REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN UNDER THE ANNUAL NATIONAL AMBIENT AIR QUALITY STANDARD FOR FINE PARTICLES

Central Indiana Area

Prepared By:
The Indiana Department of Environmental Management

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CENTRAL INDIANA AREA

1.0 INTRODUCTION

This document supports Indiana's request that Hamilton, Hendricks, Johnson, Marion, and Morgan counties (herein referred to as the "Central Indiana Area"), be redesignated from nonattainment to attainment of the 1997 annual standard for fine particles. All monitors for fine particles in the Central Indiana Area have recorded three years of quality assured ambient air quality monitoring data for the years 2008 through 2010, demonstrating attainment with the annual standard for fine particles, therefore, the Central Indiana Area is eligible for redesignation.

Section 107 of the Clean Air Act (CAA) establishes specific requirements to be met in order for an area to be considered for redesignation, including:

(a) A determination that the area has attained the annual standard for fine particles.
(b) A State Implementation Plan (SIP) for the area under Section 110(k) is fully approved.
(c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
(d) A maintenance plan under Section 175A is fully approved.
(e) A determination that all Section 110 and Part D requirements have been met.

A maintenance plan provides for the continued attainment of the air quality standard by an area for a period of ten years after the United States Environmental Protection Agency (U.S. EPA) has formally redesignated the area to attainment. The plan also provides assurances that even if there is a subsequent exceedance of the air quality standard, then measures in the maintenance plan will prevent any future occurrences through contingency measures that would be triggered.

This document addresses each of these requirements, and provides additional information to support continued compliance with the annual standard for fine particles.

1.1 Background

The CAA requires states with areas designated nonattainment of the applicable National Ambient Air Quality Standard (NAAQS) for fine particles to develop SIPs to expeditiously attain and maintain the standard. In 1997, U.S. EPA set daily and annual air quality standards for fine particles ($PM_{2.5}$), as shown in Table 1.1. The terms "fine particles" and $PM_{2.5}$" are used synonymously throughout this document. The $PM_{2.5}$ standards were legally challenged and upheld by the U.S. Supreme Court in February of 2001. In 1999, the Indiana Department of

Environmental Management (IDEM) began monitoring for fine particle concentrations. The U.S. EPA designated areas in Indiana under the annual fine particles standard on December 17, 2004, as attainment, nonattainment or unclassifiable, with an effective date of April 5, 2005.

Table 1.1
National Ambient Air Quality Standards for Fine Particles

	Annual	**24-Hour**
1997 $PM_{2.5}$ Standards	**15 µg/m^3** Annual arithmetic mean, averaged over three years	**65 µg/m^3** 24-hour average, 98th percentile, averaged over three years
2006 $PM_{2.5}$ Standards	**15 µg/m^3** Annual arithmetic mean, averaged over three years	**35 µg/m^3** 24-hour average, 98th percentile, averaged over three years

Note: The Central Indiana Area meets the 1997 and 2006 24-hour NAAQS for fine particles. Since this area is solely designated nonattainment under the 1997 annual standard for fine particles, this document only addresses the annual standard.

On December 17, 2004, based on 2001 through 2003 monitoring data, U.S. EPA designated the Central Indiana Area as nonattainment of the annual standard for fine particles. The Central Indiana Area was subject to Section 172 of the CAA, including the development of a plan to reduce nitrogen oxides (NO_x), sulfur dioxide (SO_2), and direct $PM_{2.5}$ particle emissions and a demonstration that the area will meet the annual standard for fine particles by April 5, 2010. In order to satisfy these requirements, Indiana submitted a redesignation petition and maintenance plan to U.S. EPA on October 20, 2009, demonstrating that the Central Indiana Area had met the NAAQS for fine particles by April 5, 2010, with an ample margin of safety. The Central Indiana Area monitors have continued to meet the annual NAAQS for fine particles since the end of 2007.

There were no fine particle monitors in the Central Indiana Area that violated the 1997 24-hour standard for fine particles and none that currently violate the 2006 24-hour standard for fine particles. As a result, the Central Indiana Area was designated nonattainment for fine particles solely under the 1997 annual standard. Therefore, this document pertains only to the 1997 annual standard for fine particles.

The Central Indiana nonattainment area for fine particles, as defined in Section 1.2, has not previously been subject to nonattainment area rulemakings for fine particles. However, Marion County was subject to nonattainment area rulemakings under the 1-hour ozone standard. The 1-hour ozone standard was revoked on June 15, 2005. Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, and Shelby counties in Central Indiana had also been subject to nonattainment area rulemakings under the 8-hour ozone standard and all counties in Central Indiana were redesignated to attainment and classified as maintenance under the 8-hour ozone standard on October 19, 2007.

1.2 Geographical Description

The Central Indiana nonattainment area for annual fine particles consists of Hamilton, Hendricks, Johnson, Marion, and Morgan counties. The Central Indiana Area includes cities such as Beech Grove, Carmel, Franklin, Greenwood, Indianapolis, Lawrence, Martinsville, and Noblesville and such towns as Avon, Brownsburg, Fishers, Mooresville, Plainfield, and Speedway. This area is depicted in Figure 3.1.

IDEM is the agency responsible for assuring the nonattainment area for fine particles complies with the CAA requirements and is responsible for the entire Central Indiana Area. IDEM has worked cooperatively with U.S. EPA Region V to address attainment planning issues.

1.3 Status of Air Quality

Monitoring data for fine particles for the three years, 2008 through 2010, demonstrates that air quality has met the annual NAAQS for fine particles in the Central Indiana Area. This fact, accompanied by the permanent and enforceable reductions in emission levels discussed in Section 4.0, justifies a redesignation to attainment for the Central Indian area based on Section 107(d)(3)(E) of the CAA.

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110 and Part D of the CAA list a number of requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. In addition, U.S. EPA has published detailed guidance in a document entitled "Procedures for Processing Requests to Redesignate Areas to Attainment", issued September 4, 1992, to Regional Air Directors. This document is hereafter referred to as "Redesignation Guidance". This Request for Redesignation and Maintenance Plan is based on the Redesignation Guidance, supplemented with additional guidance received from staff of the Attainment Planning and Maintenance Section of U.S. EPA Region V. The specific requirements for redesignation are listed below.

2.2 Fine Particles Monitoring

1) A demonstration that the annual standard for fine particles, as published in 40 Code of Federal Regulations (CFR) 50.13, has been attained. Fine particle monitoring data must show that violations of the annual ambient standard are no longer occurring.

2) Ambient monitoring data quality assured in accordance with 40 CFR 58.15, recorded in the U.S. EPA Air Quality System (AQS) database, and available for public view.

3) A showing that the three-year average of annual values, based on data from all monitoring sites in the area or its affected downwind environs, do not exceed 15.0 micrograms per cubic meter ($\mu g/m^3$). This showing must rely on three complete, consecutive calendar years of quality assured data.

4) A commitment that, once redesignated, the state will continue to operate an appropriate monitoring network to verify the area is in compliance (maintenance) with the standard.

2.3 Emission Inventory

1) A comprehensive emission inventory of the precursors of fine particles (direct $PM_{2.5}$, NO_x and SO_2) completed for the base year (2008 in this case).

