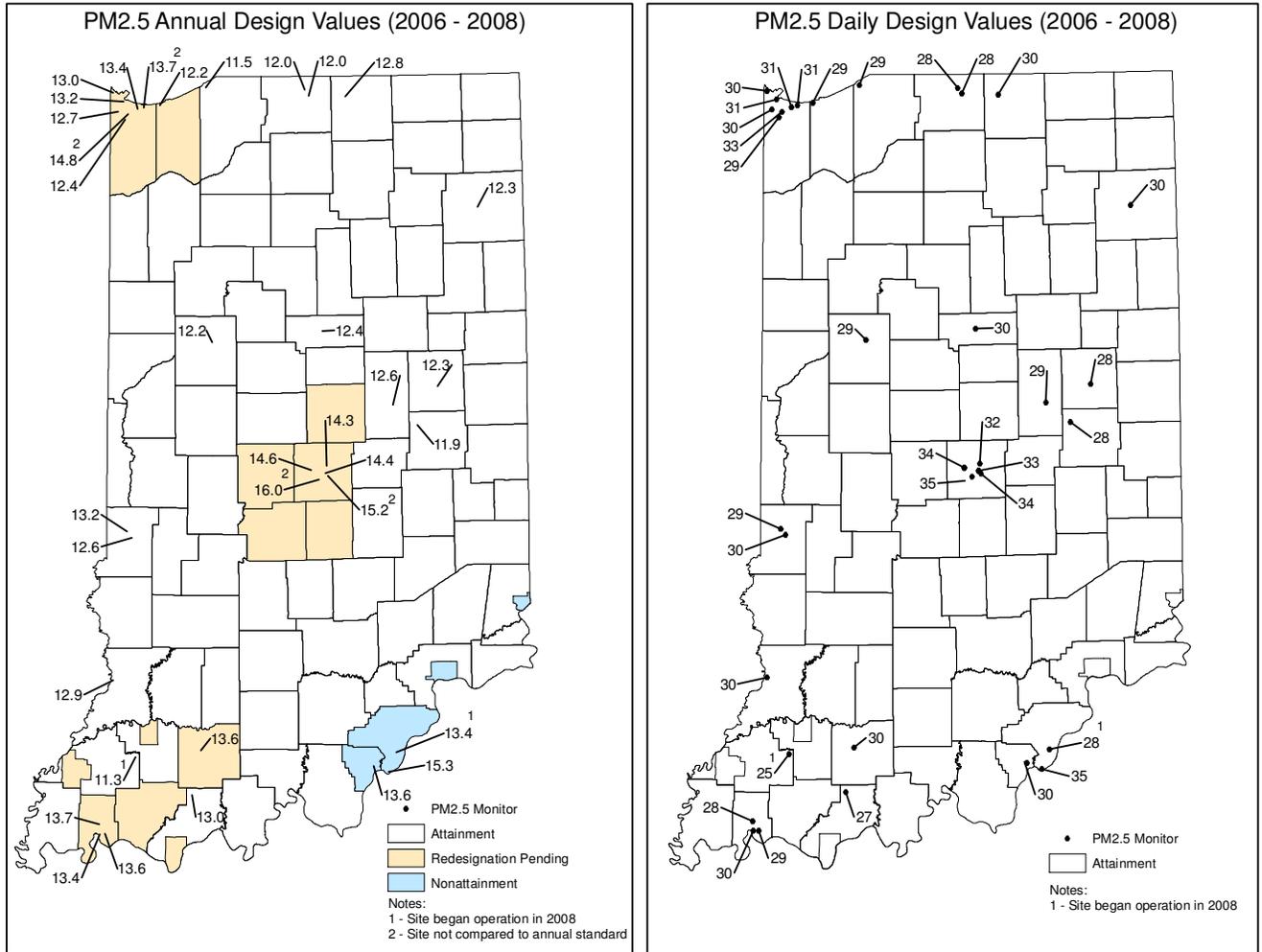


Table 13 – South Bend Sites Data Comparison

Year	Annual Average		Highest 24-Hr Conc.		Year	Design Value			
	Nuner	Angela & Eddy / Shields Dr.	Nuner	Angela & Eddy / Shields Dr.		Nuner	Angela & Eddy / Shields Dr.	Nuner	Angela & Eddy / Shields Dr.
2000	13.3	13	34.3	36.2					
2001	14	14.5	41.9	45.1					
2002	14.3	14.5	40.9	38.5	00-02	14	14.4	32	34
2003	13.8	13.7	61.3	63.3	01-03	14	14.3	34	35
2004	12.2	12.1	33.8	36.4	02-04	13.5	13.6	31	32
2005	14.8	14.9	42.2	42.5	03-05	13.7	13.7	34	33
2006	12	11.8	30.3	31.2	04-06	13	13	31	30
2007	13.2	13	42.4	41.4	05-07	13.2	13.2	32	31
2008	11.2	11.1	30.3	31.8	06-08	12	12	28	28

A new site will be located between Fort Wayne and South Bend, in Kosciusko, Noble, or Whitley County. A continuous monitor will also be installed at this site along with an FRM. The data will provide information on an unclassified area of northeast Indiana. This site is planned to be operational by January 1, 2010.

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 14 operated on a daily sampling in 2009. Each year the data are evaluated to determine which sites must collect daily data. For 2009, two (2) sites, Indpls – West St. and Jeffersonville – Walnut St. were required to sample daily. Indpls – Washington Park and Indpls – W. 18th St. are also sampling daily to continue to collect comparison data for the continuous monitors operating at these sites. All data will be reviewed in the fourth quarter of 2009 to determine which sites will collect daily samples in 2010.

Table 14 - FRM Sampling Frequency Changes

Site	Unrounded Design Value	
	05-07	06-08
Jeffersonville - Walnut St	39.47	35.33
Indpls – West St.	39.9	35.3
Indpls – Washington Park	36.5	31.97
Indpls – W. 18 th St.	39.2	34.13
+/-5% of NAAQS = 33.25ug/m ³ to 36.75ug/m ³		

Unanticipated Network Changes

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

Figure 10 – PM_{2.5} Monitoring Network 2010

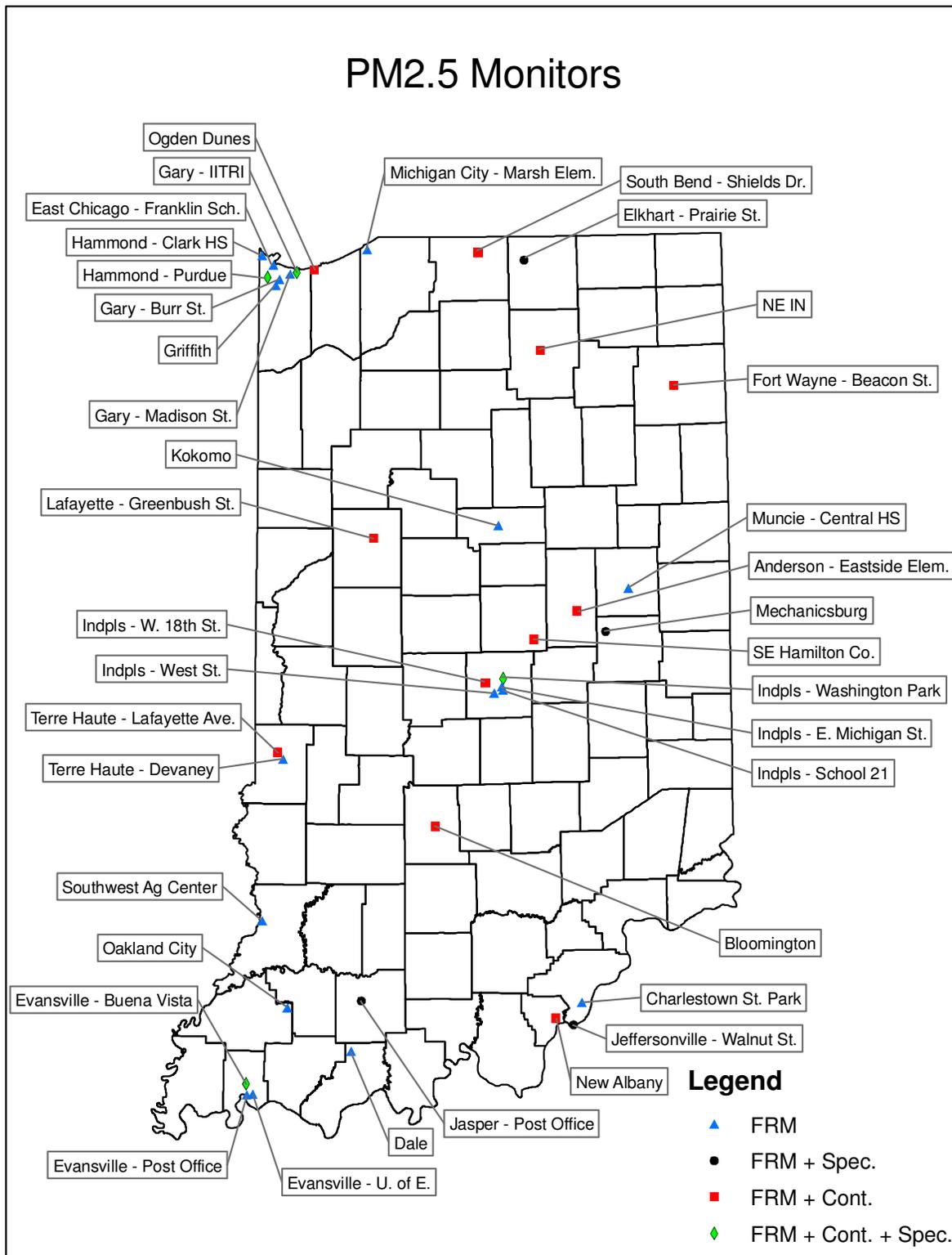


Table 15 – PM_{2.5} Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management															
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	NAAQS Comparable	MSA	Site Change Proposed?
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	SLAMS	01/01/99	3-Day	118	Neigh	Pop Exp	41.094722	-85.101944	Yes	Ft. Wayne	No
180030004	Ft Wayne - Beacon St.	Allen	Fort Wayne	2022 North Beacon St.	Special Purpose	01/01/02	Continuous	701	Neigh	Pop Exp	41.094722	-85.101944	No	Ft. Wayne	No
180190006	Jeffersonville - Walnut St.	Clark	Jeffersonville	Jeffersonville PFAU, 719 Walnut St.	SLAMS	06/26/03	1-Day	118	Neigh	Pop Exp	38.277675	-85.740153	Yes	Louisville/Jefferson Co.	No
180190008	Charlestown St. Park	Clark		Charlestown State Park 12500 Hwy 62, Charlestown	Special Purpose	07/01/08	3-Day	118	Urban	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	118	Neigh	Pop Exp	40.201111	-85.388056	Yes	Muncie	No
180372001	Jasper - Post Office	Dubois	Jasper	Post Office, 206 E. 6th St.	SLAMS	01/01/00	3-Day	118	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	118	Neigh	Pop Exp	41.656905	-85.968371	Yes	Elkhart-Goshen	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	01/18/99	3-Day	118	Neigh	Pop Exp	38.308056	-85.834167	Yes	Louisville/Jefferson Co.	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	QA Collocated	01/18/99	6-Day	118	Neigh	Quality Assurance	38.308056	-85.834167	No	Louisville/Jefferson Co.	No
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	Special Purpose	11/01/03	Continuous	760	Neigh	Pop Exp	38.308056	-87.834167	No	Louisville/Jefferson Co.	No
180510012	Oakland City	Gibson		2205 S. 1350 E., Oakland City	Special Purpose	01/18/08	3-Day	118	Urban	Pop Exp	38.322930	-87.318789	Yes	Evansville, IN-KY	No
		Hamilton			SLAMS	2009	3-Day	118	Urban	Pop Exp			Yes	Indianapolis-Carmel	Add
		Hamilton			Special Purpose	2009	Continuous		Urban	Pop Exp			No	Indianapolis-Carmel	Add
180650003	Mechanicsburg	Henry		Shenandoah HS, 7354 W. Hwy. 36, Pendleton	SLAMS	09/26/00	3-Day	118	Regional	Regional Transport	40.011667	-85.523611	Yes	Non-MSA County	No
180670003	Kokomo	Howard	Kokomo	Fire Station, 215 W. Superior	SLAMS	06/11/99	3-Day	118	Neigh	Pop Exp	40.485556	-86.132778	Yes	Kokomo	No
180830004	Southwest Ag Center	Knox		SW Purdue Ag Center, Vincennes	SLAMS	01/01/00	3-Day	118	Regional	General Background	38.740833	-87.484722	Yes	Non-MSA County	No
		Noble, or Whitley		NE Indiana	SLAMS	Proposed	3-Day	118	Regional				Yes	Non-MSA County / Wayne	Ft. Add
		Noble, or Whitley		NE Indiana	SPM	Proposed	Continuous		Regional				No	Non-MSA County / Wayne	Ft. Add
180890006	East Chicago- Franklin Sch.	Lake	East Chicago	Franklin School, Alder & 142nd St.	SLAMS	01/27/99	3-Day	118	Neigh	Pop Exp	41.636111	-87.440833	Yes	Chicago-Naperville- Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	03/04/99	3-Day	118	Middle	Source & Pop Exp	41.606667	-87.304722	Yes**	Chicago-Naperville- Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Special Purpose	01/01/03	Continuous	701	Middle	Source & Pop Exp	41.606667	-87.304722	No	Chicago-Naperville- Joliet, IL	No
180890026	Gary - Burr St	Lake	Gary	Truck Stop, 25th Ave & Burr St.	SLAMS	02/12/00	3-Day	118	Middle	Source & Pop Exp	41.573056	-87.405833	Yes**	Chicago-Naperville- Joliet, IL	No

180890027	Griffith	Lake	Griffith	Eldon Ready Elem Sch, 1345 N. Broad St.	SLAMS	02/18/00	3-Day	118	Neigh	Pop Exp	41.546667	-87.426389	Yes	Chicago-Naperville- Joliet, IL	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	SLAMS	07/01/05	3-Day	118	Neigh	Pop Exp	41.598505	-87.342991	Yes	Chicago-Naperville- Joliet, IL	No
180890031	Gary - Madison St.	Lake	Gary	Indiana American Water Co., 650 Madison St.	QA Collocated	07/01/05	6-Day	118	Neigh	Quality Assurance	41.598505	-87.342991	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	118	Neigh	Pop Exp	41.585278	-87.474444	Yes	Chicago-Naperville- Joliet, IL	No
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg, Purdue Univ. Calumet, 2200 169th St.	Special Purpose	12/01/03	Continuous	753	Neigh	Pop Exp	41.585278	-87.474444	No	Chicago-Naperville- Joliet, IL	No
180892010	Hammond - Clark HS	Lake	Hammond	Robertsdale Clark HS, 1921 Davis St.,	SLAMS	01/27/99	3-Day	118	Middle	Pop Exp	41.678333	-87.508333	Yes	Chicago-Naperville- Joliet, IL	No
180910011	Michigan City - Marsh Elem	La Porte	Michigan City	Marsh Elem. Sch., 400 E. Homer St.	SLAMS	12/17/99	3-Day	118	Neigh	Pop Exp	41.706944	-86.891111	Yes	Michigan City-LaPorte	No
180950009	Anderson - W. 5th St.	Madison	Anderson	Anderson Fire Station, 44 W. 5th St.	SLAMS	03/19/99	3-Day	118	Middle	Pop Exp	40.111944	-85.680000	Yes	Anderson	Relocate
	Anderson - Eastside Elem.	Madison	Anderson	Eastside Elementary Sch., 844 N. Scatterfield Rd.	SLAMS	2009	3-Day	118	Middle	Pop Exp			Yes	Anderson	Relocation
	Anderson - Eastside Elem.	Madison	Anderson	Eastside Elementary Sch., 844 N. Scatterfield Rd.	Special Purpose	2009	Continuous		Middle	Pop Exp			Yes	Anderson	Add
180970043	Indpls - West St.	Marion	Indianapolis	1735 South West Street	SLAMS	01/24/99	1-Day	118	Middle	Pop Exp	39.744957	-86.166496	Yes**	Indianapolis-Carmel	No
180970066	Indpls - English Ave.	Marion	Indianapolis	Seal Products Bldg., 3302 English Ave.	SLAMS	01/24/99	3-Day	118	Middle	Pop Exp	39.760437	-86.108848	Yes**	Indianapolis-Carmel	Relocate
180970084	Indpls - School 21	Marion	Indianapolis	IPS Sch 21, 2815 English Ave.	SLAMS	02/16/09	3-Day	118	Middle	Pop Exp	39.759083	-86.115556	Yes**	Indianapolis-Carmel	Relocation
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	SLAMS	03/07/99	1-Day	118	Neigh	Pop Exp	39.811097	-86.114469	Yes	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	01/01/04	Continuous	760	Neigh	Pop Exp	39.811097	-86.114469	No	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch, 3351 W. 18th St.	SLAMS	01/22/99	3-Day	118	Neigh	Pop Exp	39.788903	-86.214628	Yes	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch, 3351 W. 18th St.	QA Collocated	02/11/99	6-Day	118	Neigh	Quality Assurance	39.788903	-86.214628	No	Indianapolis-Carmel	No
180970081	Indpls - W. 18th St.	Marion	Indianapolis	Ernie Pyle Sch, 3351 W. 18th St.	Special Purpose	11/01/07	Continuous	760	Neigh	Pop Exp	39.788903	-86.214628	No	Indianapolis-Carmel	No
180970083	Indpls - E. Michigan St.	Marion	Indianapolis	Thomas Gregg Sch, 2302 E. Michigan St.	SLAMS	01/22/99	3-Day	118	Neigh	Pop Exp	39.774944	-86.122053	Yes	Indianapolis-Carmel	No
181050003	Bloomington - Binford	Monroe	Bloomington	Binford Elementary Sch, 2300 E. 2nd St.	SLAMS	04/01/09	3-Day	118	Neigh	Pop Exp	39.159444	-86.504722	Yes	Bloomington	No
181050003	Bloomington - Binford	Monroe	Bloomington	Binford Elementary Sch, 2300 E. 2nd St.	SLAMS	04/01/09	Continuous	753	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	118	Neigh	Pop Exp	41.617500	-87.199167	Yes	Chicago-Naperville- Joliet, IL	No
181270024	Ogden Dunes	Porter	Ogden Dunes	Water Treatment Plant, 84 Diana Rd	Special Purpose	12/03/03	Continuous	760	Neigh	Pop Exp	41.617500	-87.199167	No	Chicago-Naperville- Joliet, IL	No
181410014	South Bend - Nuner Sch.	St Joseph	South Bend	Nuner Elem Sch, 2716 Pleasant St.	SLAMS	11/20/99	3-Day	118	Neigh	Pop Exp	41.663333	-86.207778	Yes	South Bend-Mishawaka	Disc.