2) A projection of the emission inventory to a year at least ten years following redesignation.

3) A demonstration that the projected level of emissions is sufficient to maintain the annual standard for fine particles.

4) A demonstration that improvement in air quality between the year violations occurred and the year attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.

5) Provisions for future updates of the inventory to enable tracking of the emission levels, including emission inventory statements from emission sources.

2.4 Modeling Demonstration

While no modeling is required for redesignating nonattainment areas, IDEM has evaluated the results of federal control-case modeling to demonstrate that compliance with the standard will be maintained.

2.5 Controls and Regulations

1) A U.S. EPA approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.

2) Evidence that control measures required in past SIP revisions have been fully implemented.

3) Acceptable provisions to provide for new source review.

4) Assurances that existing controls will remain in effect after redesignation, unless the state demonstrates through photochemical modeling that the standard can be maintained without one or more controls.

5) If appropriate, a commitment to adopt a requirement that all transportation plans conform with, and are consistent with, the SIP.

2.6 Corrective Actions for Potential Future Violations of the Fine Particle Standard

1) A commitment to submit a revised plan eight years after redesignation.

2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standard occur.

3) A list of potential contingency measures that would be implemented in such an event.

4) A list of NO_x, SO_2, and direct $PM_{2.5}$ sources potentially subject to future controls.

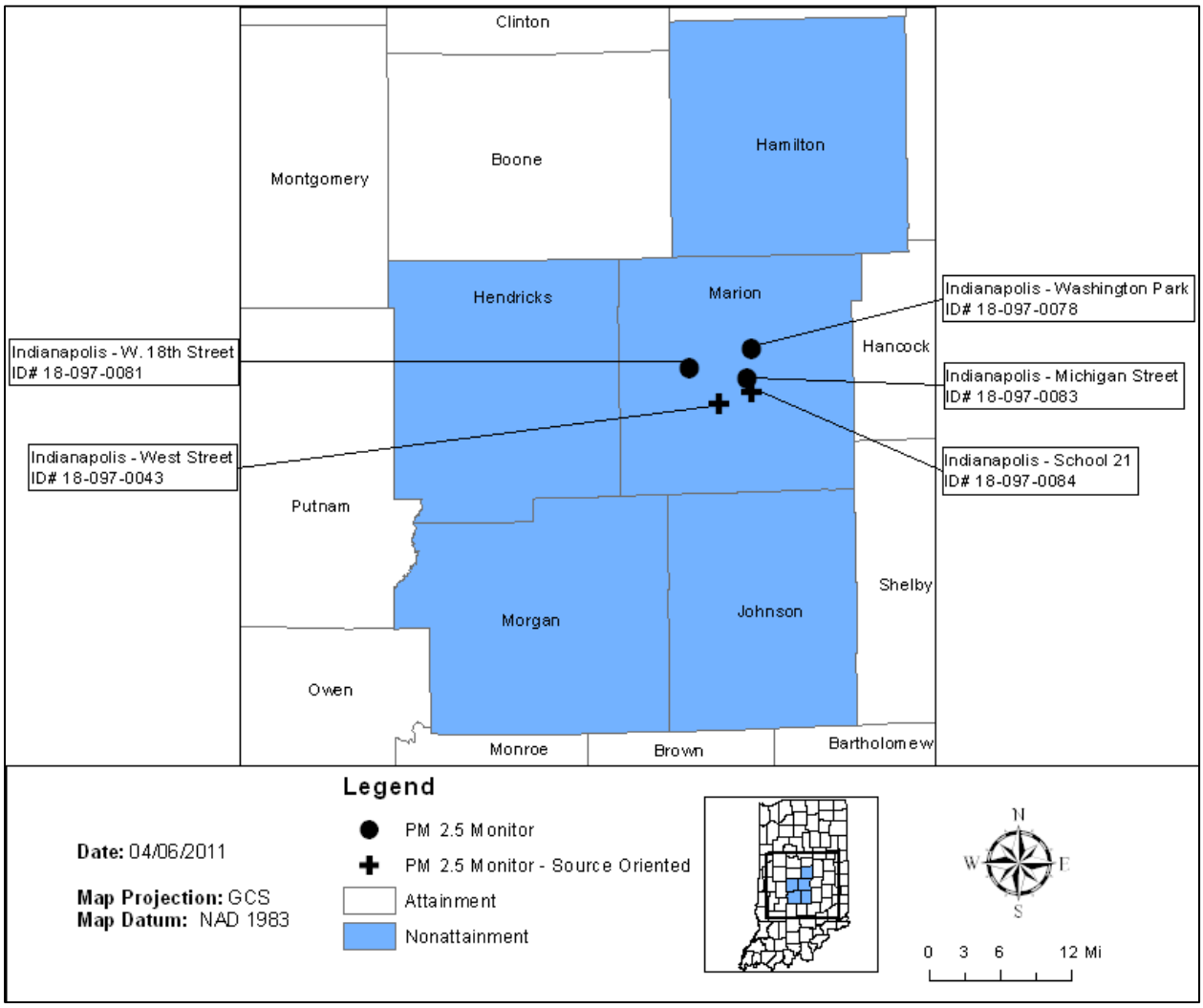
3.0 FINE PARTICLES MONITORING

3.1 Fine Particles Monitoring Network

There are currently three Federal Reference Method monitors measuring fine particle concentrations in this nonattainment area. The monitors are located in Marion County at Washington Park, West 18th Street, and East Michigan Street. The monitors are operated by IDEM's Office of Air Quality (OAQ). A listing of the monitor readings from 2008 through 2010, are shown in Table 3.1 and Appendix A and was retrieved from U.S. EPA's AQS database. The locations of the monitoring sites for this nonattainment area are shown in Figure 3.1.

IDEM also operates two fine particle monitors in Marion County (West Street and School 21) that are considered source oriented monitors. While the source oriented monitors are not used to determine attainment with the annual standard for fine particles, the monitoring locations and data are included as supporting material. Two monitors (Mann Road and East 75th Street, both in Marion County) in the Central Indiana Area were discontinued at the end of 2007.

Figure 3.1
Central Indiana Nonattainment Area



3.2 Ambient Fine Particles Monitoring Data

The following information summarizes U.S. EPA's "Guideline on Data Handling Conventions for the PM NAAQS," U.S. EPA-454/R-99-008, April 1999. Three complete years of fine particle monitoring data are required to demonstrate attainment at a monitoring site. The annual ambient air quality standard for fine particles is met at an ambient air quality monitoring site when the three-year average of the annual average of fine particle concentrations is less than or equal to 15.0 $\mu g/m^3$. When this occurs, the site is said to be in attainment. While calculating design values, three significant digits must be carried in the computations, with final values rounded to the nearest 0.1 $\mu g/m^3$. Decimals 0.05 or greater are rounded up, and those less than 0.05 are rounded down, so that 15.049 $\mu g/m^3$ is the largest concentration that is less than or equal to 15.0 $\mu g/m^3$. Values at or below 15.0 $\mu g/m^3$meet the standard. Values equal to or greater than 15.1 $\mu g/m^3$ exceed the standard.