181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	SLAMS	06/01/06	3-Day	118	Neigh	Pop Exp	41.696692	-86.214683	Yes	South Bend-Mishawaka	No
181410015	South Bend - Shields Dr.	St Joseph	South Bend	2335 Shields Dr.	QA Collocated	06/01/06	6-Day	118	Neigh	Quality Assurance	41.696692	-86.214683	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
181470009	Dale	Spencer	Dale	David Turnham School, Dunn & Locust	SPM	02/01/00	3-Day	118	Urban	Regional Trans	38.167500	-86.983333	Yes	Non-MSA County	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	SLAMS	10/01/02	3-Day	118	Neigh	Pop Exp	40.431639	-86.852500	Yes	Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	QA Collocated	10/01/02	6-Day	118	Neigh	Quality Assurance	40.431639	-86.852500	No	Lafayette	No
181570008	Lafayette - Greenbush St.	Tippecanoe	Lafayette	Cinergy Substation, 3401 Greenbush St	Special Purpose	04/01/05	Continuous	760	Neigh	Pop Exp	40.431639	-86.852500	No	Lafayette	No
181630006	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	SLAMS	04/15/99	3-Day	118	Neigh	Pop Exp	37.971667	-87.567222	Yes	Evansville, IN-KY	Relocate
181630006	Evansville - Civic Center	Vanderburgh	Evansville	Civic Center Courts Bldg, 1 NW ML King Blvd.	QA Collocated	04/15/99	6-Day	118	Neigh	Quality Assurance	37.971667	-87.567222	No	Evansville, IN-KY	Relocate
181630020	Evansville - Post Office	Vanderburgh	Evansville	800 Sycamore St	SLAMS	03/11/09	3-Day	118	Neigh	Pop Exp	37.975278	-87.567778	Yes	Evansville, IN-KY	Relocation
181630020	Evansville - Post Office	Vanderburgh	Evansville	800 Sycamore St	QA Collocated	03/11/09	6-Day	118	Neigh	Quality Assurance	37.975278	-87.567778	No	Evansville, IN-KY	Relocation
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	04/15/99	3-Day	118	Neigh	Pop Exp	38.021667	-87.569444	Yes	Evansville, IN-KY	Relocate
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	10/01/02	Continuous	760	Neigh	Pop Exp	38.021667	-87.569444	No	Evansville, IN-KY	Relocate
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	2009	3-Day	118	Neigh	Pop Exp	38.013333	-87.577778	Yes	Evansville, IN-KY	Relocation
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	2009	Continuous	760	Neigh	Pop Exp	38.013333	-87.577778	No	Evansville, IN-KY	Relocation
181630016	Evansville - U of E	Vanderburgh	Evansville	Carson Center, Walnut St.	SLAMS	06/05/99	3-Day	118	Neigh	Pop Exp	37.974444	-87.532222	Yes	Evansville, IN-KY	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	SLAMS	03/19/99	3-Day	118	Neigh	Pop Exp	39.486111	-87.401389	Yes	Terre Haute	No
181670018	Terre Haute - Lafayette Ave.	Vigo	Terre Haute	961 N. Lafayette Ave.	Special Purpose	07/02/03	Continuous	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	118	Neigh	Pop Exp	39.456111	-87.370556	Yes	Terre Haute	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.

<i>MONITORING METHODS:</i>	<i>118 - R & P 2025</i>	<i>170 - MET ONE BAM - FEM</i>
	<i>701- TEOM</i>	<i>731 - MET ONE BAM W/ SCC</i>
	<i>753 - Thermo SHARP</i>	<i>760 - FDMS TEOM</i>

Sulfur Dioxide (SO₂)

Monitoring Requirements

40 CFR Part 58 Appendix D, 4.4 details the requirements for SO₂ monitoring. There are no minimum requirements for the number of SO₂ monitoring sites listed. Continued operation of existing SLAMS SO₂ sites using FRM or FEM is required until discontinuation is approved by the USEPA. With SLAMS SO₂ monitoring, at least one of the SO₂ monitoring sites must be a maximum concentration site for that specific area. The appropriate spatial scales for SO₂ 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 SO₂ monitoring is implemented when there is a need to collect air quality data as part of an ongoing SO₂ stationary source impact investigation. Such locations would include suburban areas adjacent to SO₂ stationary sources or for determining background concentrations versus human population response to SO₂ exposure. SLAMS sites are expected to provide data that are useful in specific compliance actions, maintenance plan agreements and measuring specific stationary sources for SO₂.

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 SO₂ 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 SO₂ 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 SO₂ data at the NCore, Indpls-Washington Park site.

Monitoring Network

Indiana operates eight (8) SO₂ monitors located throughout the state. Included in the eight (8) is the NCore site at Indianapolis – Washington Park, identified in last year's review. This monitor will begin operations later in 2009. The Evansville-Mill Rd. (181630012) site will be relocated to Evansville-Buena Vista (181630021). The current network, along with any changes planned in 2010, is listed in Table 16.

Network Modifications

No changes are planned for the Indiana SO₂ monitoring network in 2010.

Figure 11- SO₂ Monitoring Network

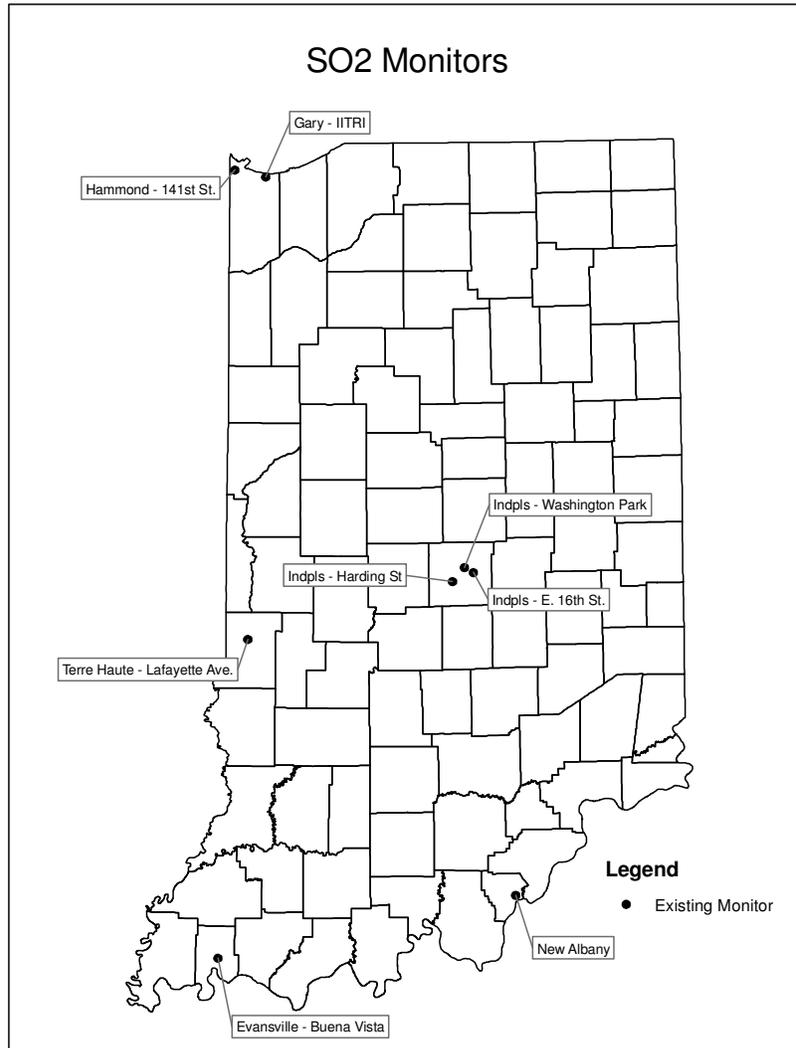


Table 16 – SO₂ Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180431004	New Albany	Floyd	New Albany	Green Valley Elem. Sch., 2230 Green Valley Rd.	SLAMS	11/01/76	Continuous	060	Neigh	Pop Exp	38.308056	-85.834167	Louisville/Jefferson Co.	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	SLAMS	06/12/97	Continuous	060	Neigh	Unknown	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180892008	Hammond - 141st St.	Lake	Hammond	1300 E. 141st Street	NAMS	08/01/75	Continuous	060	Neigh	Highest Conc	41.639444	-87.493611	Chicago-Naperville-Joliet, IL	No
180970057	Indpls - Harding St.	Marion	Indianapolis	1321 Harding St.	NAMS	03/04/82	Continuous	060	Neigh	Highest Conc	39.749019	-86.186314	Indianapolis-Carmel	No
180970073	Indpls - E. 16th St.	Marion	Indianapolis	6125 E. 16th St.	NAMS	04/02/90	Continuous	060	Neigh	Pop Exp	39.789167	-86.060833	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	NCORE	2009	Continuous	100	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	SLAMS	10/01/82	Continuous	060	Middle	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	SLAMS	2009	Continuous	060	Middle	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation
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

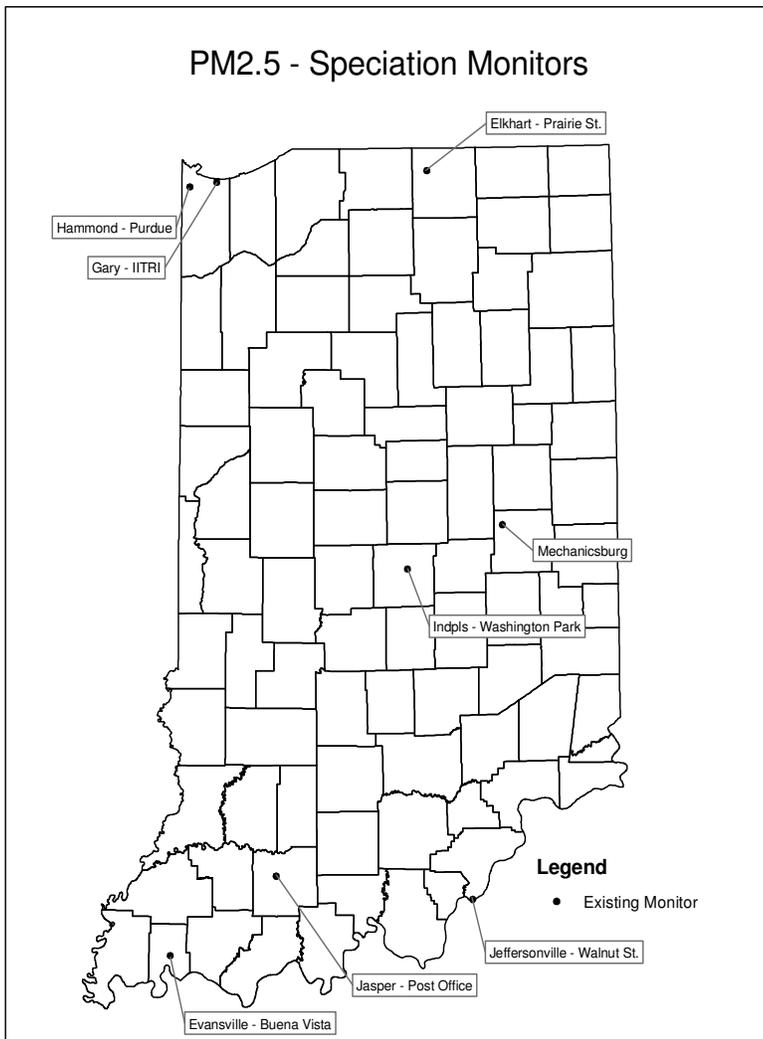
Monitoring Requirements

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 forty-eight (48) trace metals. A nylon filter using Ion Chromatography for an analytical method is used to target sulfates, nitrates, and three (3) cations; ammonium, potassium, and sodium. And a quartz fiber filter using Thermal Optical Analysis is used to target organic, elemental, and total carbon.

Figure 12 - Speciation Monitoring Network



The Met One SASS 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 AE2100 Aethalometer, using optical absorption analysis methodology, is used for sampling black carbon at Indpls-Washington Park, Gary-IITRI, and 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. During 2009 a sulfate monitor will be deployed at Gary – IITRI.

Monitoring Network

The Indiana speciation network consists of eight (8) sites across the state. The relocation of all the PM_{2.5} monitors from Evansville – Mill Rd. (181630012) to Evansville – Buena Vista (181630021) is to be completed in the 3rd quarter of 2009. The current network, along with any changes planned for 2010, is listed in Table 17.

Network Modifications

Continuous sulfate monitoring is planned to begin at Gary – IITRI (180890022) in 2010.

Table 17 – PM_{2.5} Speciation Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
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	861	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Special Purpose	Proposed	Continuous Sulfate	875	Middle	Pop Exp	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	Add
180892004	Hammond - Purdue	Lake	Hammond	Powers Bldg. Purdue Univ. Calumet, 2200 169th St.	Suplmntl Speciation	01/01/04	6-Day	811, 812, 833	Neigh	Pop Exp	41.585278	-87.474444	Chicago-Naperville-Joliet, IL	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Trends Speciation	12/13/00	3-Day	811, 812, 833	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	10/01/03	Continuous Black Carbon	861	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	01/01/06	Continuous Sulfate	875	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	Suplmntl Speciation	10/05/02	6-Day	811, 812, 833	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	Special Purpose	11/20/08	Continuous Black Carbon	861	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630012	Evansville - Mill Rd.	Vanderburgh	Evansville	Fire Station #17, 425 West Mill Rd	Special Purpose	02/01/09	Continuous Sulfate	875	Neigh	Pop Exp	38.021667	-87.569444	Evansville, IN-KY	Relocate
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Suplmntl Speciation	2009	6-Day	811, 812, 833	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Special Purpose	2009	Continuous Black Carbon	861	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation
181630021	Evansville - Buena Vista	Vanderburgh	Evansville	1110 W. Buena Vista Rd	Special Purpose	2009	Continuous Sulfate	875	Neigh	Pop Exp	38.013333	-87.577778	Evansville, IN-KY	Relocation

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
 861 - MAGEE AETHALOMETER AE2100 / ANALYSIS METHOD: OPTICAL ABSORPTION
 875 - THERMO ELECTRON 5020 / CATALYTIC THERMAL REDUCT, PULSED FLUORESCENCE

PAMS Ozone Precursors (VOCs)

Monitoring Requirements

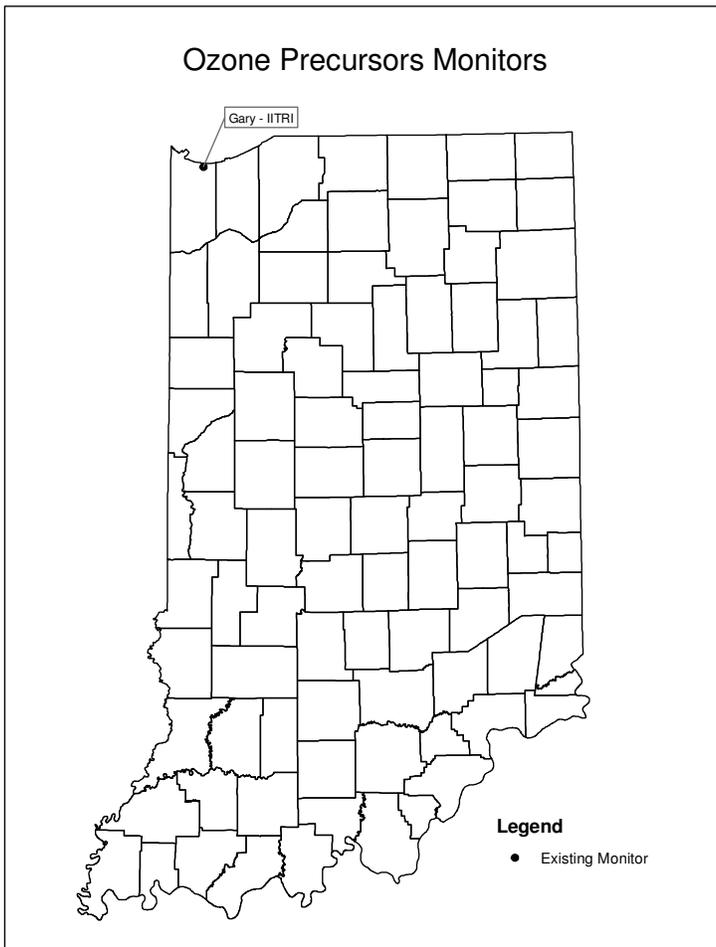
Ozone precursor monitoring is required as part of the PAMS program. The specific requirements are addressed in Table D-6 of 40 CFR Part 58 Appendix D. According to the Modified Network Plan for the Chicago Nonattainment Area, Indiana operates one (1) type 2 PAMS site. A type 2 site requires measurements for speciated VOCs, carbonyls, NO_x, CO, O₃, and surface met.

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

Monitoring Methodology

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

Figure 13 - Ozone Precursors Network



Monitoring Network

Indiana operates one PAMS monitoring site collecting ozone precursors VOCs at Gary – IITRI (180890022). The site details are in Table 18.

Network Modifications

No changes are planned for ozone precursor VOC monitoring in 2010.

Table 18 - Ozone Precursor Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	07/06/95	Continuous*	128	Middle	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	07/06/95	6-Day	146	Middle	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No

* Data collected June, July, & August only

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

Toxics (VOCs)

Monitoring Requirements

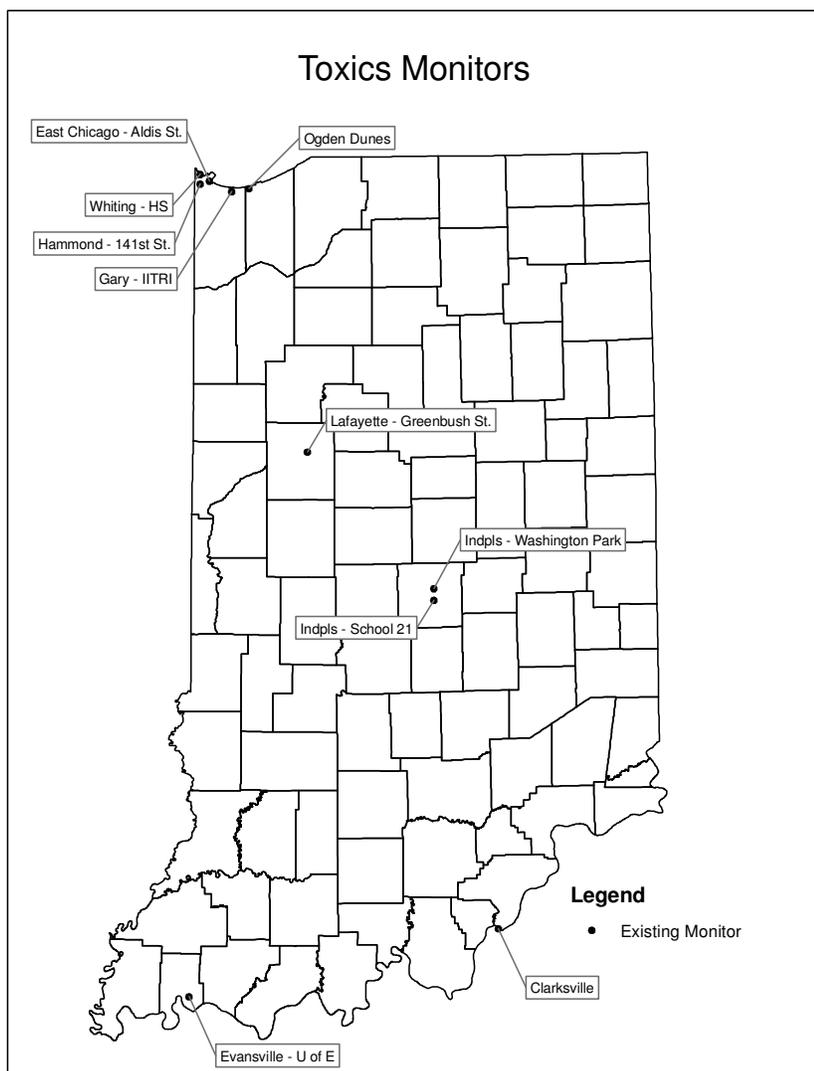
There are no requirements for toxics monitoring listed in 40 CFR Part 58.