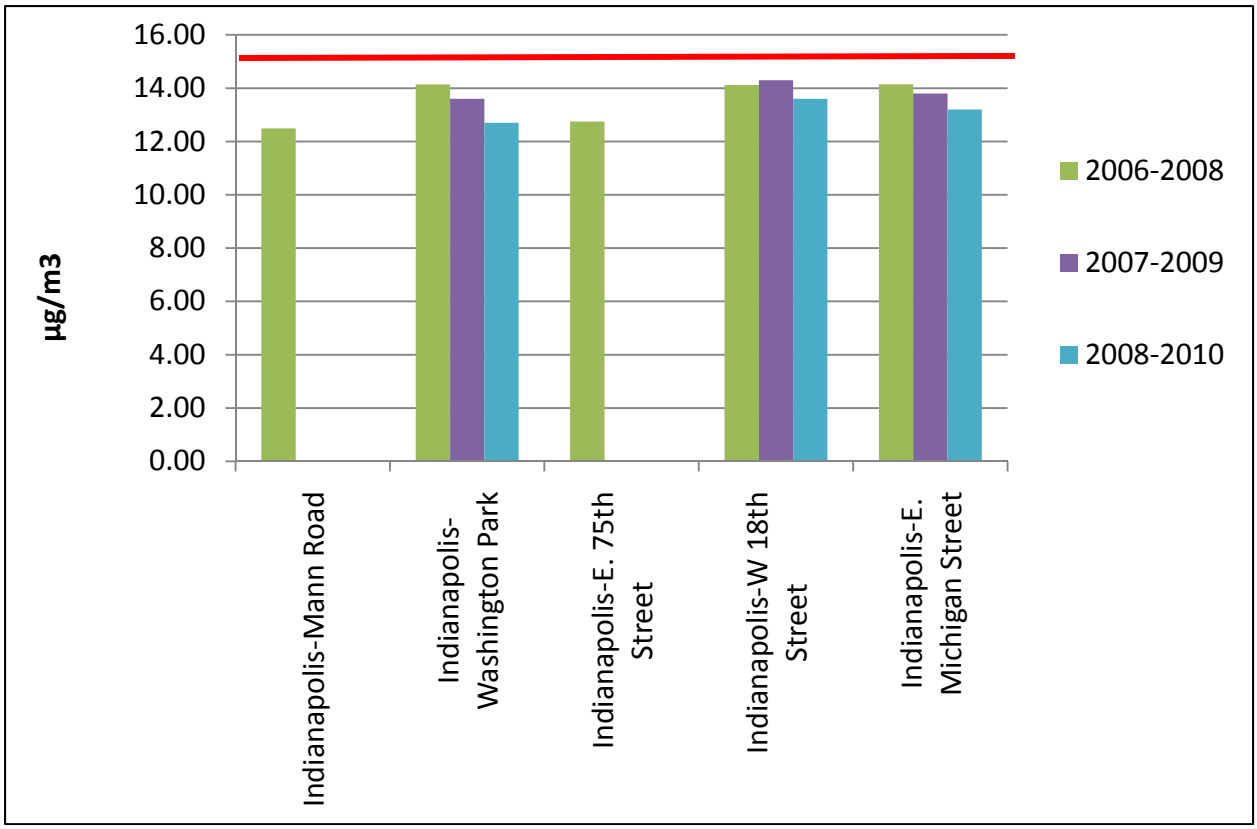
Data handling procedures are applied on an individual basis at each monitor in the area. An individual site's three-year average of the annual average fine particles concentration is also called the site's *design value*. An area is in compliance with the annual NAAQS for fine particles only if all monitoring sites meet the NAAQS. The air quality design value for the area is the highest design value among all sites in the area. Table 3.1 outlines the annual fine particle values by site and the 2008 through 2010 design values for the three active fine particle monitoring sites in the Central Indiana nonattainment area. The nearby Anderson monitor is included for supporting material. Appendix A contains the complete monitoring data summary from 2000 to 2010 for all of the Central Indiana monitors which includes the three active fine particle monitoring sites, the Anderson monitor, the two source oriented monitoring sites, and the two discontinued monitoring sites in the Central Indiana Area.

Table 3.1
Monitoring Data for the Central Indiana Area
(Annual Average and 2008-2010 Design Values)

SITE ID	COUNTY	SITE NAME	YEAR	Annual Average ($\mu g/m^3$)	2008-2010 Design Value ($\mu g/m^3$)
180970078	Marion	Indianapolis-Washington Park	2008	13.02	12.7
			2009	12.11	
			2010	12.86	
180970081	Marion	Indianapolis-W 18th Street	2008	13.75	13.6
			2009	12.96	
			2010	14.03	
180970083	Marion	Indianapolis-E. Michigan Street	2008	13.17	13.2
			2009	12.40	
			2010	13.91	

Graph 3.1 visually demonstrates the 2006 through 2010 design values for the Central Indiana Area.

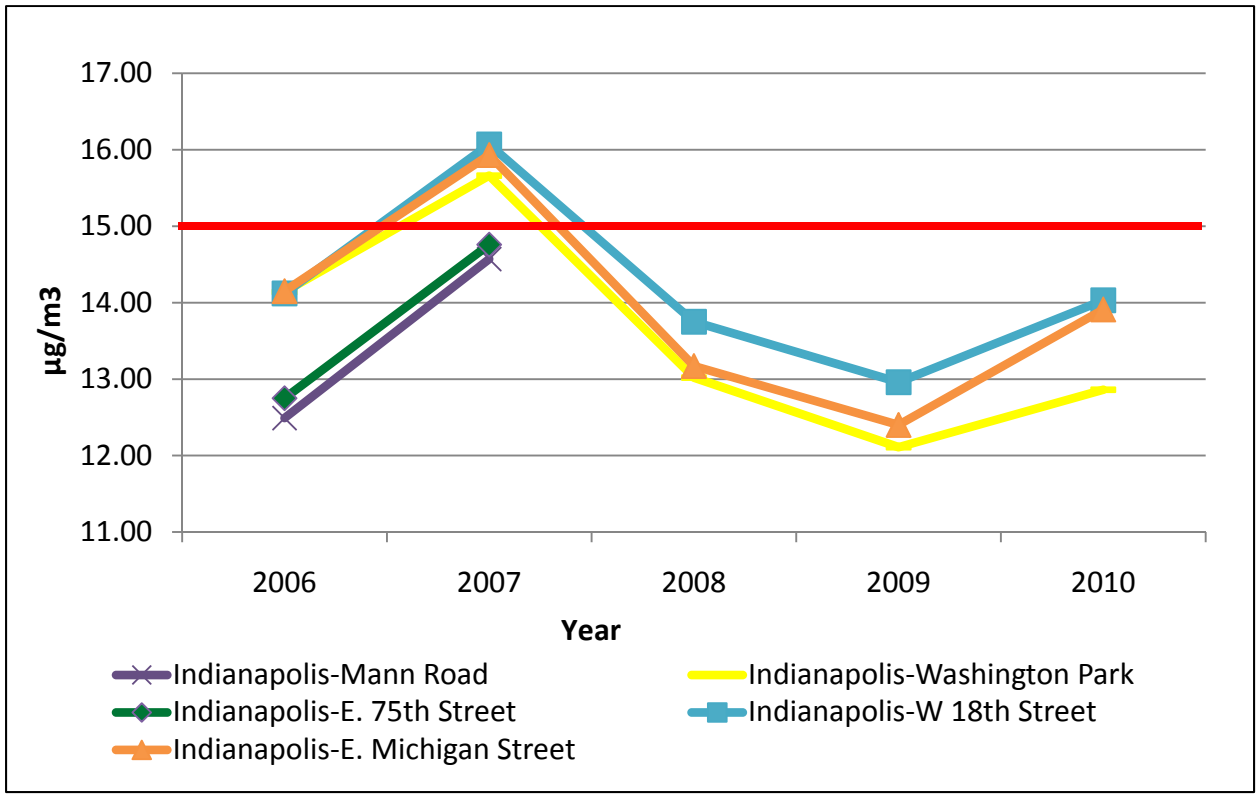
Graph 3.1
Design Values for the Central Indiana Area, 2006 through 2010