Monitoring Methodology

Indiana uses a modification of the TO-15 method at the majority of its sites to collect toxics VOC data. TO-15 is part of 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 14 - Toxics Monitoring Network



Monitoring Network

In 2009, Indiana will operate nine (9) sites. The Indpls-School 21 site was scheduled to be discontinued at the end of 2008. Meteorological monitoring was discontinued, but not toxics. 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 2010, is listed in Table 19.

Network Modifications

No changes are planned for the toxics monitoring network in 2010.

Table 19 - Toxics Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
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
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
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
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
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
<p><i>MONITORING METHOD: 126 - CRYOGENIC PRECONCENTRATION GC/FID DETECTION</i></p> <p><i>128 - PERKIN ELMER 8700; AUTO GC; SUBAMBIENT DUAL FID</i></p>														

Carbonyls

Monitoring Requirements

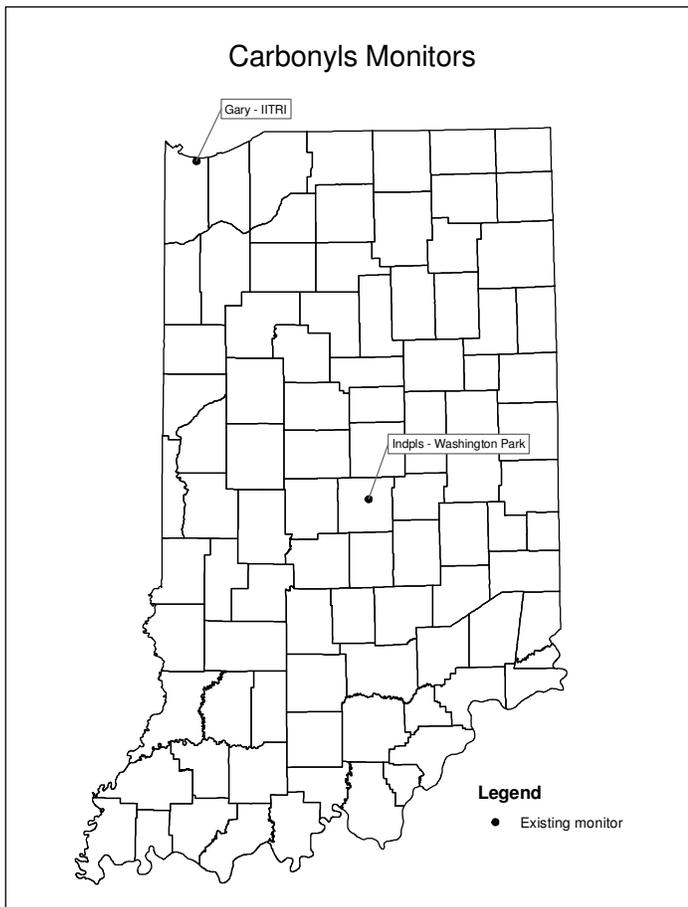
Carbonyl monitoring is required as one of the components of the PAMS monitoring program. The overall requirements are addressed in Table D-6 of 40 CFR Part 58 Appendix D. The specific requirement of monitoring for carbonyls at Indiana's PAMS site is listed in the approved PAMS network plan for the Chicago 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 and 1/3 Carbonyl 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.

Samples are collected on a 1/6 day sampling schedule at all sites. As mentioned above, the Gary-IITRI PAMS collects four (4) 3-hour samples on a 1/3 schedule during the months of June, July, and August.

Figure 15 - Carbonyl Monitoring Network



Monitoring Network

Indiana currently operates two (2) carbonyl monitoring sites. Gary - IITRI collects data for the PAMS program. Washington Park is conducted as part of the toxics monitoring network. The details of the network are in Table 20.

Network Modifications

No changes are planned for the carbonyl monitoring network in 2010.

Table 20 - Carbonyl Monitoring Network

RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	MSA	Site Change Proposed?
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	06/01/95	3-Day (4-3Hr Samples)*	102	Neigh	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180890022	Gary - IITRI	Lake	Gary	IITRI Bunker, 201 Mississippi St.	Unofficial PAMS	06/01/95	6-Day	102	Neigh	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Joliet, IL	No
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	01/01/02	6-Day	102	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
							*June - August							
MONITORING METHOD: 102 - HPLC (TO-14) DNPH-COATED CARTRIDGES														

Metals

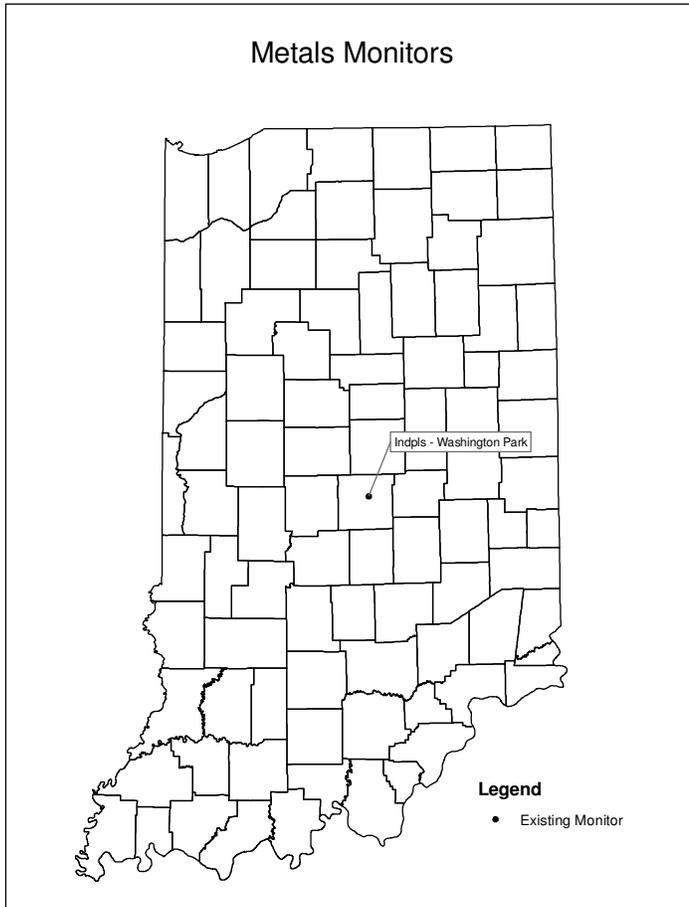
Monitoring Requirements

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

Monitoring Methodology

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

Figure 16 - Metals Monitoring Network



Monitoring Network

There is one (1) site that monitors particulate metals in Indiana. Arsenic, beryllium, cadmium, chromium, lead, manganese, and nickel are monitored. This site is detailed in Table 21.

Network Modifications

No changes are planned for the metals monitoring network in 2010.

Table 21 - Metals Monitoring Network

RO: 0523 OPERATING AGENCY: Indianapolis Office of Environmental Services (IOES)														
<u>Site ID</u>	<u>Site Name</u>	<u>County</u>	<u>City</u>	<u>Address</u>	<u>Monitor Type</u>	<u>Start Date</u>	<u>Operating Schedule</u>	<u>Monitoring Method</u>	<u>Scale</u>	<u>Monitoring Objective</u>	<u>Latitude</u>	<u>Longitude</u>	<u>MSA</u>	<u>Site Change Proposed?</u>
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St	Special Purpose	01/01/02	6-Day	107	Neigh	Pop Exp	39.811097	-86.114469	Indianapolis-Carmel	No
<u>Metals Monitored</u> Lead Manganese Nickel Arsenic Beryllium Cadmium Chromium														
MONITORING METHOD: 107 - HI-VOL SAMPLER / ANALYSIS METHOD: FLAMELESS ATOMIC ABSORPTION														

Meteorological Monitoring

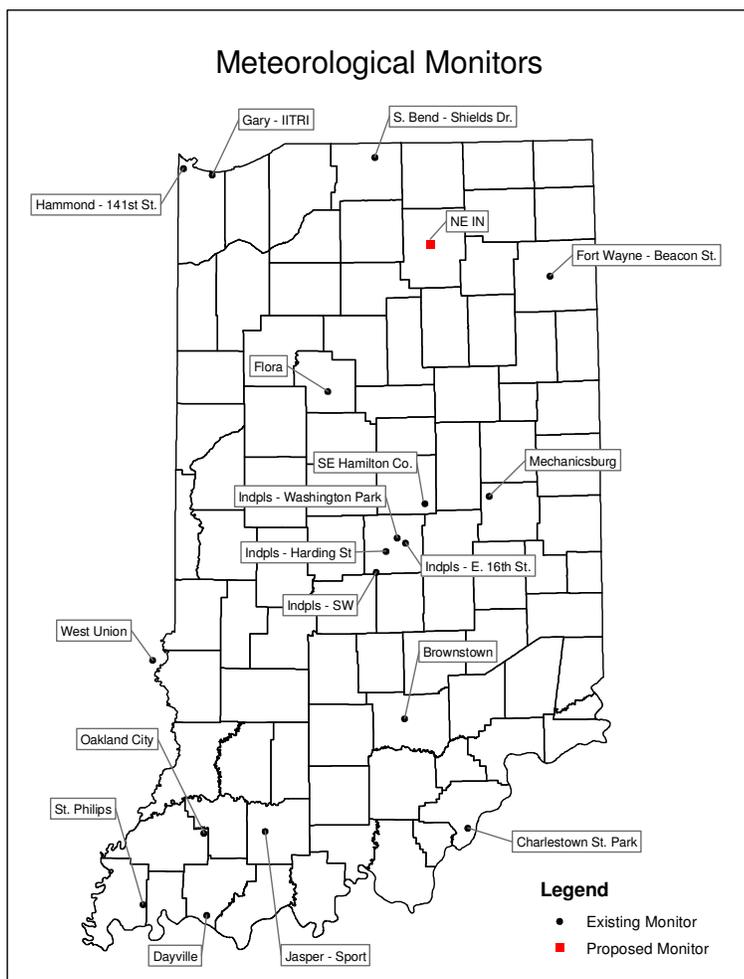
Monitoring Requirements

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 2009. This includes sites which will be installed during the remainder of 2009. Sites are established to provide coverage in all areas of the state where pollutant monitoring is conducted. Table 22 details the meteorological sites and the parameters collected.

Figure 17 - Meteorological Monitoring Network



during 2009.

Met monitoring will be deployed along with the new PM_{2.5} monitor to be located in NE Indiana in 2010.

Network Modifications

The number of meteorological monitoring sites will increase to nineteen (19) in 2010.

A new meteorological site to be installed at Bloomington with the PM_{2.5} was listed in 2009 Monitoring Network Plan but siting limitations forced the cancellation.

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. The Indpls-Mann Rd. (180970042) site was to be installed in 2008, but siting problems have necessitated the search for another location. This site is expected to be operational during 2009.

Meteorological monitoring will be added at Indpls-Washington Park as required for NCore monitoring during the 3rd quarter of 2009.

A new PM_{2.5} site in Hamilton County also is planned to have meteorological parameters installed to help support the PM_{2.5} data as well as provide data in the event of a bioterrorism event. This site is planned to be installed

Table 22 - Meteorological Monitoring Network

Site ID	Site Name	County	City	Address	Latitude	Longitude	61101/ 61102	62201	64101	62101	63302	63301	61109	65102	Site Change Proposed?
							WS / WD	RH	Baro Press	Outside Temp	UV Rad	Solar Rad	Vertical WS	Precip	
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
		Hamilton					■	■		■					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
				NE Indiana			■	■		■					Add
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 - SW	Marion	Indianapolis				■	■		■					No
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		2488 Eble Rd., Newburgh	37.954450	-87.321933	■	■	■	■					No

Appendix A Comment Submittal Information

The proposed 2010 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 15 through June 14, 2009.

A 2-hour public meeting and webinar to discuss the Indiana 2010 Ambient Air Monitoring Network Plan is scheduled to be held June 10, 2009 beginning 6:00 PM EDT in Conference Room C of the Indiana Government Center South, IGCS.

For more details visit <http://www.in.gov/idem/5472.htm>

Comments should be emailed to

Steve Lengerich (slengeri@idem.in.gov)

or mailed to

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

or faxed to

317-308-3239

Network Comments

The network plan was posted to IDEM's website on May 15, 2009. Appendix B, Indiana's Proposed NCore Monitoring Plan was not complete at that time. It was added to the Network Plan and posted to the website on May 21. Any comments received through June 22 were accepted. Three comments were received.

Comment #1

Received from Stephen Bottoms
e-mail submission on 6/14/09

Mr. Bottoms submitted a comment requesting a small particle monitor for Somerville due to coal mining operations in the area.

Response

Currently IDEM operates a PM2.5 sampler to the southeast of Oakland City. This monitor is approximately five (5) miles from Somerville. There are active coal mines and coal operations between the two sites. Values reported in 2008 from Oakland City were 25.4 ug/m3 for the 98th percentile value and 11.3 for the annual average. Data is also gathered in Evansville, Jasper, and Dale. The concentrations for the 98th percentile ranged from 22.9 to 27.2 and the annual averaged ranged from 12.0 to 12.9. These values indicate fairly consistent concentration of PM2.5 in the southwest corner of Indiana. IDEM believes that the PM2.5 concentrations collected at a site in Somerville would be in this same range and adding a monitoring site there would not produce different values.

Comment #2

Received from Joanne M. Alexandrovich, Ph.D., Vanderburgh County Ozone Officer
e-mail submission on 6/18/09

Dr. Alexandrovich submitted the following comments:

1. Was pleased that the network in SW Indiana was not reduced and had Bloomington added.
2. Expressed her objection to the decision to relocate the Mill Rd. site to Buena Vista due to concerns that the data collected at the new site would not be consistent with data collected at Mill Rd.
3. Noted the discrepancy between start dates listed for Bloomington; March on page 40 and April in Table 15. She had been unable to locate Bloomington data on IDEM's website.
4. Noted a typo in Table 15. The Bloomington Binford site # was 18-105-0063 and not 18-105-0003.
5. Was unable to locate the sulfate data from Evansville on the website.

Response

1. IDEM is appreciative of Dr. Alexandrovich's support for the SW Indiana network. The Bloomington site had been planned for the past two (2) years. Acquiring a suitable site had been very difficult and IDEM is happy to finally get the site operational.
2. Relocation of the Evansville – Mill Rd. site had been an ongoing issue for the past two to three years. Trees to the east and southeast of the site had grown enough over the years that the site was no longer meeting the siting criteria necessary for a SLAMS site. Preliminary survey work for a potential site move was conducted in 2006-2007. Removal or trimming of the trees and/or moving of the site shelter at its Mill Rd location were discussed with Evansville EPA in May 2008. No work was done at that time. The discontinuation of the Local Agency Contract with Evansville prompted a solution to the siting issue and whether IDEM would continue to monitor at this location. In order to remedy the siting concerns with the trees, and remove the trailer from City owned property, a suitable site location as near as possible to the existing Mill Rd. site was pursued. The site at 1110 Buena Vista Dr. is within 1 mile of Mill Rd., meets siting criteria, is located in grass covered area, is surrounded by a mixed

- commercial/population neighborhood, and has more than adequate distance from the nearest roadways (Buena Vista and 1st Ave.). Pollutant values are expected to be very close, if not the same, to the values collected at Mill Rd.
3. The Bloomington site began sampling on April 1 and the continuous monitor was installed on that date also. These corrections were made in the Network Plan. The continuous data from Bloomington were accessible via the reports menu. The site was not on the map. This has been corrected.
 4. The Bloomington AQS # has been corrected in the Network Plan. It is 18-105-0003.
 5. The sulfate data from Evansville – Mill Rd. is currently not being posted to the web. This unit is a different version of the monitor collecting data at Indianapolis – Washington Park. IDEM is waiting on an updated data processing module for this unit to validate the data. Once that module is in place, IDEM will post this data.

Comment # 3

Received from Mr. Tim Maloney, Sr. Policy Director, Hoosier Environmental Council
e-mail submission on 06/15/09

Mr. Maloney submitted the following comments:

1. Establish a CO monitor downwind of the I-69/I-465 corridor between Castleton and Pendleton.
2. Install a toxics monitor in southwestern Marion County.
3. Include mercury monitoring activities and results in this air monitoring plan.
4. Establish a PM2.5 monitoring site near Somerville.

Response

1. Currently USEPA is reviewing the CO NAAQS and are developing guidelines/requirements for roadside monitoring for NOx. It is anticipated that these issues will be addressed within the next year. IDEM will proceed with implementation of the required monitoring at that time.
2. IDEM recently concluded the two (2) year monitoring phase of the Southwest Indianapolis Toxics Monitoring Study. IDEM has collected two (2) years of air toxic data in SW Indianapolis and have recorded no abnormalities. There is no indication in the data that would indicate the need for continued permanent air toxic monitoring in SW Indianapolis. Because of these monitored results, IDEM will not establish a new toxics monitor in southwest Indianapolis.
3. The mercury monitoring project, which is a joint effort between IDEM and the USGS, consists of wet deposition monitoring for mercury at four (4) locations in Indiana. The sites are operated by USGS personnel with no resources for this program coming from the Air Monitoring Branch. This monitoring project has never been part of the Indiana ambient air monitoring networks and the data are not submitted into AQS. USEPA has not asked for these sites to be part of the ambient air monitoring network plans and none of the other Region 5 states submit the mercury monitoring sites as part of their plan submittals. In order to maintain consistency with other Region 5 states, IDEM will continue to keep the mercury monitoring plans separate from the ambient air monitoring plans and under the control of the USGS. The USGS mercury monitoring plan and past reports on mercury monitoring in Indiana can be found online at: <http://in.water.usgs.gov>.
4. Addressed in Comment #1.