Red line represents the annual standard for fine particles of 15 µg/m^3.

Note: The Indianapolis Mann Road and E. 75th Street monitors were discontinued December 31, 2007.

Graph 3.2
Central Indiana Annual Fine Particles Trends, 2006 through 2010



Red line represents the annual standard for fine particles of 15 µg/m^3.

Note: The Indianapolis Mann Road and E. 75th Street monitors were discontinued December 31, 2007.

The design values for the Central Indiana nonattainment area demonstrate that the annual NAAQS for fine particles has been attained. Appendix A contains the complete fine particles monitoring data summary for the years 2000 through 2010.

Graph 3.1 shows the trend in design values, while Graph 3.2 shows the trend for annual fine particles. A comprehensive list of the design values for the three monitoring sites over the 2000 through 2010 period is outlined in Appendix A. The area's design values have recently trended downward, as emissions have declined due to programs such as the Acid Rain program and cleaner automobiles and fuels, both regionally and locally. U.S. EPA's rule to control nitrogen oxides from specific source categories (40 CFR Parts 51, 72, 75 and 96, published on October 17, 1998 and referred to as the "NO_x SIP Call") has significantly reduced emissions from large electric generating units (EGUs), industrial boilers, and cement kilns. Indiana's NO_x SIP Call Rule was adopted into the Indiana Administrative Code (IAC) on June 6, 2001 at 326 IAC 10-3 and 326 ICA 10-4. The elevated fine particle values for 2005 are considered an abnormal occurrence. An analysis of meteorological conditions and monitoring values is included in Section 7.0 and supports the conclusion that attainment of the standard as of 2010 is not the result of unusually favorable meteorological conditions. It is expected that this downward trend

will persist as the above programs continue and U.S. EPA's proposed Clean Air Transport Rule is implemented.

3.3 Quality Assurance

IDEM has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and recorded the data in the AQS database and, thus, the data is available to the public.

3.4 Continued Monitoring

Indiana commits to continue monitoring fine particle concentrations at the sites indicated in Table 3.1 and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making changes to the existing monitoring network through the annual network review should changes become necessary in the future. IDEM will continue to quality assure the Indiana monitoring data to meet the requirements of 40 CFR 58. IDEM will enter all data into AQS on a timely basis in accordance with federal guidelines.

4.0 EMISSION INVENTORY

U.S. EPA's Redesignation Guidance and Implementation Rules require the submittal of a comprehensive inventory of precursor emissions for fine particles (NO_x, SO_2, and direct $PM_{2.5}$) representative of the year when the area achieves attainment of the annual NAAQS for fine particles (base year). IDEM is using 2008 as the base year. Consistent with the federal implementation rule for fine particles, IDEM and U.S. EPA do not consider volatile organic compounds (VOCs) or ammonia (NH_3) to be significant contributors to fine particles. IDEM must also demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other requirements related to the emission inventory include: a projection of the emission inventory to a year at least ten years following redesignation; a demonstration that the projected level of emissions is sufficient to maintain the annual standard for fine particles; and, a commitment to provide future updates of the inventory to enable tracking of emission levels during the ten year maintenance period. The following subsections address each of these requirements.

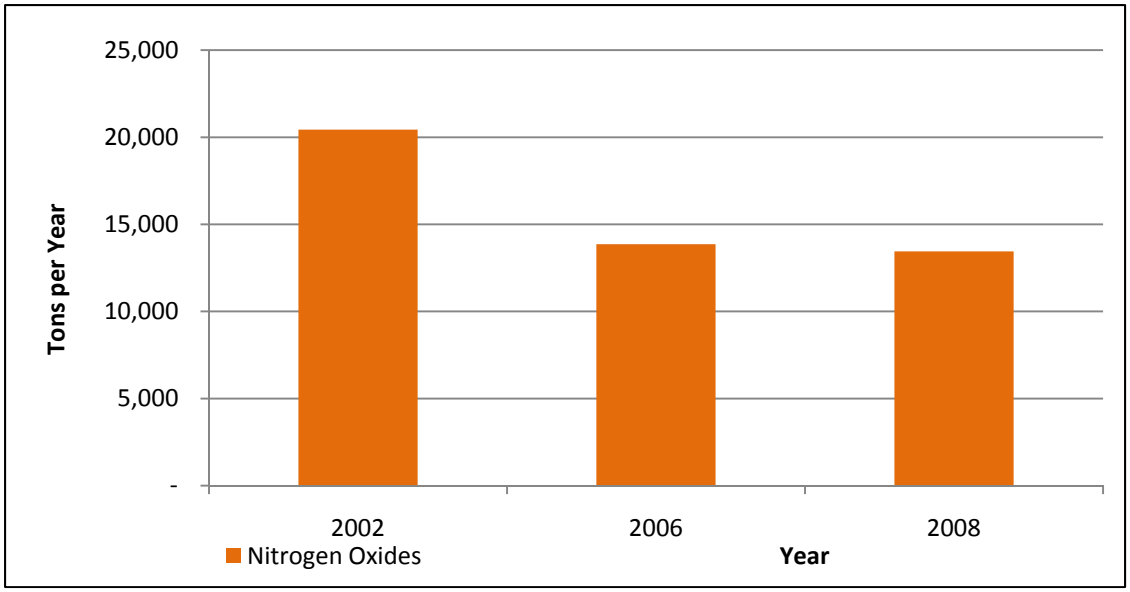
4.1 Emission Trends

Point Sources

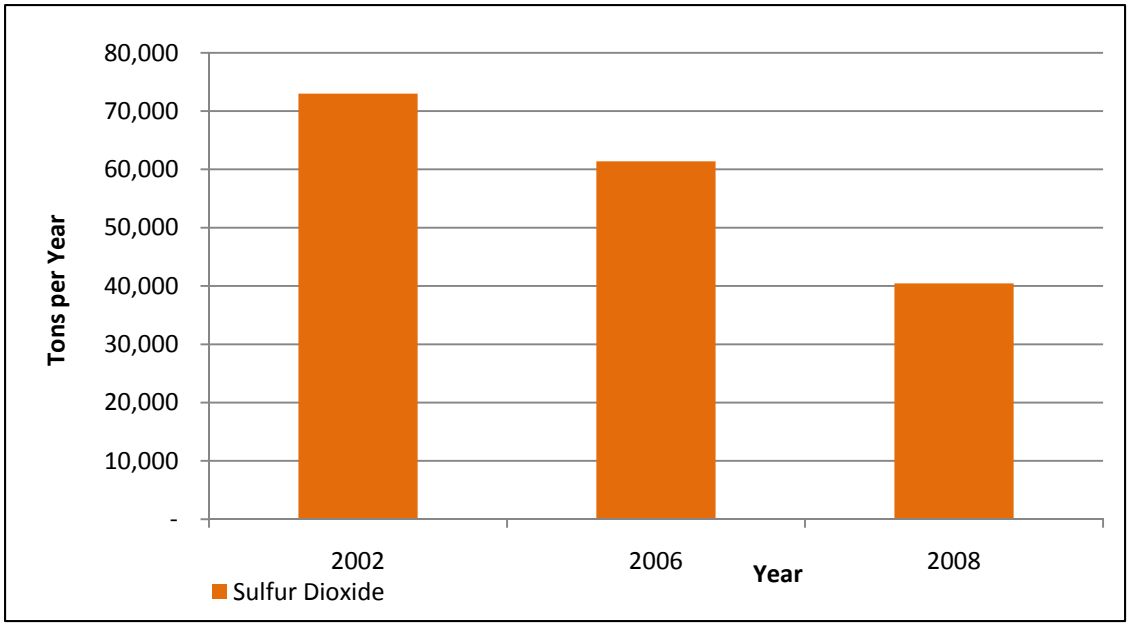
The point source data are obtained from Indiana's emissions reporting program and are based on county point source totals. The Central Indiana Area had a 34.21 percent (%) reduction in NO_x point source emissions from 2002 to 2008. As Graph 4.7 illustrates, Central Indiana NO_x emissions from electric generating units have decreased substantially during this time period as well. The Central Indiana Area had a 44.59% reduction in SO_2 point source emissions from 2002 to 2008. The large decrease in SO_2 point source emissions from 2006 to 2008 is due to the shutdown of the Citizens Gas and Coke plant in Indianapolis. A moderate increase in direct

$PM_{2.5}$ point source emissions from 2002 to 2008 is noted. However, this increase in direct $PM_{2.5}$ emissions is due to the fact that most companies did not submit their direct $PM_{2.5}$ emissions data in 2002, but did submit direct $PM_{2.5}$ data in the 2005/2006 emissions inventory, from which the 2008 inventory is extrapolated. Graphs 4.1, 4.2, and 4.3 demonstrate the trend in point source emissions of NO_x, SO_2, and direct $PM_{2.5}$ for the Central Indiana Area that generally correspond to the years of monitored values used in this redesignation petition. Graphs and data tables of emissions for the point source category can be found in Appendix B.

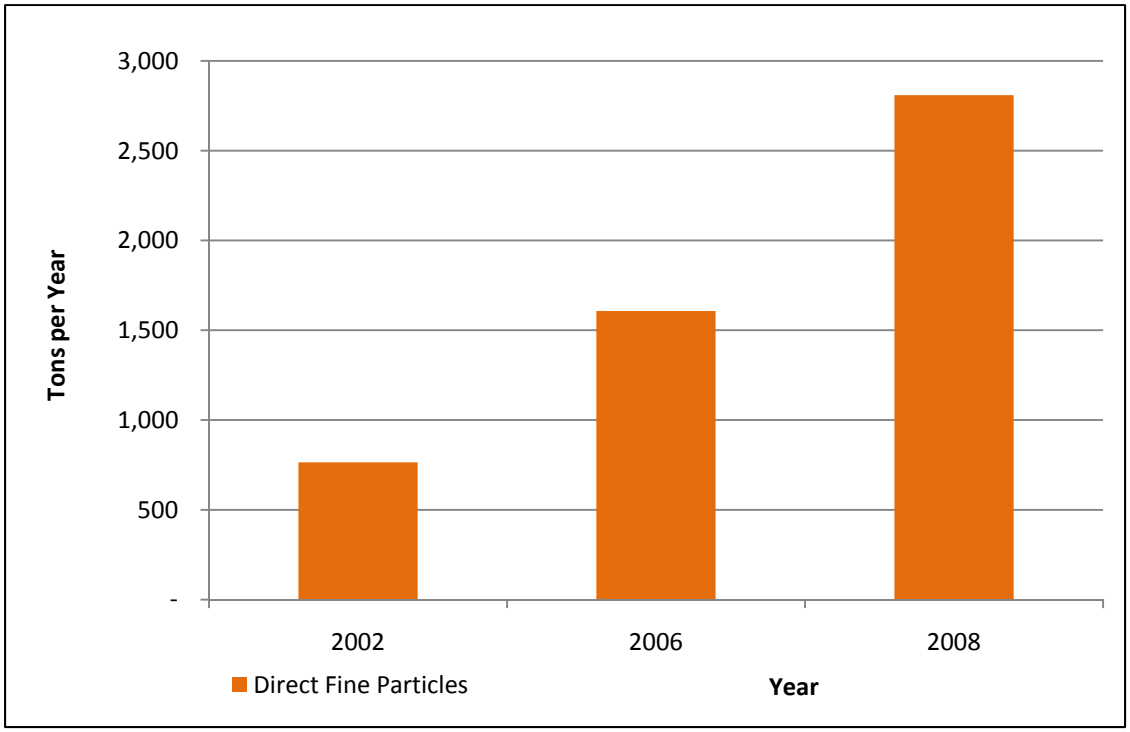
Graph 4.1
Central Indiana Area NO_x Point Source Emission Trends, 2002, 2006, and 2008



Graph 4.2
Central Indiana Area SO_2 Point Source Emission Trends, 2002, 2006, and 2008