Appendix B

**Indiana
NCORE Monitoring Network Plan**

**For
Indianapolis - Washington Park**



Indiana Department of Environmental Management
Office of Air Quality
July 1, 2009

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Acronyms

AQS	Air Quality System
BAM	Beta Attenuation Monitor
BP	Barometric Pressure
CAMS	Continuous Air Monitoring Station
CFR	Code of Federal Regulations
CO	Carbon Monoxide
FDMS	Filter Dynamic Measurement System
FEM	Federal Equivalent Method
FRM	Federal Reference Method
IDEM	Indiana Department of Environmental Management
lpm	liters per minute
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standard
NAMS	National Air Monitoring Station
NCore	National Core Multipollutant Monitoring Station
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NO _y	Total Reactive Nitrogen Oxides
O ₃	Ozone
OT/RH	Outdoor Temperature/Relative Humidity
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 between 10 and 2.5 microns
QA	Quality Assurance
SASS	Speciation Air Sampling System
SLAMS	State or Local Air Monitoring Stations
SO ₂	Sulfur Dioxide
TSP	Total Suspended Particulate
TEOM	Tapered Element Oscillating Microbalance
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
VOC	Volatile Organic Compounds
WSWD	Wind Speed/Wind Direction

Indiana NCore Monitoring Plan

Introduction

National Core (NCore) monitoring stations are characterized as a type of SLAMS that are a subset of multi-pollutant sites currently within the SLAMS network. Nationally USEPA expects to have approximately fifty (50) NCore sites that are representative of urban areas, and approximately twenty (20) that are representative of rural areas. Representative locations will utilize siting criteria that is specific and defined for the NCore classification.

NCore Requirements

40CFR Parts 53 and 58, Revisions to Ambient Air Monitoring Regulations; Final Rule published on October 17, 2006, established the criteria for the NCore Monitoring Network. In Appendix D to Part 58, 3(a) sets the requirement for each state to operate at least one (1) NCore site. §58.10a(3) states that “the plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.”

Appendix D to Part 58, 3(b) lists the minimum parameters to be monitored at an NCore site:

- Continuous PM_{2.5} particle mass
- Intermittent PM_{2.5} particle mass
- Speciated PM_{2.5}
- PM_{10-2.5} particle mass
- Speciated PM_{10-2.5}
- O₃
- SO₂ (trace level)
- CO (trace level)
- NO/NO_y
- WS/WD
- OT/RH

NCore Monitoring Objectives

The NCore Network addresses the following objectives:

- Timely reporting of data to public by supporting AIRNow, air quality forecasting, and other public reporting mechanisms;
- Support for development of emission strategies through air quality model evaluation and other observational methods;
- Accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors;
- Support for long-term health assessments that contribute to ongoing reviews of the NAAQS;
- Compliance through establishing nonattainment/attainment areas through comparison with the NAAQS;
- Support to scientific studies ranging across technological, health, and atmospheric process disciplines; and
- Support to ecosystem assessments recognizing that national air quality networks benefit ecosystem assessments and, in turn, benefit from data specifically designed to address ecosystem analyses.

NCore System Design

The regulatory changes promulgated on October 17, 2006 (40 CFR Parts 53 and 58) provide the basic design attributes for NCore sites. They provide the regulatory structure to reform the existing SLAMS network, and to complement QA requirements. IDEM will fulfill this by utilizing the following at the IDEM NCore site:

- **Multi-Pollutant Measurements.** Multi-pollutant measurements will simplify overall monitoring operations and offer an increased capacity with regards to monitor diagnostics and instrument performance.
- **Emphasis on Continuous Operating Instrumentation.** Continuous Air Monitoring systems will allow for near instantaneous data to be assimilated into a telemetry system and dispersed to reporting mechanisms such as the IDEM WEB site and the USEPA AIRNow site. These data can then be utilized for near real time analysis for public health uses and air quality modeling.
- **Establish a “Representative” Location.** Siting criteria must be specific and defined for the site classification. National-level health assessments and air quality model evaluations require data representative of broad urban (4 to 50 Km) spatial scales.

NCore Network Monitoring Scales

40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. The monitoring objective for the NCore site is to produce data that represent a fairly large area and therefore the spatial scale of the site is important. In the case of urban NCore the spatial scales to be used are neighborhood and urban as listed in Table 1.

Table 2 – Possible Spatial Scales for NCore Pollutants

Pollutant	Spatial Scale	Comments
Ozone	Neighborhood and Urban Scale	
NO _x	Neighborhood and Urban Scale	
Carbon Monoxide (CO)	Neighborhood Scale	There is no Urban scale for CO
SO ₂	Neighborhood Scale	There is no Urban scale for SO ₂
PM ₁₀ /PM _{2.5} /Lead	Urban	

NCORE Network Siting Criteria

The overall siting criteria for scale, probe location, and distance from trees, obstructions and roadways are listed in Table 2.

Table 3 is taken from Table E-1 in Appendix D of Part 58. It details the minimum distances from roadways, depending on traffic counts, for O₃ and NO, NO₂, NO_x, and NO_y.

Table 2 – USEPA Siting Criteria for NCore Sites

Pollutant	Scale (maximum monitoring path length, meters)	Height from ground to probe, inlet or 80% of monitoring path ¹	Horizontal and vertical distance from supporting structures ² to probe, inlet or 90% of monitoring path ¹ (meters)	Distance from trees to probe, inlet or 90% of monitoring path ¹ (meters)	Distance from roadways to probe, inlet or monitoring path ¹ (meters)
SO ₂	Middle (300 m) neighborhood urban, and regional (1 km)	2–15	> 1	> 10	N/A
CO	Micro, middle (300 m), neighborhood (1 km)	3± 1/2: 2–15	> 1	> 10	2–10
NO ₂ , O ₃	Middle (300 m) neighborhood, urban, and regional (1 km)	2–15	> 1	> 10	See Table 3 for all scales
Ozone precursors (for PAMS)	Neighborhood and urban (1 km)	2–15	> 1	> 10	See Table 3 for all scales
PM, Pb	Micro: middle, neighborhood, urban and regional	2–7 (micro); 2–7 (middle pm _{10–2.5}); 2–15 (all other scales)	> 2 (all scales, horizontal distance only)	> 10 (all scales)	2–10 (Micro scale); See Table 3 for all other scales

Table 3 – Roadway Distances to Probes

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters) Neighborhood Scale	Minimum distance ^{1,2} (meters) Urban Scale
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

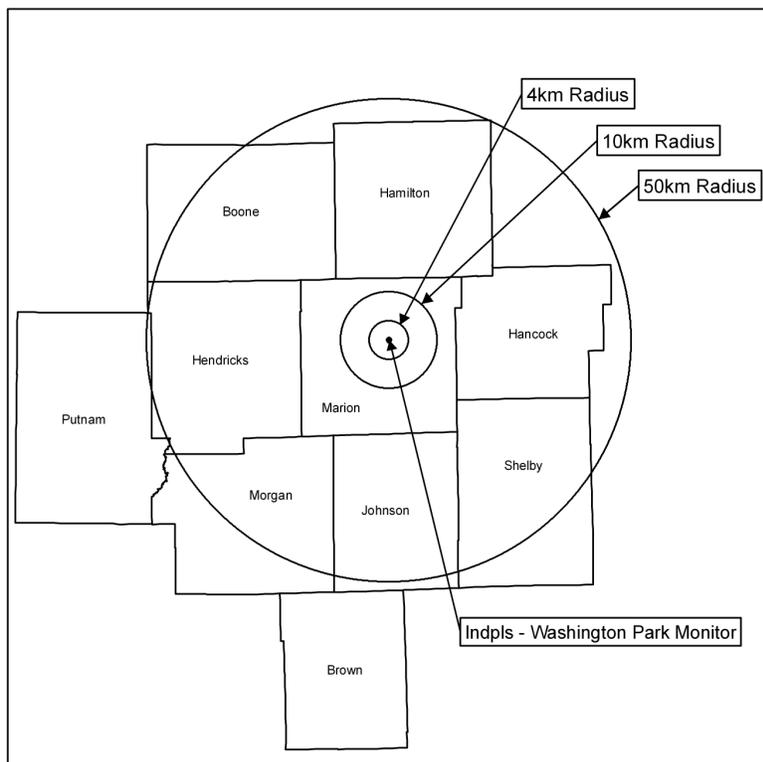
Indiana’s Proposed NCore Site

Indiana will establish an NCore multi-pollutant air monitoring station at the Indpls - Washington Park (180970078) monitoring site. This site is also designated as CAMS #57 on IDEM’s website for the posting of ambient air quality data. This is an established SLAMS PM_{2.5} monitoring site that will be converted to an NCore site. This site location meets the objective for an NCore urban site.

Site Description

The Washington Park NCore site represents an urban (large city) area and the siting criteria which are specifically defined for this classification. It is located in the Indianapolis MSA which includes the counties of Boone, Brown, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, Putnam, and Shelby. The location of Washington Park in the MSA is in Figure 1.

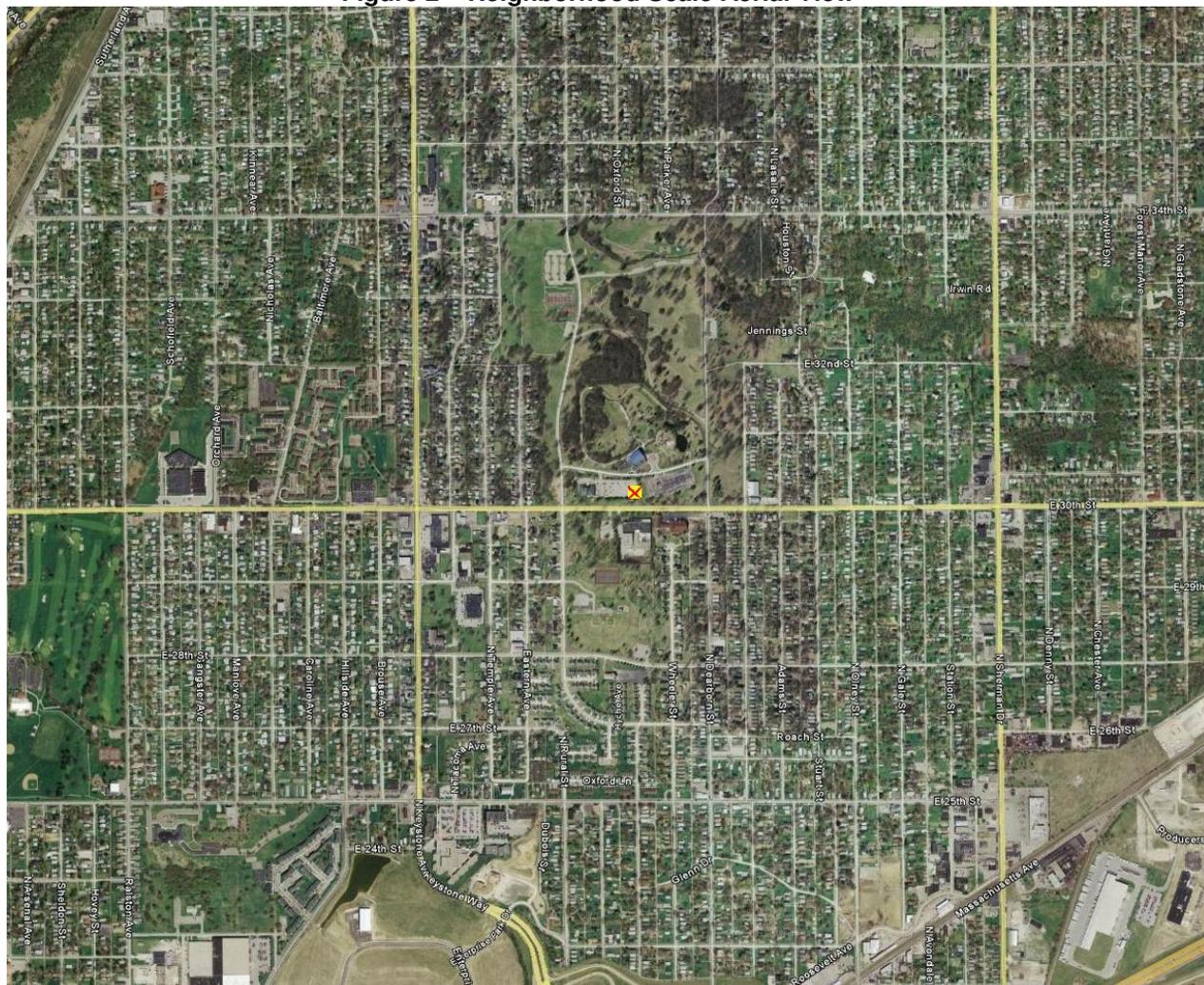
Figure 3- 4km to 50km MSA Radius Map



IDEM’s NCore Site Description

The parameters to be monitored at Washington Park are representative of neighborhood scale (area of representativeness up to a radius of 4 km.) This area is a mix of commercial, light industrial, and dense residential along with the I-70 corridor. It is representative of most areas inside I-465 (the bypass loop around Indianapolis). This scale also includes the Indianapolis Public School District. Figure 2 shows an aerial view of the site in relationship to the 4 kilometer neighborhood scale. Figure 3 is a local street map of the area.

Figure 2 – Neighborhood Scale Aerial View



Indpls – Washington Park Site Details

Site Identification

Site Name: Indpls - Washington Park (CAMS # 57)

AQS Site Number: 18-097-0078

Location

Washington Park is located to the northeast of the downtown area of Indianapolis. It is 5.6 km. from the center of the city and approximately 4 km. from the edge of the central business district.

Address: 3120 East 30th Street, Indianapolis, IN

County: Marion

Site Coordinates:

- Latitude: 39° 48' 39" North (+39.810833 °)
- Longitude: 86° 06' 52" West (-86.14444 °)
- Elevation: 230 meters (755 feet)

approximately thirty-five (35) feet high. These trees are forty-two (42) meters to the southwest of the probes on the larger shelter. There are no obstructions to affect the airflow to the site. There are no major or minor sources near this location.

All continuous instruments will be contained within a shelter that will control the inside environment to within $\pm 2^{\circ}\text{C}$, with an elevated sampling inlet for the NO_y monitor that will be raised to 10 meters in height.

Site Photos

Figure 4 shows the two (2) shelters currently being used at Washington Park. Figure 5 through 12 are views of the eight (8) cardinal directions surrounding the site.

Figure 4 – Site Shelters





Figure 5 – Northwest View



Figure 6 – North View



Figure 7 – Northeast View



Figure 8 – East View



Figure 9 – Southeast View



Figure 10 – South View



Figure 11 – Southwest View



Figure 12 – West View

Monitored Parameters

Washington Park was established in 1999 as one of the original $PM_{2.5}$ monitoring sites for Indianapolis. Due to its location as being generally downwind of the central business district, and the density of the population in the surrounding area, this site has been very good as a representative site for a majority of the City of Indianapolis. Over the years, it has had other parameters added and has provided a rich monitoring database.

The NCore parameters currently being monitored include intermittent and continuous $PM_{2.5}$, speciated $PM_{2.5}$, and O_3 . The met station is planned to be installed in June 2009. The trace level CO and SO_2 , along with the NO_y monitors are planned to be installed later this year, around September or October. Samplers for $PM_{10-2.5}$ and speciated $PM_{10-2.5}$ will not be purchased until samplers for these parameters have been designated by USEPA for use in the NCore network. They will be deployed at that time. It is anticipated this will meet the January 1, 2011 deadline.

The NCore parameters monitored at this site along with those planned to be deployed are listed in Table 4.

Table 4 – NCore Monitors to be used at Indpls – Washington Park

Parameter	Designation	Start Date	Sampler or Monitor	Method Code	Analysis Method	Sample Frequency
CO – trace level	NCore	Proposed 10/09	Teledyne API 300EU	093	Automated reference method utilizing trace level non-dispersive infrared analysis.	Continuous
NO _y	NCore	Proposed 10/09	Teledyne API 200EU	099	Automated reference method utilizing chemiluminescence analysis.	Continuous
O ₃	NCore/AQI	4/1/09	Thermo Electron 49i	047	Automated equivalent method utilizing uv photometry analysis.	Continuous
SO ₂ – trace level	NCore	Proposed 10/09	Teledyne API 100EU	100	Automated equivalent method utilizing Trace Level UV Fluorescence Analysis	Continuous
Intermittent PM _{2.5}	NCore	3/7/99	Thermo Electron 2025	145	Manual reference method utilizing gravimetric analysis.	1/1 day
Intermittent PM _{10-2.5}	NCore	Proposed 1/1/11	NA	NA	NA	1/3 day
Continuous PM _{2.5}	NCore/AQI	1/1/04	Thermo Electron 1400A TEOM with FDMS and 'c' drier	760	Automated equivalent method* utilizing tapered element oscillating microbalance/gravimetric analysis	Continuous
PM _{2.5} Speciation	NCore	12/13/00	Met One SASS & URG 3000N	Various	Multi-species manual collection method utilizing thermal optical, ion chromatography, gravimetric, and x-ray fluorescence analyses.	1/3 day
PM _{10-2.5} Speciation	NCore	Proposed 1/1/11	NA	NA	NA	NA
WSWD	NCore	Proposed 6/09	RM Young 05305-AQ	020	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure temperature, rainfall, and solar radiation	Continuous
OT/RH	NCore	Proposed 6/09	RM Young 41372VF	040 / 020	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure temperature, rainfall, and solar radiation	Continuous

Table 5 – Additional Monitors at Indpls – Washington Park

Parameter	Designation	Start Date	Sampler or Monitor	Method Code	Analysis Method	Frequency of Sampling
Continuous Sulfate	SPM	1/1/06	Thermo Electron 5020 SPA	875	Catalytic thermal reduction fluorescence	Continuous
Continuous Black Carbon	SPM	10/1/03	Magee AE21	861	Optical Absorption	Continuous
Toxics	SPM	4/18/99	Meriter MCS-1-R	126 150	SS 6l canister with cryogenic GC/MS	1/6 day
Carboynls	SPM	4/18/99	ATEC 2200 2C	102	Silica DNPH cartridge w/KI O3 scrubber with HPLC (TO-11A)	1/6 day
Metals	SPM	4/18/99	High Volume Sampler	107	Atomic Absorption with graphite furnace	1/6 day
Precipitation	Other	Proposed 10/09	RM Young 52202E	014	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure temperature, rainfall, and solar radiation	Continuous
BP	Other	Proposed 10/09	Met One 594	011	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure temperature, rainfall, and solar radiation	Continuous

In addition to the required NCore parameters, other parameters are also currently being monitored at this location, or are planned as part of the installation of the met station. These include toxics, carbonyls, metals, continuous sulfate, and continuous black carbon. The specific monitor information is in Table 5.