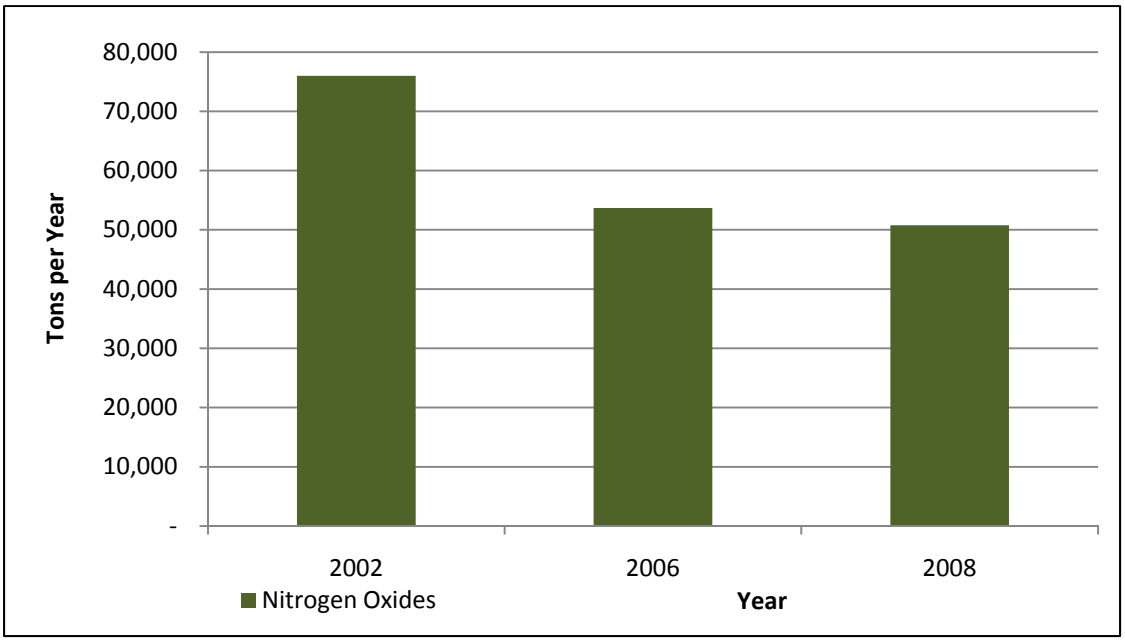
Graph 4.3
Central Indiana Area Direct $PM_{2.5}$ Point Source Emission Trends, 2002, 2006, and 2008



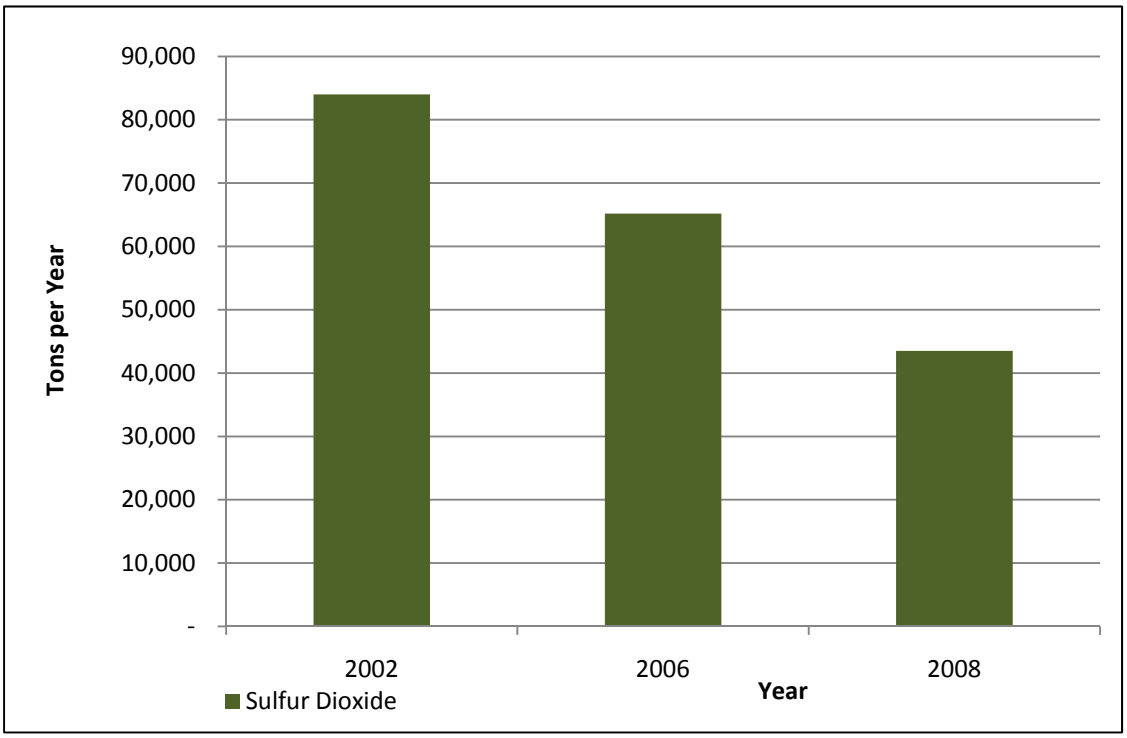
All Anthropogenic Sources

Periodic inventories, which include emissions from all sectors (mobile, area, nonroad, and point source), were prepared for 2002, 2005/2006, and 2008. The 2006 and 2008 data were extrapolated from the 2005 emission inventory. Graphs 4.4, 4.5, and 4.6 show the trend in anthropogenic source emissions for the Central Indiana Area. Regional NO_x emission reductions affect fine particle levels in the Central Indiana Area far more so than NO_x emission reductions within the nonattainment area itself. These emission trends roughly follow the years of monitored trends discussed in Section 3.0. There is a downward trend in NO_x emissions from 2002 to 2006 and a further decrease through 2008. The decrease in NO_x can be largely attributed to the impact of the NO_x SIP Call. There is a general downward trend in SO_2 emissions from 2002 to 2008, as well. As noted previously, there is an overall increase in direct $PM_{2.5}$ anthropogenic emissions. Graphs and data tables of emissions from each source category are available in Appendix C.

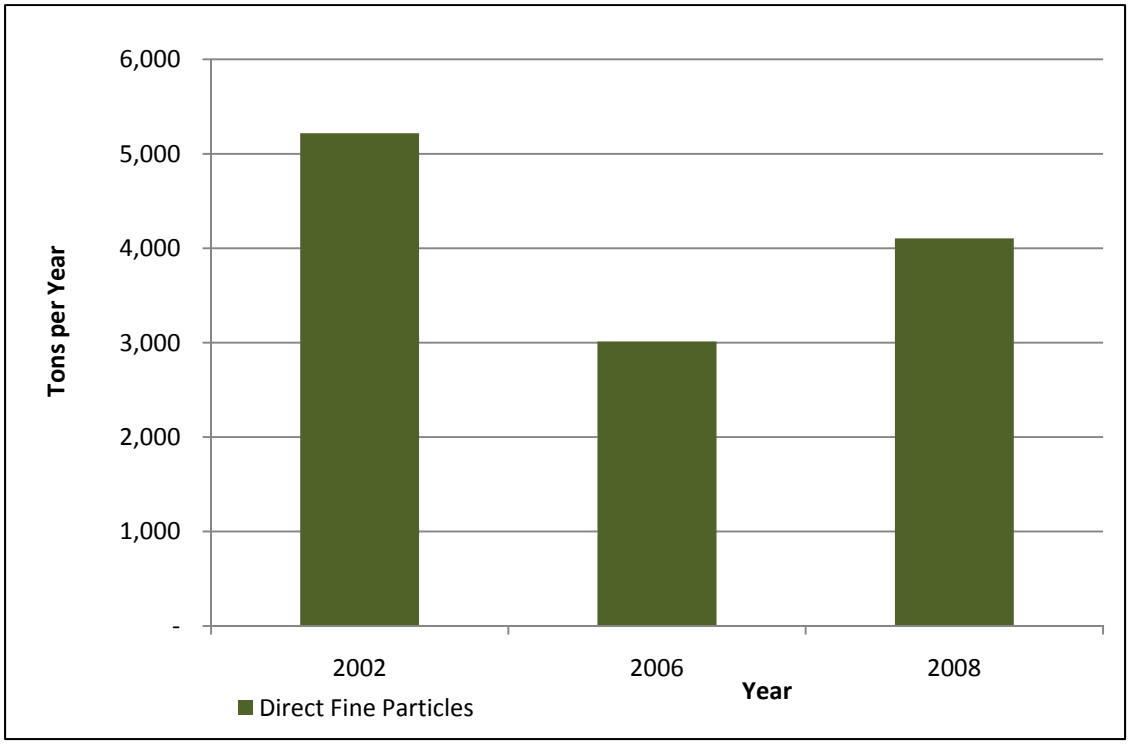
Graph 4.4
NO_x Emission Trends, All Sources in the Central Indiana Area, 2002, 2006, and 2008



Graph 4.5
SO_2 Emission Trends, All Sources in the Central Indiana Area, 2002, 2006, and 2008



Graph 4.6
Direct $PM_{2.5}$ Emission Trends, All Sources in Central Indiana Area, 2002, 2006, and 2008



EGU Sources

Graphs 4.7 and 4.8 show both NO_x and SO_2 emissions are decreasing substantially in response to national programs affecting all EGUs, such as the Acid Rain program and the NO_x SIP Call. Other sectors of the inventory also impact the formation of fine particles, but large regional sources, such as EGUs, have a substantial impact on the formation of fine particles.

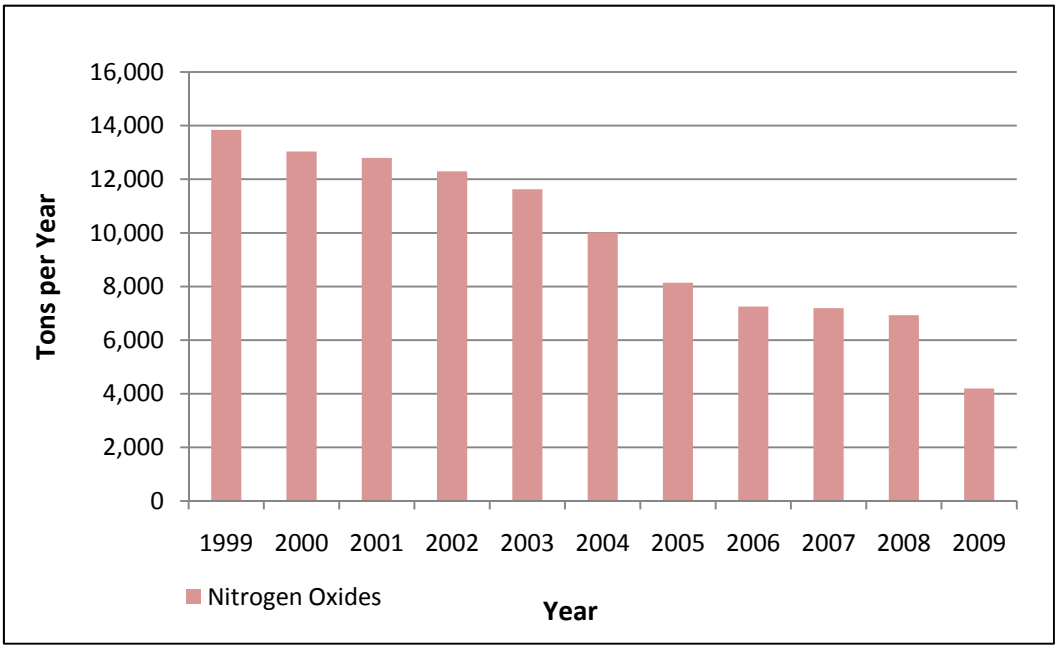
The data were taken from U.S. EPA's Clean Air Markets database located at http://www.epa.gov/airmarkets. Data are available sooner for these units than other point sources in the inventory because of the NO_x SIP Call budget and trading requirements.

As part of the NO_x SIP Call, the states were required to adopt into their rules a budget for all large EGUs. Indiana's budget is referenced in 326 IAC 10-4. The budget represents a statewide cap on NO_x emissions. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. To summarize, NO_x emissions have dramatically decreased over the years represented on these graphs.

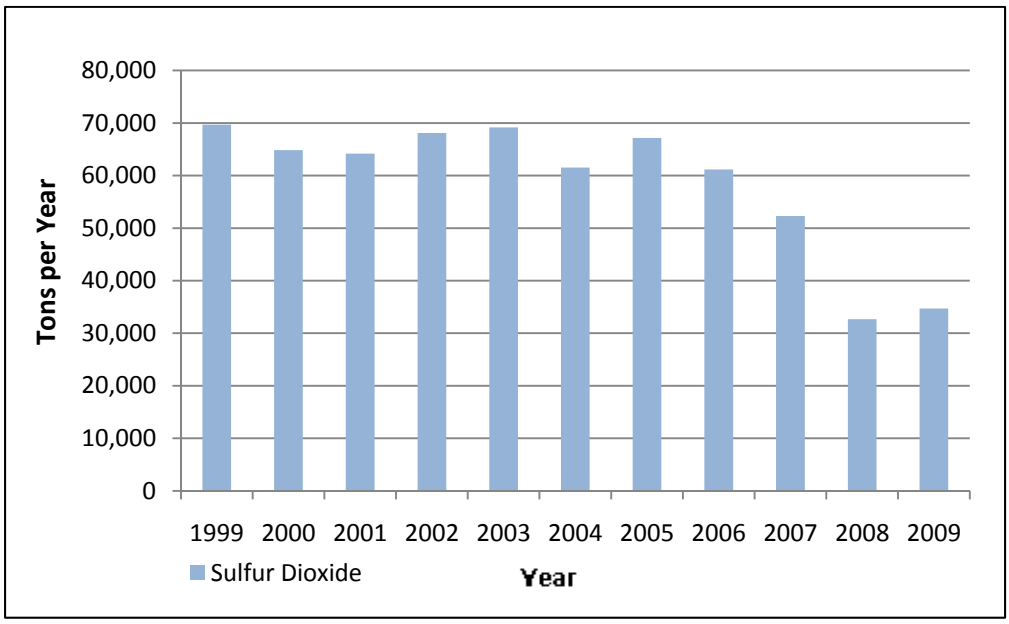
These emissions, capped by the state rule, are expected to remain near these levels throughout the maintenance period covered by this request. The state cap for the NOx SIP Call remained in place through 2008, at which time the Clean Air Interstate Rule (CAIR) program superseded it.

CAIR, issued in March 2005, adopted by the Indiana Air Pollution Control Board on November 1, 2006, and implemented beginning in 2010, will continue to reduce regional EGU NO_x emissions statewide by approximately another 17% by 2015 and 57% for EGU SO_2 emissions by 2015. The D.C. Circuit court's vacatur of CAIR in July of 2008 and subsequent remand without vacatur of CAIR in December of 2008, directs U.S. EPA to revise the CAIR rule in the future. The proposed Clean Air Transport Rule (CAIR's replacement rule) will result in similar or greater emission reductions than assumed within the current emission inventories, once it is implemented.