Data Collection

The Coastal Environmental Systems, Zeno Model 3200 Datalogger is used for the capture, storage and transmittal of voltages from the analog outputs of the instrumentation. Values are logged every second and averaged over 5 minutes. The 5 minute averages are requested from the datalogger every quarter hour and transmitted to the central polling server via wireless broadband.

The data are posted to IDEM's website and available to the public at <http://leads.idem.in.gov/idem/index2.html>.

Gaseous Monitor Calibration

An auto-calibration system will be installed to perform many of the QA operations required for the continuous gaseous monitors, CO, NO_y, O₃, and SO₂. The systems consists of a Teledyne Advanced Pollution Instrumentation, TAPI model M700E dynamic dilution calibrator with mass flow controllers capable of 0-20 lpm of dilutant zero air, and 0-100 cc/min mass flow of source gas. The zero air system is a TAPI model M701 capable of delivering 0-20 lpm @ 30 psi. The system performs calibrations, weekly audits and daily span-zeroes.

Data Submittal

All filter samples will be analyzed in monthly batches. Continuous data are validated on a monthly basis. Data are planned to be submitted to AQS within sixty (60) days after the month in which the data were collected. This timeframe will allow Indiana to meet the USEPA's reporting requirement, §58.12(b) of 40 CFR Part 58, to submit data within ninety (90) days of the end of the quarter in which the data were collected.

Appendix C

2010

Indiana Lead Monitoring Network Plan



Indiana Department of Environmental Management
Office of Air Quality
July 1, 2009

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Acronyms

AERMOD	American Meteorological Society / Environmental Protection Agency Regulatory Model
AQS	Air Quality system
BOF	Basic Oxygen Furnace
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
EAF	Electric Arc Furnace
EI	Emissions Inventory
IDEM	Indiana Department of Environmental Management
IITRI	Illinois Institute of Training and Research Incorporated
MSOP	Minor Source Operating Permit
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NWS	National Weather Service
SLAMS	State and Local Air Monitoring Station
tpy	tons per year
TRI	Toxics Release Inventory
TSP	Total Suspended Particulate
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
USEPA	United States Environmental Protection Agency

Indiana Lead Monitoring Network Plan

Introduction

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of Pb emissions have historically been from fuels in motor vehicles (such as cars and trucks) and industrial sources. Emissions from on-road vehicles decreased 99% between 1970 and 1995 due primarily to the use of unleaded gasoline. Use of leaded gasoline in highway vehicles was prohibited on December 31, 1995. Due to the phase out of leaded gasoline, ore and metals processing have become the major sources of Pb emissions in the air today. The highest levels of Pb in air are generally found near Pb smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. Combustion and smelting processes operate at high temperatures and emit submicron particulate matter Pb. Material handling and mechanical operations emit larger particles of Pb.

New NAAQS

USEPA promulgated a new lead NAAQS on October 15, 2008. The new standard is set forth in 40 CFR Part 50.

§50.16 National primary and secondary ambient air quality standards for lead.

(a) The national primary and secondary ambient air quality standards for lead (Pb) and its compounds are 0.15 micrograms per cubic meter, arithmetic mean concentration over a 3-month period, measured in the ambient air as Pb either by:

(1) A reference method based on Appendix G of this part and designated in accordance with part 50 of this chapter or;

(2) An equivalent method designated in accordance with part 53 of this chapter.

(b) the national primary and secondary ambient air quality standards for Pb are met when the maximum arithmetic 3-month mean concentration for a 3-year period, as determined in accordance with Appendix R of this part, is less than or equal to 0.15 micrograms per cubic meter.

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 maximum Pb concentrations in ambient air in excess of the NAAQS, the potential for high population exposure, and logistics of siting a monitor. 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. The facility emissions are to be based on the most recent National Emission Inventory or other scientifically justifiable methods and data, such as improved emissions factors or site-specific data. Waivers may be granted if the state can demonstrate that the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% ($0.075 \mu\text{g}/\text{m}^3$) of the NAAQS. The source-oriented sites are to be 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.

Indiana's Sources

Originally thirty-one (31) Pb sources were identified through the NEI and TRI databases as operating in Indiana and potentially requiring monitoring. Table 1 lists these sites along with the original NEI, TRI, and

State EI data. As the databases were not all in agreement, updated information was requested from the individual sources to determine the most current emissions data. When the updated information was compiled, there were nineteen (19) sources of concern listed in Table 2.

Source Analysis

The sources were divided into three (3) categories, as indicated in Table 2, to decide the next step in determining the need to monitor:

Category 1 – Facilities where emissions exceed 1 tpy based on emission estimates confirmed by the state.

Dispersion modeling is performed as a first step in the process of siting a monitor or applying for a waiver. If the modeling results show a maximum Pb concentration of 50% or more of the NAAQS then the state should site a monitor. If the results show that the industry does not contribute to 50% of the NAAQS, then the state can apply for a waiver to siting a monitor.

Category 2 – Facilities where emissions are confirmed to be between 0.7-1 tpy and USEPA requests modeling.

The state is asked to perform dispersion modeling of these sources in order to assess the maximum ambient Pb concentrations and potential need for a monitor. If the modeling results show a maximum Pb concentration of 50% or more of the NAAQS, including background, then the state should site an ambient monitor. If the modeling demonstrates that the source does not contribute to 50% of the NAAQS, then it is not necessary to monitor.

Category 3 – Facilities exceeding 1 tpy according to USEPA inventories, but shown by the state to be lower.

The state should provide USEPA with an explanation of how it determined that existing estimates were erroneous and why the source does not need to be considered for modeling or monitoring.

Eleven (11) facilities were identified as Category 1 sources and one (1) source was identified as a Category 2. Both categories had sources identified as having over 0.7 tpy of Pb emissions during 2005, 2006, or 2007 and require modeling to determine maximum ambient impact. Depending on the results, the modeling would indicate potential areas to locate a monitoring site, determine a site is not required, or allow the state to apply for a waiver of monitoring.

Modeling has been completed for seven (7) of the sources. The bottom five (5) sources on Table 2 are EGUs and the modeling and analysis will be completed shortly. Preliminary data indicate these sources, when modeled, will be below one-half of the NAAQS, $<0.075 \text{ ug/m}^3$. A waiver of the monitoring requirement will be prepared and submitted to USEPA.

Modeling is not required for sources identified as Category 3 in Table 2. The state must address the discrepancies in the various emissions databases and submit documentation how the emissions were revised or point out major issues such as plant closures. This documentation is in Attachment C-1.

Table 1 – Initial Listing of Pb Sources in Indiana

Point sources where Pb monitoring may be required, unless E.I. is revised or modeling shows <50% NAAQS resulting from emissions.

"Yes" if State E.I. >1.0 tpy once during 2005-2007; "Possibly" if between 0.7 tpy and 1.0 tpy; "Unlikely" if <0.7 tpy

State	County	FIPs	Facility	Address	City	Zip	Site ID	NEI		TRI			State EI			Monitor needed?
								02	05	04	05	06	05	06	07	
IN	Cass	18017	Essroc Corp.	State Rd. 25 S. 3084 W. Co.	Logansport	46947	NEI16354	2.38	0.74			0.38			?	unlikely
IN	De Kalb	18033	Auburn Foundry Plant 1	635 W. Eleventh St.	Auburn	46706	NEI31376	0.73	0.81							unlikely
IN	De Kalb	18033	Parker Hannifin Corp.	1 Parker Dr.	Ashley	46705	NEI2INT16240	1.32	0.1	0.46		1.37				unlikely
IN	De Kalb	18033	Steel Dynamics Inc.	4500 CR 59	Butler	46721	NEI31386	2.93	0.22	3.26	2.88	3.28	0.22	0.22	0.17	unlikely
IN	Delaware	18035	Exide Technologies	2601 W. Mt. Pleasant Blvd.	Muncie	47302	NEI31400	1.47	1.47	0.53	0.45	0.48			0.80	yes
IN	Fulton	18049	Rochester Metal Products Corp.	616 Indiana Ave.	Rochester	46975	NEI31691	1.76	2.09	2.09	2.32	2.20		0.10	0.01	unlikely
IN	Gibson	18051	Duke Energy; Gibson Station	1097 N. 950 W.	Owensville	47665	NEI31699		0.11	1.62	1.43	1.41				unlikely
IN	Hamilton	18057	Firestone Industrial Products	1700 Firestone Blvd.	Noblesville	46060	NEI11698	1.10	0	1.36	2.10	1.73				unlikely
IN	Hendricks	18063	Steel Dynamics Inc.- Eng. Bar Prod.	8000 N. County Rd. 225E	Pittsboro	46167	NEIIN0630003		0.00		1.95	2.98			0.10	unlikely
IN	Kosciusko	18085	Dalton Corp. Warsaw Manuf.	1900 E. Jefferson St.	Warsaw	46580	NEI11745	1.99	0				0.00	0.00	0.00	unlikely
IN	Lake	18089	Mittal Steel - IN Harbor West	3001 Dickey Rd.	East Chicago	46312	NEI31951	6.26	0.44	0.65	0.52	0.53	0.44	>5	>5	yes
IN	Lake	18089	Mittal Steel USA, IN Harbor East	3210 Watling Street	East Chicago	46312	NEIIN00316	3.00	2.99	1.33	1.23	1.06	3.54	4.25	>5	yes
IN	Lake	18089	USS Gary Works	One N. Broadway, MS-70	Gary	46402	NEI31812	1.91	0.93	1.22	0.96	1.65	0.92	0.92	0.88	possibly
IN	Marion	18097	Covanta Indianapolis Inc.	2320 S. Harding St.	Indianapolis	46221	NEI32146	1.20	0.03						0.06	unlikely
IN	Marion	18097	Indianapolis Belmont WWTP	2700 S Belmont Ave.	Indianapolis	46221	NEI32134	1.00	1.00						0.10	unlikely
IN	Marion	18097	Milestone Contractors, L.P.	4202 S. Harding St.	Indianapolis	46217	NEIIN509	1.22	0							unlikely
IN	Marion	18097	Quemetco, Inc.	7870 W. Morris St.	Indianapolis	46231	NEI32182	1.71	1.71	0.43	0.56	0.53			0.64	unlikely
IN	Martin	18101	Crane Div., Naval Surf. Warfare Ctr.	300 US 361	Crane	47522	NEIIN1010000	0.67	0.08	0.17	0.03	0.57	1.20	0.90	0.89	yes
IN	Noble	18113	Dalton Corp. Kendallville Mfg.	200 W. Ohio St.	Kendallville	46755	NEIIN1130000	1.91	0.62	0.00	0.00	0.00	0.62	0.58	0.57	unlikely
IN	Perry	18123	Thyssenkrupp Waupaca, Inc.	9856 State Hwy 66	Tell City	47586	NEIIN123188	0.83	1.09	0.83	0.84	0.84	1.09	1.08	0.12	unlikely
IN	Pike	18125	Ipalco-Petersburg	Hwy 57 N	Petersburg	47567	NEI32321		0.08							unlikely
IN	Porter	18127	Beta Steel Corp.	6500 S. Boundary Rd.	Portage	46368	NEIIN1270003		0.00			1.84			0.04	unlikely
IN	Porter	18127	ISG Burns Harbor LLC	250 W US Hwy 12	Burns Harbor	46304	NEI32327	3.95	3.62	4.74	4.63	1.24	3.62	2.23	2.66	yes
IN	Porter	18127	Philip Metals - Burns Harbor Yard	U.S. Hwy 12	Burns Harbor	46311	NEIIN583	1.13	0.68					0.53	0.52	unlikely
IN	Posey	18129	GE Plastics - Mt. Vernon Inc.	1 Lexan Ln.	Mount Vernon	47620	NEI32357		0.06		1.25					unlikely
IN	Spencer	18147	Indiana Michigan Power	RR 2, Box 24A Rte 231	Rockport	47635	NEI32467		0.04							unlikely
IN	Vigo	18167	Duke Energy; Wabash River Station	450 Bolton Rd.	West Terre Haute	47885	NEI32614		0.11	0.51		0.78				unlikely
IN	Warrick	18173	Alcoa Inc. - Warrick Operations	Hwys 66 & 61	Newburgh	47629	NEI32661	0.22	0.03	1.16	1.15	0.98			0.30	unlikely
IN	Wells	18179	Sterling Casting Division	1000 W. Wiley St.	Bluffton	46714	NEI32715	0.82	0.82							unlikely
IN	Whitley	18183	Steel Dynamics Inc. - Struct. & Rail	2601 Cnty Rd. 700 E.	Columbia City	46725	NEI2IN183000	0.88	0.58	0.88	0.94	1.24			0.18	unlikely
IN	Jasper	18377	Nipsco - R.M. Schahfer	RR#1 Box 320	Wheatfield	46392	NEI12582		0.08							unlikely

Table 2 – Revised Emission Source Information

Facilities requiring Pb ambient air monitor, dispersion modeling to assess potential to violate NAAQS, or statement of revised emissions.														Lat	Long
State	County	Facility	Address	City	NEI			TRI			State EI				
					02	05	04	05	06	05	06	07			
IN	De Kalb	Parker Hannifin Corp.	1 Parker Dr.	Ashley	1.3	0.1	0.5		1.4	ND	ND	ND	3	41.53	-85.08
IN	De Kalb	Steel Dynamics Inc.	4500 CR 59	Butler	2.9	0.2	3.3	2.9	3.3	0.2	0.2	0.2	3	41.37	-84.92
IN	Delaware	Exide Technologies	2601 W. Mt. Pleasant Blvd.	Muncie	1.5	1.5	0.5	0.5	0.5	ND	ND	0.8	1v	40.16	-85.42
IN	Fulton	Rochester Metal Products Corp.	616 Indiana Ave.	Rochester	1.8	2.1	2.1	2.3	2.2	ND	2.3	0.0	3	41.07	-86.21
IN	Hamilton	Firestone Industrial Products	1700 Firestone Blvd.	Noblesville	1.1	0.0	1.4	2.1	1.7	ND	ND	ND	*3c	40.04	-86.00
IN	Hendricks	Steel Dynamics - Eng. Bar Prod.	8000 N. County Rd. 225E	Pittsboro		0.0		2.0	3.0	ND	ND	0.1	3	39.52	-86.29
IN	Lake	Mittal Steel - IN Harbor West	3001 Dickey Rd.	East Chicago	6.3	0.4	0.7	0.5	0.5	0.4	5.0	5.0	1	41.67	-87.46
IN	Lake	Mittal Steel USA, IN Harbor East	3210 Watling Street	East Chicago	3.0	3.0	1.3	1.2	1.1	3.5	4.3	5.0	1	41.65	-87.45
IN	Lake	USS Gary Works	One N. Broadway, MS-70	Gary	1.9	0.9	1.2	1.0	1.7	0.9	0.9	1.0	1	41.62	-87.32
IN	Marion	Indianapolis Belmont WWTP	2700 S Belmont Ave.	Indianapolis	1.0	1.0				ND	ND	0.1	3	39.73	-86.19
IN	Marion	Quemetco, Inc.	7870 W. Morris St.	Indianapolis	1.7	1.7	0.4	0.6	0.5	0.6	0.5	0.6	2	39.75	-86.30
IN	Martin	Crane, Naval Surf. Warfare Ctr.	300 US 361	Crane	0.7	0.1	0.2	0.0	0.6	1.2	0.9	0.6	1	38.87	-86.82
IN	Perry	Thyssenkrupp Waupaca, Inc.	9856 State Hwy 66	Tell City	0.8	1.1	0.8	0.8	0.8	1.1	1.1	0.1	3	37.99	-86.77
IN	Porter	Beta Steel Corp.	6500 S. Boundary Rd.	Portage		0.0			1.8	0.0	1.5	0.0	3	41.62	-87.16
IN	Porter	ISG Burns Harbor LLC	250 W US Hwy 12	Burns Harbor	4.0	3.6	4.7	4.6	1.2	3.6	2.2	2.7	1	41.64	-87.13
IN	Posey	GE Plastics - Mt. Vernon Inc.	1 Lexan Ln.	Mount Vernon		0.1		1.3		0.1	0.2	0.2	3	37.94	-87.91
IN	Warrick	Alcoa Inc. - Warrick Operations	Hwys 66 & 61	Newburgh	0.2	0.0	1.2	1.2	1.0	0.0	0.0	0.0	3	37.91	-87.33
IN	Whitley	Steel Dynamics - Struct. & Rail	2601 Cnty Rd. 700 E.	Columbia City	0.9	0.6	0.9	0.9	1.2	0.6	0.6	0.2	3	41.14	-85.51
IN	Gibson	Duke Energy; Gibson Station	1097 N. 950 W.	Owensville		0.1	1.6	1.4	1.4	0.0	2.1	2.2	1	38.37	-87.77
IN	JASPER	NIPSCO - SCHAFER STATION	RR#1 BOX 320	WHEATFIELD		1.0	0.1	0.1	0.1	1.2	1.1	1.2	1	41.23	-87.03
IN	PIKE	INDIANAPOLIS POWER AND LIGHT - PETERSBURG GENERATI	HIGHWAY 57 NORTH	PETERSBURG		1.1	0.4	0.4	0.4	0.4	0.4	0.4	1	38.53	-87.25
IN	SPENCER	INDIANA MICHIGAN POWER (DBA AEP) - ROCKPORT	RR 2, BOX 24A ROUTE 231	ROCKPORT		2.2	0.2	0.2	0.4	0.2	0.2	0.2	1	37.93	-87.04
IN	WARRICK	ALCOA - WARRICK GENERATING	HWYS 66 & 61	NEWBURGH		1.2	1.2	1.2	1.0	0.8	0.8	0.4	1	37.91	-87.33

1) Monitor required. State confirms Pb > 1 tpy during 2005-07, 1v) existing monitor violates; 1c) existing monitor violates, facility closing
 2) State confirms Pb > 0.7 tpy during 2005-07. EPA requests modeling, unless emissions & site characteristics preclude likelihood of >50% NAAQS
 3) State confirms Pb < 0.7 tpy. Documentation needed in annual monitoring plan to dispute > 1 tpy in NEI 2005 or TRI 2004-06.

*3c - announced last year plans to close by July 2009
 ND = NO DATA

Modeling Methodology

For this analysis AERMOD, version 07026, was used. Sources were modeled with the 3 latest years of available meteorology (1990-1992). The emission rates used were from the 2007 I-Steps data base.

Flat terrain was used with a rectangular receptor grid of 500 meters for sources in Lake County, including Mittal East, Mittal West, and US Steel. The same receptor grid was used for Arcelor Mittal Burns Harbor in Porter County. All of the sources in northwest Indiana were modeled with South Bend NWS surface data. The upper-air data were obtained from Lincoln, Illinois.

For Crane, receptors were placed around the border of the weapons site but elevated terrain was used. Surface meteorological data were obtained from the Evansville NWS. The upper-air data were obtained from Lincoln, Illinois

Exide and Quemetco were modeled with flat receptor grids of 200 meters. They were modeled with Indianapolis surface data and Dayton, Ohio upper air measurements from the NWS.

Modeling Results

Table 3 lists the source impact results from the completed modeling. The peak impact is added to the background reading which is compared to half of the new standard ($0.075 \mu\text{g}/\text{m}^3$). The highest monthly average of modeling was used as a conservative estimate. Note that Mittal Steel East and Mittal Steel West are two facilities next to each other. They were modeled separately and also combined.

Table 3 - Source Impacts

SOURCE NAME	ACTUAL EMISSION RATE	BACKGROUND READING	MONTHLY IMPACT	TOTAL IMPACT	ABOVE 0.075 ?
	(tons/year)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
Mittal Steel West	10.36	0.056	0.047	0.103	Yes
Mittal Steel East	5.60	0.056	0.040	0.096	Yes
Mittal Steel East & Mittal Steel West Combined	15.86	0.056	0.059	0.115	Yes
U.S. Steel	0.85	0.056	0.031	0.087	Yes
Arcelor-Mittal Burns Harbor	2.26	0.056	0.13**	0.186	Yes
Crane	0.88	0.027	0.003	0.030	No
Exide	1.62	2.33	0.084	2.414	Yes
Quemetco	0.64	0.049	0.020	0.069	No
EGUs					
Duke Energy – Gibson	2.2	0.020	0.000	0.020	No
NIPSCO Schahfer	1.2	0.056	0.005	0.061	No
IPL Petersburg	1.1	0.020	0.000	0.020	No
AEP Rockport	2.2	0.020	0.001	0.022	No
ALCOA Power Plant	0.8	0.020	0.000	0.020	No

** Highest quarterly average was used

Individual Source Discussion

Mittal East and Mittal West

Modeling

Mittal East and Mittal West are steel mills in East Chicago, Indiana that border the southern shore of Lake Michigan. These sources are located on a peninsula jutting into Lake Michigan, with heavy industry to the east and west. Mittal East's (formerly Inland Steel) largest sources are the BOFs with emissions points at 225 feet of elevation. Mittal West's (formerly LTV) largest source is the blast furnace with an emissions point at 145 feet. These sources are sufficiently high for significant dispersion to take place before a plume reaches the ground. Due to the close proximity of these two facilities, they were both modeled individually and together for downwind high concentration impacts. The modeling results indicate that monitoring is required for these facilities. Figures 1 through 3 indicate the modeling results and list the closest monitoring locations around the sources.

Monitoring Site(s)

Currently, an IDEM Pb sampler is located immediately to the southeast of the combined complex at East Chicago - Aldis St. (1808900230), site #4 on the modeling figures, which is inside the 0.01 to 0.02 $\mu\text{g}/\text{m}^3$ isopleth on the combined modeling map. IDEM will use this site as one SLAMS and search for another site in a higher impact area to the south or southwest of Mittal Steel. If a site cannot be obtained in the higher impact area, then Hammond – 141st St.(180892008) will be used as a second receptor monitoring location. The Hammond site currently monitors for Pb.

Figure 1 - Mittal East Modeling Results

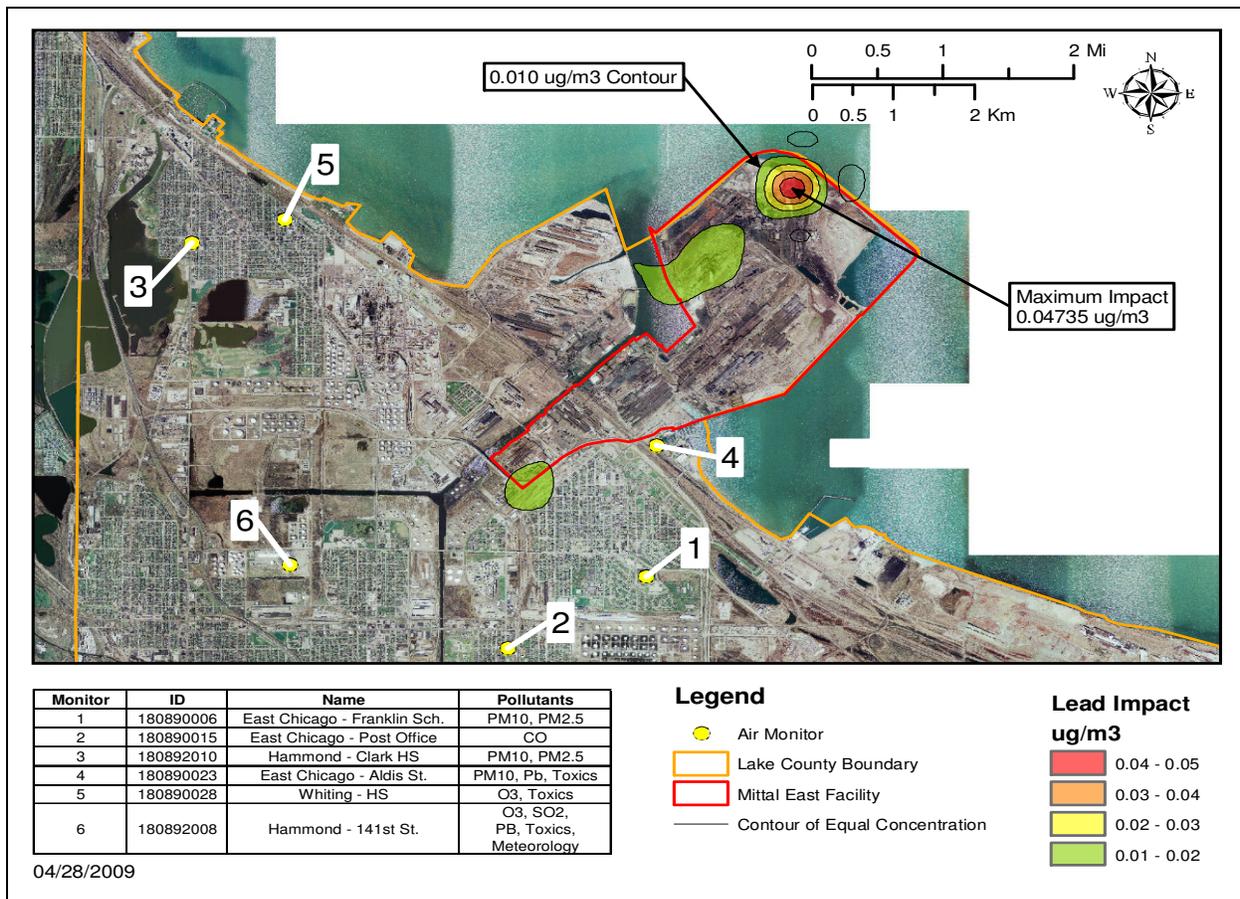


Figure 2 - Mittal West Modeling Results

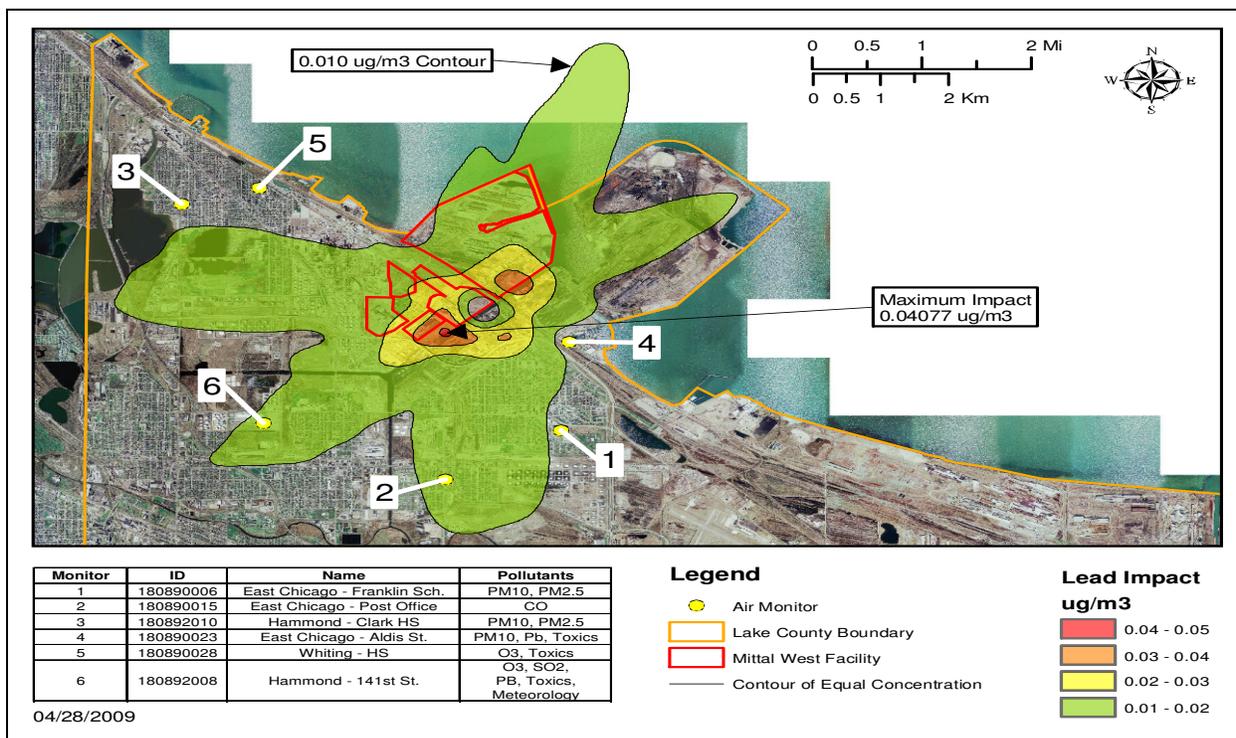
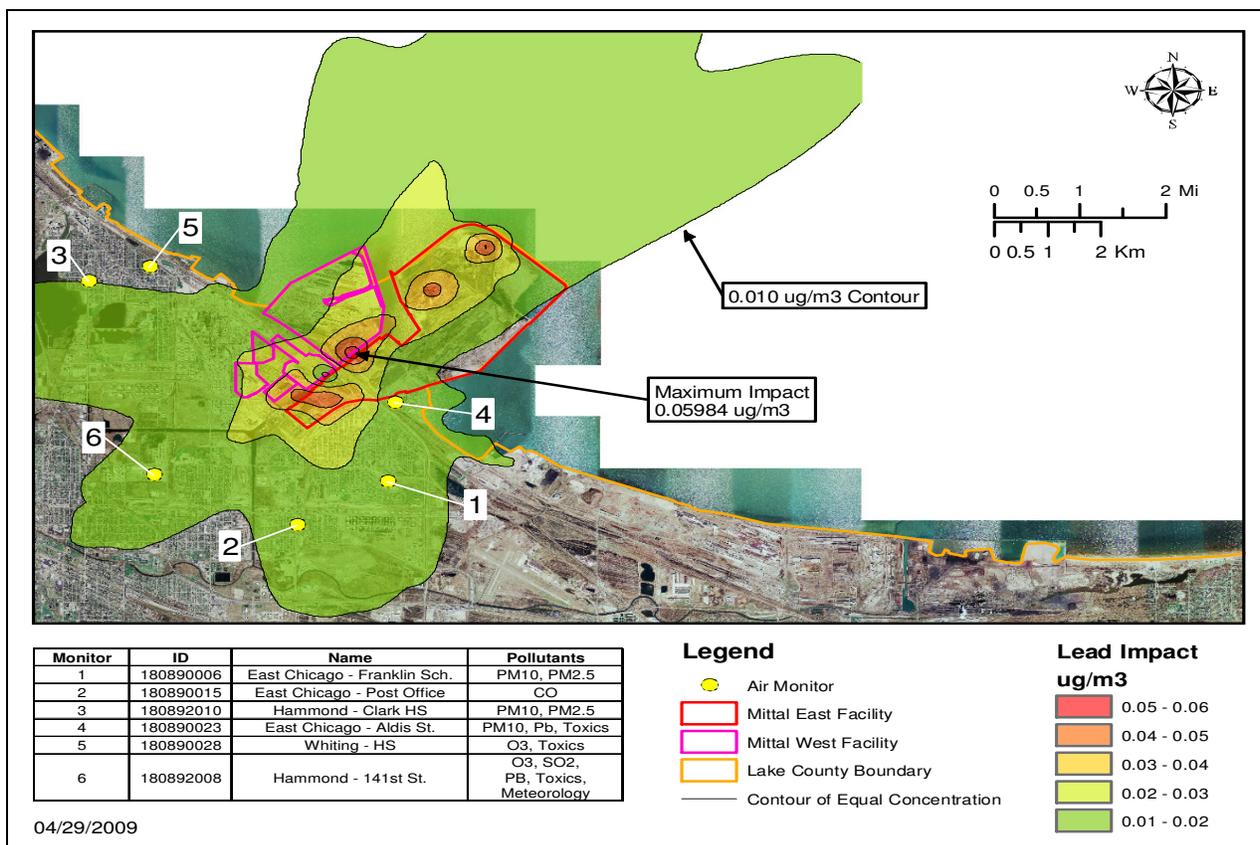


Figure 3 - Mittal East and Mittal West Combined Modeling Results



Arcelor-Mittal Burns Harbor

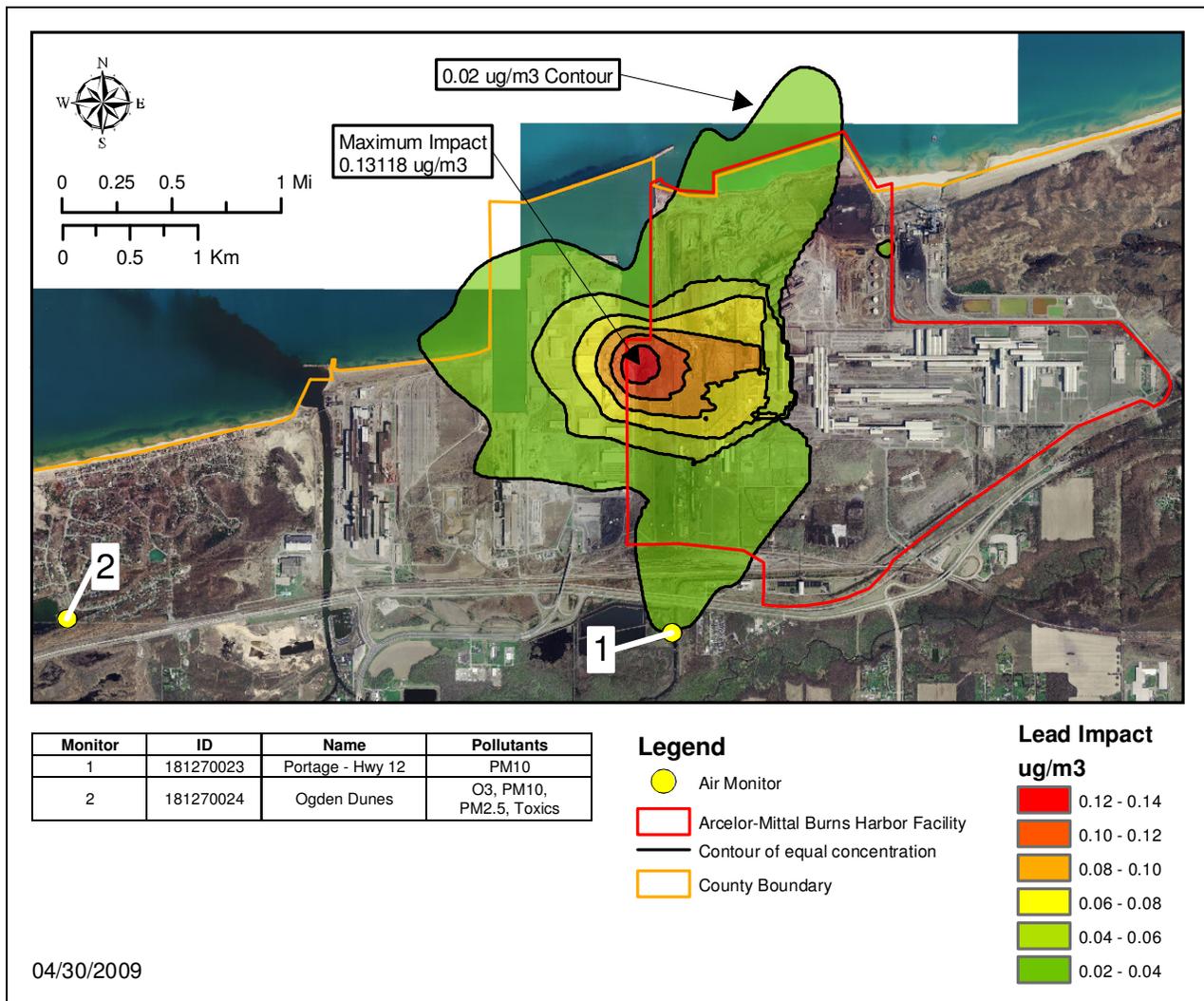
Modeling

Arcelor-Mittal Burns Harbor is a steel mill located in Burns Harbor, Indiana. The mill borders Lake Michigan and Indiana Dunes National Lakeshore to the north and east respectively, with woodlands, residential, and lighter industry to the south. The terrain is mostly flat to slightly rolling. The primary source at this site is a blast furnace stack at least 90 feet tall. The modeling results indicate that monitoring is required for this facility. Figure 4 shows the modeling results and lists the closest monitoring locations around this source.

Monitoring Site

IDEM currently operates an air monitoring site, Portage-Hwy 12 (181270023), immediately to the south of the 0.02 – 0.04 $\mu\text{g}/\text{m}^3$ isopleth. IDEM will pursue a new monitoring location in the high impact area to the west of the source. This is a gated industrial area with several large buildings. If a site is unable to be obtained in the high impact area, then IDEM will use the Portage – Hwy 12 site as the receptor site for Arcelor-Mittal Burns Harbor.

Figure 4 - Arcelor-Mittal Burns Harbor Modeling Results



US Steel

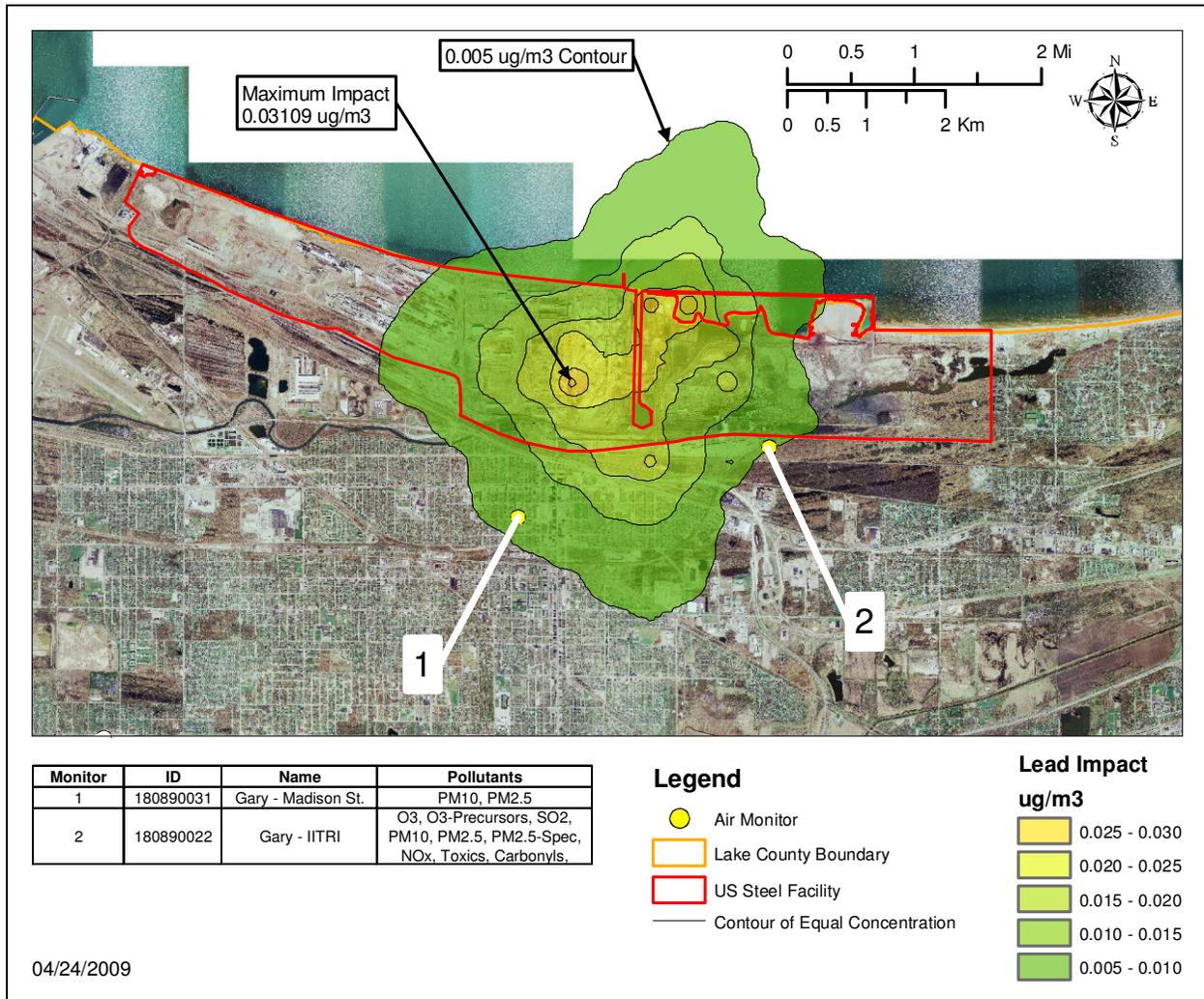
Modeling Results

US Steel is a steel mill located in Gary, Indiana. The mill covers a two mile wide by approximately 6 mile long area along Lake Michigan to the north, just to the east of Mittal East, and an urban industrial area to the south. The terrain is mostly flat to slightly rolling. The largest sources for US Steel are blast furnaces, a sinter plant, and a precarbon precipitator; all of which are emitted at a height of at least 90 feet. The modeling results indicate that monitoring is required for this facility. Figure 5 indicates the modeling results and lists the nearest monitoring locations to US Steel.

Monitoring Site

IDEM currently operates two (2) sites near US Steel. Gary – IITRI is located to the southwest of the facility just inside the 0.005-0.010 $\mu\text{g}/\text{m}^3$ isopleth. Gary – Madison St. located to the southwest of the main impact area is located in this isopleth also. A new site located in the higher impact area is proposed. If a site in this area cannot be obtained then IDEM will use the Gary – Madison St. site as the monitoring site for US Steel.

Figure 5 - US Steel Modeling Results



Exide

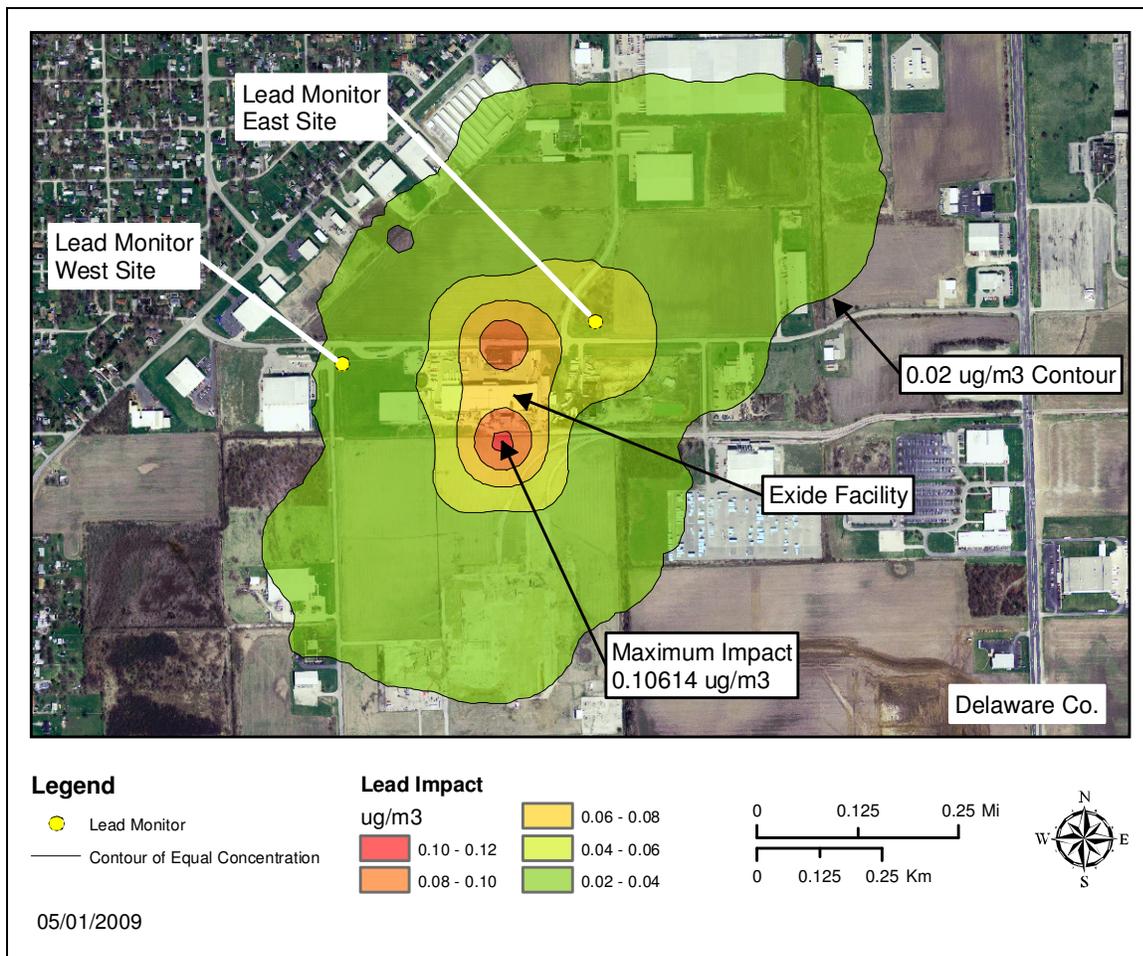
Modeling Results

Exide Technologies is southwest of Muncie in an area which is mostly farmland to the west, south and east with considerable industry immediately to the north. The largest sources at Exide are a reverb and blast furnace stack which is over 100 feet tall and a battery crusher and breaker stack which is nearly 70 feet tall. These two account for 98% of emissions according to the latest year's actual figures. The modeling results indicate that monitoring is required for this facility. Figure 6 shows the modeling results and identifies the nearest monitoring locations to Exide.

Monitoring Site

Exide currently operates two (2) sites near its facility as part of a NESHAPS requirement. The east site (180350009) is located in a high impact area for the facility and has recorded exceedances of the old NAAQS (1.5 ug/m^3 for a quarterly average), as recently as the 2nd quarter of 2008. The west site (180350008) is an upwind site. IDEM is proposing to use the current east site location to establish a SLAMS monitor as the source oriented monitoring location for Exide. State owned equipment would be installed and operated by IDEM. If IDEM is unable to establish a site at Exide's current site location, then a new site in the high impact area would be pursued. Exide may elect to continue to collect data for their own purposes.

Figure 6 - Exide Modeling Results



Quemetco

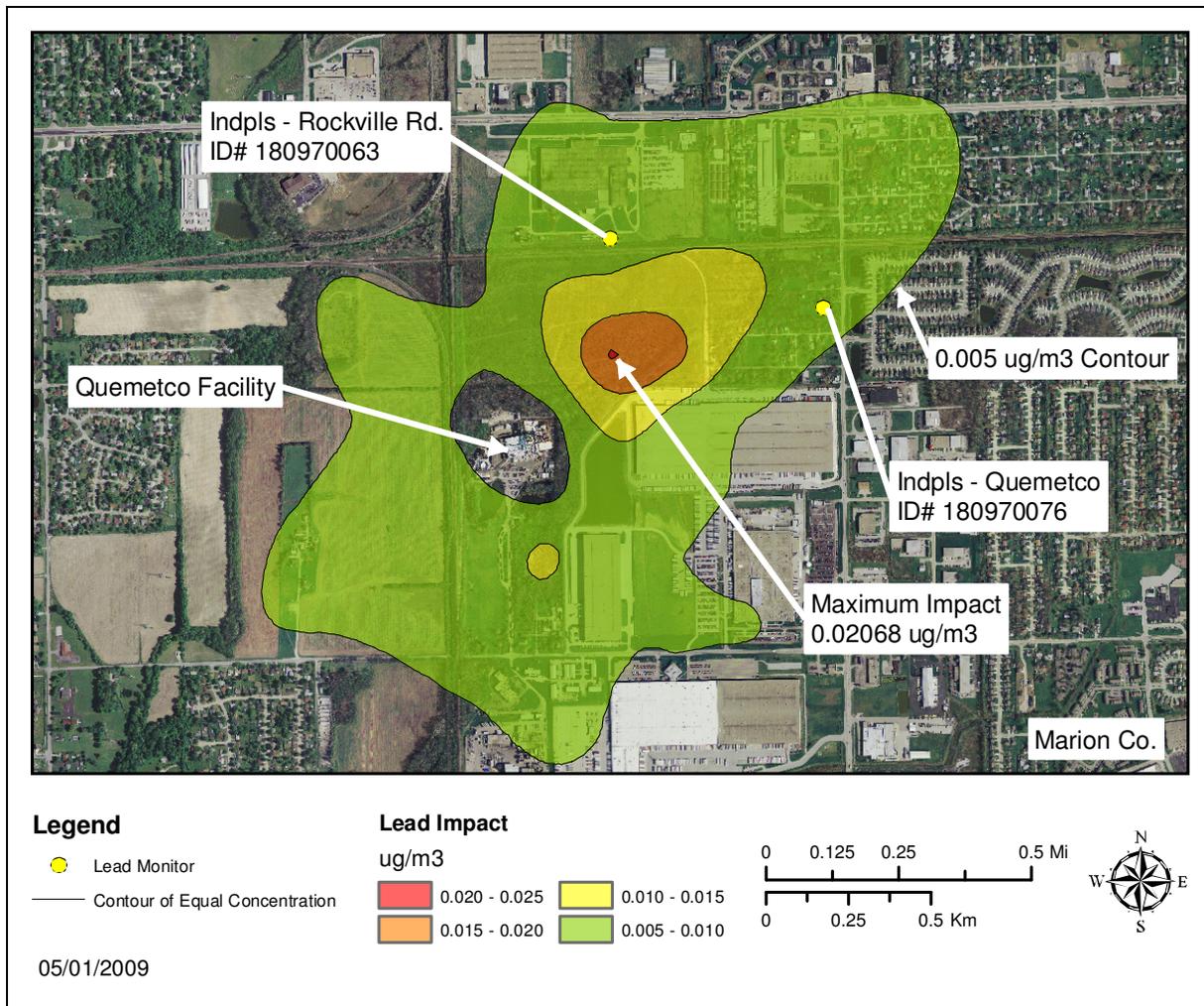
Modeling

Quemetco, located a couple miles north of the Indianapolis airport, has considerable commercial and light industry to the south with residential homes to the east and north, while some farmland exists to their west. At Quemetco, the hot charge EAF and reverb furnace vent to a common stack which is 95 feet tall, the refining kettles vent to another stack which is well over 150 feet, and the bag house roof vents at 40 feet accounting for all of the Pb emissions. The modeling results indicate that no monitoring is required for this facility. Figure 7 indicates the modeling results and identifies the nearest monitoring locations to Quemetco.

Monitoring Site

Even though there is no monitor required for Quemetco, IDEM plans to continue to operate both the Indpls – Rockville Rd. (180970063) and Indpls – Quemetco (180970076) monitors.

Figure 7 - Quemetco Modeling Results



Crane

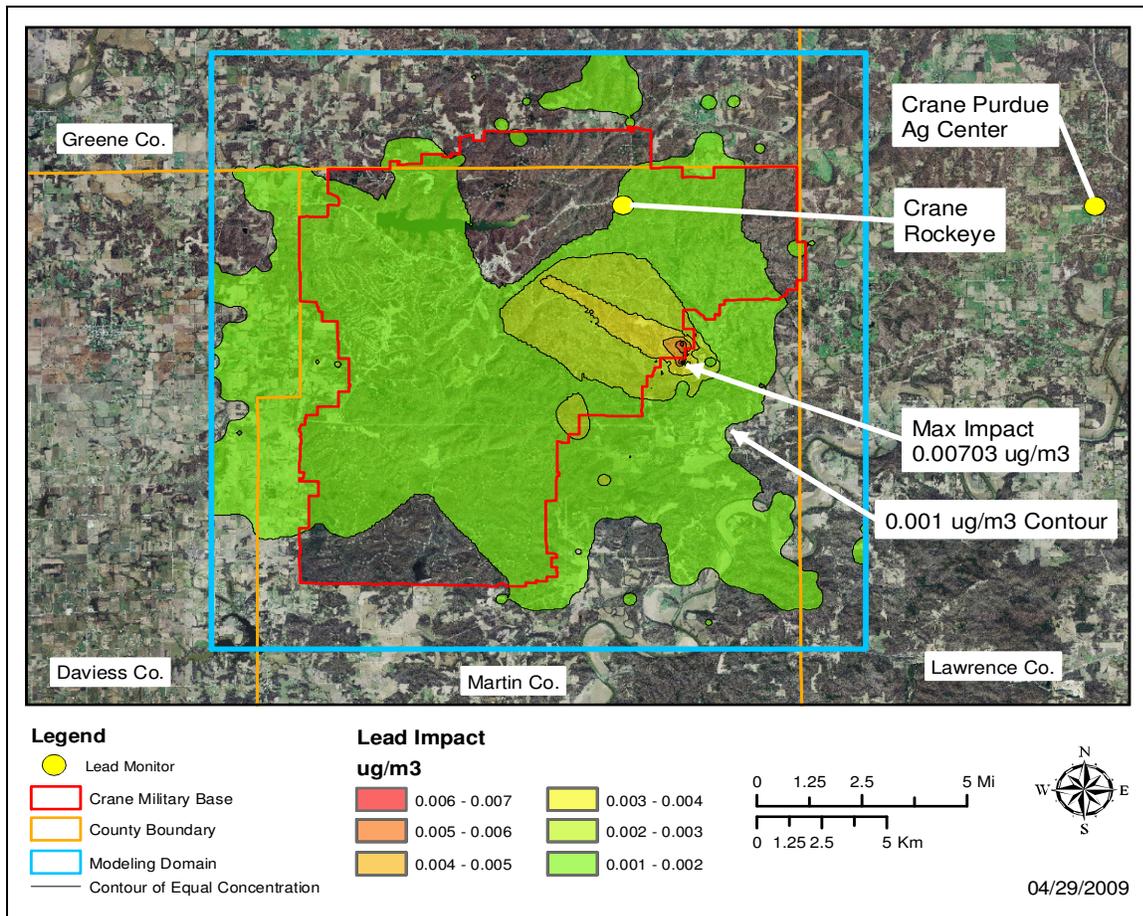
Modeling

Crane Naval testing Grounds is located in a 62,000 acre tract of land in Martin County, Indiana. Martin County is located between Indianapolis, Evansville, and Louisville, Kentucky. The terrain is quite hilly and forested, with a fair amount of agricultural land. Elevations range from 500 to 850 feet above sea level with the source elevations at 543 and 676 feet. The largest source is a Mobile Treatment System which is more than a mile from the boundary of the facility. The modeling results indicate that no monitoring is required for this facility. Figure 8 shows the modeling results and identifies the two (2) monitoring sites previously operated by Crane from 2002 - 2006. Every daily reading from these monitors was below the minimum detectable limit and entered as $0.027 \mu\text{g}/\text{m}^3$.

Monitor Waiver

IDEM is requesting that the Pb sampling requirement at this site be waived and is submitting a letter to USEPA with the documentation necessary. When completed, the letter will be in Attachment C-2.

Figure 8 - Crane Modeling Results



Electric Generating Units

Modeling

There are five (5) EGUs identified in Table 2 with greater than 0.7 tpy of Pb emissions. These include Duke Energy Gibson in Gibson County, AEP Rockport in Spencer County, NIPSCO Schahfer in Jasper County, IPL Petersburg in Pike County, and ALCOA Warrick Power Plant in Warrick County. The modeling results show minimal impact and indicate that no monitoring is required for these facilities.

Monitoring Waiver

Due to the modeling results for the five (5) EGUs, IDEM is requesting that the Pb sampling requirement at these sites be waived and is submitting a letter to USEPA with the documentation necessary. The letter is in Attachment C-2.

Proposed Source Oriented Monitoring Network

Table 4 summarizes the sources, the monitoring requirement, and the proposed sites. Indiana will use one (1) existing SLAMS lead site, East Chicago – Aldis St. (180890023) as a source-oriented site for Mittal East. New sites in the high impact areas near Mittal West, US Steel, and Arcelor Mittal Burns Harbor will be established, if suitable locations can be procured. If new sites cannot be obtained, then the closest sites to the high impact areas will be identified as the lead monitoring sites. A new SLAMS will be located near Exide, preferably at Exide's current site location. Even though no site is required near the Quemetco facility, Indpls – Rockville Rd. (180970063) and Indpls – Quemetco (180970076) will continue to operate.

Table 4 - Pb Sources and Proposed Sites

Source	Location	Monitor Required	Primary Monitoring Site Proposed	Contingent Monitoring Site
Mittal Steel East	East Chicago	Yes	East Chicago – Aldis St. (180890023)	
Mittal Steel West	East Chicago	Yes	New site in high impact area	Hammond – 141st St. (180892008)
Arcelor-Mittal	Burns Harbor	Yes	New site in high impact area	Portage – Hwy 12 (181270023)
US Steel	Gary	Yes	New site in high impact area	Gary – Madison St. (180890031)
Exide	Muncie	Yes	Muncie – Mt. Pleasant Blvd. (180350009)	New site in high impact area
Quemetco	Indianapolis	No	Indpls – Rockville Rd. (180970063)	
			Indpls – Quemetco (180970076)	
Crane	Martin County	No	Monitoring Waiver Submitted	

Non-source Oriented Monitoring Requirement

A minimum of one (1) non-source oriented, or population oriented monitor, is required in CBSAs with populations greater than or equal to 500,000 people. These monitors should be neighborhood scale sites in urban areas impacted by re-entrained dust from roadways, airports, closed industrial facilities which were previously significant sources of Pb, hazardous waste sites, construction/demolition projects, or other fugitive dust sources of Pb. The population estimates should be based on the most recent available census data (2000), and there is no "waiver" provision.

At this time Indiana would be required to operate three (3) sites; Indianapolis (1,843,588), Fort Wayne (548,416), and South Bend (544,582). The sites will be addressed in the 2010 Network Assessment to identify the Indiana 2011 Ambient Air Monitoring Network Plan.

Monitoring Methodology

Indiana will continue to use the USEPA Reference Method (method code 803) for Pb to collect monitoring data. This method is defined in 40 CFR Part 50, Appendix G. TSP filters are collected in the field using a high volume sampler. The samples are analyzed using atomic absorption spectrometry with a graphite furnace.

The high volume samplers will collect a 24-hour sample every sixth day in accordance with the National Monitoring Schedule.

Data Submittal

All Pb samples will be analyzed in monthly batches. Data are planned to be submitted to AQS within sixty (60) days after the month in which the data were collected. This timeframe will allow Indiana to meet the USEPA's reporting requirement, §58.12(b) of 40 CFR Part 58, to submit data within ninety (90) days of the end of the quarter in which the data were collected.

Attachment C-1
Category 3 Emission Revision Justification

The following is documentation for Category 3 Pb sources for the Pb SIP monitoring plan.

033-00073 Parker Hannifin Corp., DeKalb County: This source was included because they reported 1.4 tons of Pb emissions to TRI in 2006. The source has not reported Pb emissions to IDEM. The source is permitted through an MSOP and has chrome plating, parts grinding and polishing, and natural gas boilers processes. Total PM after controls in the MSOP for all processes is less than 0.1 ton per year. Total Pb potential emissions in the MSOP are 0.00002 tons per year.

033-00043 Steel Dynamics Inc., DeKalb County: This source was included because they reported greater than 1 ton per year to TRI in 2004, 2005, and 2006, but they reported less than 0.5 tons per year to IDEM in years 2005-2007. The source was contacted and verified in writing that its emissions are approximately 0.2 tons per year.

049-00002 Rochester Metals, Fulton County: This source was included because they reported greater than 1 ton per year to TRI in 2004, 2005 and 2006, and they reported greater than 1 ton to IDEM in 2006. The source confirmed in e-mail that their Pb emissions are less than 0.01 ton per year based on recent stack testing.

057-00006 Firestone Industrial Products, Hamilton County: This source was included because they reported greater than 1 ton per year to TRI in 2004, 2005 and 2006. The source has not reported Pb emissions to IDEM. The source is permitted through a FESOP and has fuel oil boilers, rubber compounding, cement operations and paint booths. The FESOP calculates total potential PM emissions of approximately 0.2 tons per year. The source announced plans to close the facility by July, 2009.

063-00037 Steel Dynamics Engineered Bar Division, Hendricks County: This source was included because they reported greater than 1 ton per year to TRI in 2005 and 2006, but they reported less than 0.5 tons per year to IDEM in 2007. The source was contacted and verified in writing that its emissions are approximately 0.1 tons per year based on estimates made using stack test data.

097-00032 Indianapolis Belmont WWTP, Marion County: This source was included because of IDEM estimates of approximately 1 ton that were included in the 2002 and 2005 NEIs. The source has not reported Pb emissions to TRI or IDEM. New estimates made from sludge monitoring data show total uncontrolled estimates would be about 1 ton per year, but actual controlled emissions are closer to 0.1 ton per year.

123-00019 Thyssenkrupp Waupauca Foundry, Perry County: This source was included because they reported close to one ton per year to TRI in 2004, 2005 and 2006, and greater than one ton per year to IDEM in 2005-2007. The source was contacted and verified in writing that its emissions are approximately 0.05 tons per year based on estimates made using new stack test data.

127-00036 Beta Steel, Porter County: This source was included because they reported greater than 1 ton to TRI in 2006, and greater than one ton per year to IDEM in 2006 and 2007. The source was contacted and verified in writing that its emissions are approximately 0.04 tons per year based on estimates made using new stack test data obtained from a similar facility.

129-00002 GE Plastics, Posey County: This source was included because they reported greater than 1 ton to TRI 2005, but did not report Pb emission to TRI in 2004 or 2006, and has reported about 0.2 tons per year to IDEM in 2005-2007. The source is a plastics manufacturer with Pb emissions from coal and diesel boilers. No information was found for Pb emissions in any other processes in the sources Title V permit.

173-00007 Alcoa Inc, Warrick Operations, Warrick County: This source was included because they reported greater than 1 ton to TRI in 2004, 2005 and 2006, but reported less than 0.1 ton per year to

IDEM in 2005-2007. It appears the TRI data includes emission estimates for the coal fired generating plant since the TRI Warrick County listing only contains one entry for Alcoa Warrick, but IDEM's air inventory system has two sources, Alcoa – Warrick Operations (173-00007), and Alcoa – Warrick Power Plant, AGC Div (173-00002).

183-00003 Steel Dynamics – Structure and Rail Division, Whitley County: This source was included because they reported close to 1 ton to TRI in 2004, 2005 and 2006, but reported 0.6, 0.6 and 0.2 ton per year to IDEM in 2005-2007. The source was contacted and verified in writing that its emissions are approximately 0.2 tons per year based on estimates made using current production and stack test data.

Attachment C-2

Lead Monitoring Waiver Letter



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

Mitchell E. Daniels Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
Toll Free (800) 451-6027
www.idem.IN.gov

Mr. Bharat Mathur
Acting Regional Administrator
U.S. EPA Region 5
77 West Jackson Blvd R-19J
Chicago, IL 600604-3590

Re: Request for Lead Monitoring Waivers near
Indiana Industrial Sources

Dear Mr. Mathur,

On November 12, 2008, U.S. EPA substantially strengthened the National Ambient Air Quality Standards (NAAQS) for lead by revising the level of the primary standard from 1.5 $\mu\text{g}/\text{m}^3$ to 0.15 $\mu\text{g}/\text{m}^3$. In conjunction with strengthening the lead (Pb) NAAQS, the U.S. EPA promulgated new monitoring requirements including new design requirements for the Pb NAAQS surveillance network. Monitoring is now required for Pb sources that may contribute to violations of the Pb standard.

There must be one source-oriented State or Local Air Monitoring Station site located near each Pb source that emits 1.0 or more tons per year (TPY) to measure the maximum Pb contribution in ambient air, unless a waiver is granted by the appropriate U.S. EPA regional administrator. According to 40 CFR Part 58, Appendix D, paragraph 4.5(a), states may apply for a monitoring waiver if they can demonstrate that a particular source will not contribute to a maximum Pb concentration (based on a maximum 3-month rolling average over three years of monitoring data) in ambient air in excess of 0.075 $\mu\text{g}/\text{m}^3$, or 50% of the NAAQS, based on historical monitoring data, modeling, or other means. To apply for a waiver, U.S. EPA requires the following: 1) a formal letter that summarizes the rationale for why monitoring should not be necessary at a given facility, 2) the detailed modeling results or historical monitoring data analysis, and 3) any supporting documentation, as noted above for modeling or providing the full air quality dataset with a map showing monitor location(s).

This letter is a request for such waivers for Crane Div., Naval Surface Warfare Center (Crane) in Martin County Indiana and five electric utilities in various counties in the state.

Source Background - Crane

Crane is located in a 62,000 acre tract of federal land in Martin County. Martin County is located between Indianapolis, Evansville and Louisville. The terrain is Tipton Till plain, hilly

and forested, with some agricultural land outside of the facility. Elevations range from 500 to 850 feet above sea level with the source elevations between 490 and 650 feet. The largest source, Ammunition Burning Ground (ABG), is 1.5 kilometers from the facility boundary. All the other sources, including an incinerator, are nearly 4 kilometers from the boundary of the facility. The ABG, Old Rifle Range (ORR), and Ordinance Demolition (OD) are all open sources. The emissions are fuel or explosives which are burned or detonated in flash pans. The 2005 Emission Inventory showed Crane with 1.2 Tons per year of lead emissions. Table 1 lists the source emissions for Crane. The ABG and the ORR may have emissions with a duration of one minute, with many events during the day, to emissions that last hours at a time. Each release of emissions at OD are instantaneous, yet the OD site may have many events during the day. The variability of emissions within one day is not an important factor when impacts are averaged over a three month period.

Table 1 – Emission Rates

SOURCE NAME	EMISSION RATE
	(tons/year)
Ammunition Burning Ground (ABG)	0.54
Ordinance Demolition (OD)	0.27
Old Rifle Range (ORR)	0.27
Incinerator P03	0.12
Total	1.20

Crane Modeling

The sources were modeled using Bowman Engineering’s BEEST Model. This utilizes U.S. EPA’s American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD) model version 97026. The BEEST model has been shown to be equivalent to U.S. EPA’s AERMOD for multiple PSD permit applications. Receptors were placed around the border of the weapons site but elevated terrain was used. U.S. Geological Survey 7.5 degree quad maps were used for Digital Elevation Model terrain files. Sources were modeled with the three latest years of available meteorology (1990-1992). The surface data was taken from Evansville National Weather Service (NWS), and the upper air data was taken from Peoria, Illinois.

The background monitored readings were taken from the two monitors associated with Crane in Lawrence and Martin Counties. The last year of monitoring was 2006, but each day of measurement was 0.027 ug/m^3 . By definition, the highest rolling average is 0.027 ug/m^3 . That level is also the lowest detectable threshold. Results are in Table 2.

Crane and Surrounding Area Map

The attached map shows the former monitoring locations, as well as the pollutant concentration isopleths from the AERMOD modeling. The warmer colors indicate higher concentration gradients. However, note that peak impact is only 0.007 ug/m^3 , which is located near the east side of the Crane property line. Concentrations beyond the plant boundaries are lower. This is well under the 0.075 ug/m^3 modeling threshold necessary for requesting a waiver of monitoring requirements. While the monitors were not located in the areas of maximum impact, any ambient monitoring location on the map would be expected to be well below 0.075 ug/m^3 . The modeled concentrations match actual ambient monitored concentrations very well.

Source Background - Electric Utilities

Next, there are five electric generating utilities (EGUs) identified in Table 2 of the "2010 Indiana Lead Monitoring Network Plan (Proposed)" (Network Plan) with greater than 0.7 tons per year of lead emissions. These include Duke Energy Gibson in Gibson County, AEP Rockport in Spencer County, NIPSCO Schahfer in Jasper County, IPL Petersburg in Pike County, and ALCOA Warrick Power Plant in Warrick County. The ALCOA Power Plant contains both EGU and non-EGU sources. All ALCOA Power Plant units were modeled. Table 4 below summarizes their emissions and stack parameters as modeled.

Utility Modeling

These sources were modeled as described in the Crane analysis. IPL Petersburg and Duke Energy Gibson were modeled with elevated terrain in a 250 meter receptor grid. ALCOA and AEP Rockport were modeled with a flat 500 meter receptor grid. NIPSCO Schahfer had a 1000 meter elevated terrain. Note that the EGU sources all have very tall stacks. The AEP Rockport stack is over 1,000 feet tall but was modeled at GEP height of 962 feet. NIPSCO Schahfer and Gibson stacks are all at 500 feet, ALCOA Power plant stacks are at 500 and 400 feet tall, and IPL Petersburg stacks are just over 610 feet tall. These are all high enough to extend over any terrain features in Indiana.

ALCOA is a few kilometers to the southeast of Newburgh, with a population of 3,000. AEP Rockport is several kilometers north of Rockport, with a population of 2,000. Both the Rockport and ALCOA sources are located next to the Ohio River and are within its broad valley with terrain features are less than 200 feet above plant elevation. IPL Petersburg is along the valley of the White River, about four kilometers to the northeast of Petersburg with a population of 2,500. Terrain features there are closer to the plant but still less than 200 feet. NIPSCO Schahfer has terrain elements of less than 100 feet in its vicinity. This source is two kilometers northwest of Wheatfield, population 900. Duke Energy Gibson is located in the broad valley of the Wabash River, two kilometers south of Mount Carmel, Illinois, population 8,000. Gibson is distant from any elevated terrain concerns. All of these sources are located in large areas of farmland with some wooded areas.

Table 4 - Stack Parameters

Source	Height meters	Diameter meters	Temperature Kelvin	Exit Velocity m/sec	Emission Rate (tons/year)
Duke Energy Gibson	152.4	9.75	415.3	28.95	0.798
	152.4	9.75	415.3	28.95	0.473
	152.4	7.16	335.9	21.33	0.463
	152.4	7.16	335.9	21.33	0.463
NIPSCO Schahfer	152.4	6.40	425.9	27.55	0.274
	152.4	6.40	416.4	31.30	0.387
	152.4	5.48	344.2	23.59	0.264
	152.4	5.48	344.2	23.59	0.249
IPL Petersburg	189.2	4.66	323.7	23.20	0.009
	189.2	6.27	424.8	23.87	0.007
	187.4	6.70	324.2	25.79	0.044
	187.4	6.70	342.0	26.33	1.043
AEP Rockport	316.3	12.95	430.3	31.70	2.200
ALCOA Power Plant	121.9	5.91	426.4	13.69	0.300
	121.9	5.91	420.9	12.69	0.386
	152.4	4.42	410.9	36.29	0.110

The emissions listed in Table 4 differ from State Emission Inventory values in Table 2 of the Network Plan for Rockport and Petersburg. To provide more consistent modeling results, U.S. EPA AP42 "A" rated emission factors for coal-fired utilities were used for all units. This provides conservative or "worst case" results for further analysis.

The peak modeled impact is added to the background reading which is compared to half of the new standard. The highest monthly average of modeling was used as a conservative estimate. Table 5 lists the quarterly averages for these background sites.

The monitoring site used as background for Gibson, IPL Petersburg, AEP Rockport, and ALCOA was the Martin Luther King Blvd. site in Evansville, IN. This is about 8 blocks north and east of the Ohio River, in the downtown of a metropolitan area of nearly 340,000 people. This is conservative compared to the rural areas of southwest Indiana. The background monitoring site closest to NIPSCO is the Water Filtration Plant, the same one that was used for the steel mills background in Lake County. This site was used for the NIPSCO location near Wheatfield, a rural setting, and is considered very conservative. Note that the other monitoring site in Lake County, 141st Street, still in a heavily industrialized area, has values about half those of the Water Filtration Plant.

Table 5 - Background Monitoring Readings

Site ID	Site Address	County	Year	#Obs 24-Hr	Qtr 1	Qtr2	Qtr 3	Qtr 4	# Exceed
180890023	Water Filtration Plant	Lake	2006	59	0.05	0.04	0.04	0.04	0
180890023	Water Filtration Plant	Lake	2007	60	0.03	0.05	0.06	0.04	0
180890023	Water Filtration Plant	Lake	2008	46	0.03	0.03	0.04		0
180892008	1300 141 st Street	Lake	2006	54	0.01	0.02	0.03	0.01	0
180892008	1300 141 st Street	Lake	2007	38	0.01	0.02	0.02		0
180892008	1300 141 st Street	Lake	2008	39	0.01	0.02	0.02		0
181630006	Martin Luther King Blvd	Vanderburgh	2005	54	0.02	0.01	0.01	0.01	
181630006	Martin Luther King Blvd	Vanderburgh	2006	61	0.01	0.01	0.01	0.01	
181630006	Martin Luther King Blvd	Vanderburgh	2007-8	64	0.01	0.00	0.01	0.01	

* Geographic Area: Lake Co, Vanderburgh Co, IN

* Pollutant: Lead

* Year: 2008, 2007, 2006, 2005

The highest monthly impact is used as a conservative value for the highest rolling quarterly average. The highest modeled concentration from any of the five sources is 0.005 ug/m^3 , which is below the monitoring minimum detectable threshold. Due to the tall stacks, emissions are widely dispersed. For this reason, maps showing concentration isopleths are not included as there are no regions around the sources that show any measurable impact above general background concentrations. Table 6 illustrates the modeling results used in this analysis. The highest modeled reading added to the highest background reading is still much less than 0.075 ug/m^3 , which is half of the new proposed standard.

Table 6 - Source Impacts

SOURCE NAME	BACKGROUND READING	MONTHLY IMPACT	TOTAL IMPACT	ABOVE 0.075?
	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)
Duke Energy Gibson	0.020	0.000	0.020	No
NIPSCO Schahfer	0.056	0.005	0.061	No
IPL Petersburg	0.020	0.000	0.020	No
AEP Rockport	0.020	0.001	0.022	No
ALCOA Power Plant	0.020	0.000	0.020	No

Conclusion

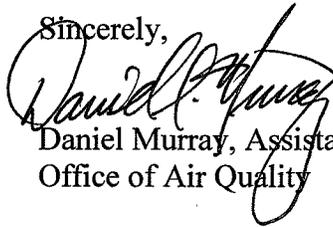
This letter addresses the items necessary to apply for waivers of monitoring requirements for Crane Div, Naval Surface Warfare Center and five electrical generating utilities.

The reported emissions from Crane exceed one ton per year, but actual ambient monitored data from two sites near this source for 2004-2006 recorded values at minimum detectable thresholds. Crane modeling produces data that is also below this threshold. Therefore, no purpose would be served in again establishing and operating an ambient monitoring site. As a result, Indiana requests that U.S. EPA waive the requirement to monitor at this location.

In addition, modeling of the five EGUs has not identified any local areas of high impact around these sources, for which all emissions are from tall stacks. The utility modeling indicates that concentrations in the areas surrounding these sources would vary little from background levels. Therefore, Indiana requests that U.S. EPA waive the requirement to monitor at these locations as well.

If you have any questions regarding this request, please contact Steve Lengerich, Chief, Ambient Monitoring Section, Office of Air Quality, 317-308-3264.

Sincerely,



Daniel Murray, Assistant Commissioner
Office of Air Quality

DM/sl
Attachment

cc: Motria Caudill, U.S. EPA Region 5
Steve Rosenthal, U.S. EPA Region 5

Handwritten signature or scribble

Map of Crane with property boundaries, modeling domain, modeled concentrations, and monitor locations.