Graph 4.7
NO_x Emissions from EGUs, Central Indiana Area, 1999 to 2009

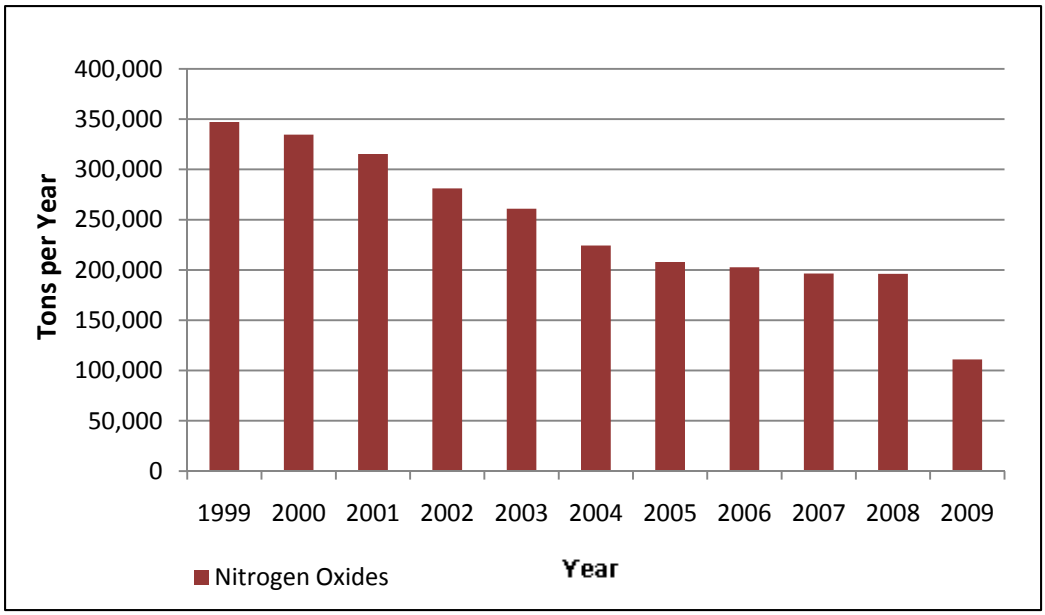


Graph 4.8
SO_2 Emissions from EGUs, Central Indiana Area, 1999 to 2009

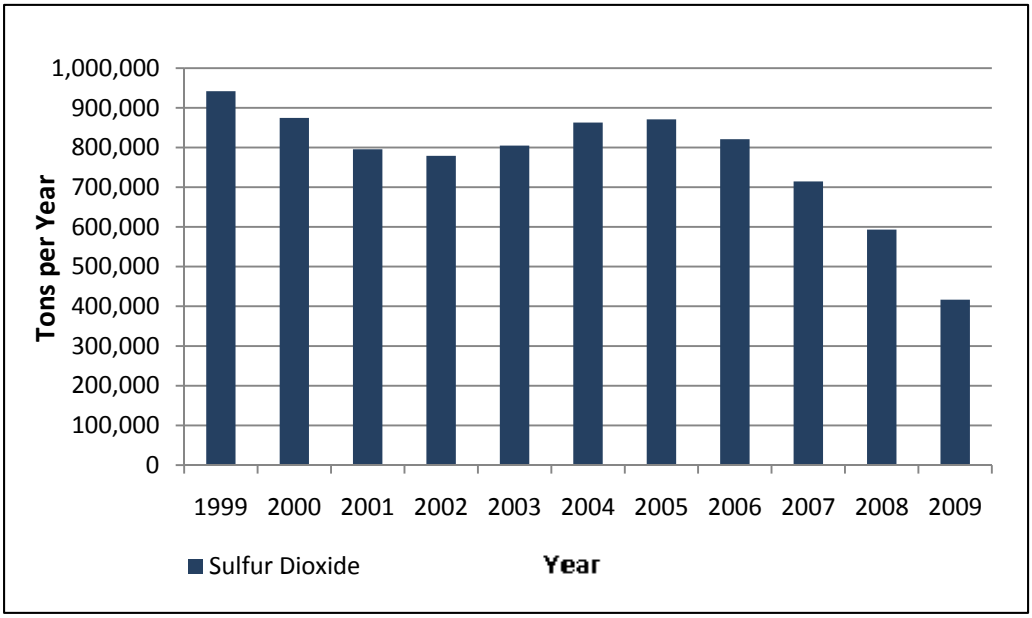


Although there are minor fluctuations in emissions over time, as shown in Graphs 4.7 and 4.8, there are moderate reductions to date. Indiana does expect to see significant reductions in SO_2 emissions from CAIR and Best Available Retrofit Technology (BART), once implemented. Additional NO_x control technologies have been installed on various emission units at the Indianapolis Power & Light Company (IPL)-Harding Street Generating Station located in Marion County as well as the IPL-Eagle Valley Generating Station, located in Morgan County, since the 2001-2003 monitoring period. These control technologies include selective non-catalytic reduction, selective catalytic reduction, neural net controls, low NO_x burners, and separated overfire air. The SO_2 data from 2008 reflects the installation of a flue gas desulphurization system at the IPL-Harding Street Generating Station that became operational in 2007. As IPL indicates, many control technologies have been installed voluntarily and are not required to be operated. Most of the major sources within the area are subject to the NO_x SIP Call, CAIR or RACT requirements. Appendix B shows detailed emissions for the point source emissions, and Appendix D shows detailed emissions for the EGUs.

Graph 4.9
Indiana Statewide NO_x Emissions from EGUs, 1999 to 2009



Graph 4.10
Indiana Statewide SO_2 Emissions from EGUs, 1999 to 2009



4.2 Base Year Inventory

IDEM prepared a comprehensive inventory for the Central Indiana Area, including area, mobile, nonroad, and point sources for direct $PM_{2.5,}$ NO_x and SO_2 for 2005/2006 and 2008 (the years with the most complete emissions inventory available at this time). The 2008 emission inventory represents a base year for maintenance purposes. The 2007 implementation rule for the annual fine particle standard states that NO_x, $SO_{2,}$ and direct $PM_{2.5}$ are the regulated precursors of fine particles. Ammonia and VOCs are not required to be addressed unless the state or U.S. EPA make a technical demonstration that emissions of these pollutants from sources in the state significantly contribute to $PM_{2.5}$ concentrations in a given nonattainment area. U.S. EPA and IDEM have not determined ammonia or VOCs are significant contributors to fine particles formation in Indiana. IDEM's 2008 base year inventory was developed as follows:

- Area sources were extrapolated from the Indiana 2005 periodic inventory submitted to U.S. EPA.
- Mobile source emissions were calculated from MOBILE6.2 model-produced emission factors and data extracted from the region's travel-demand model. These emissions were then interpolated as needed to determine 2008 base year values.
- Point source information was compiled from IDEM's emissions inventory database and U.S. EPA's Clean Air Markets acid rain database.
- Biogenic emissions are not specifically included in these summaries, but are included in the photochemical modeling results presented in Section 7.0.
- Nonroad emissions were extrapolated from the 2005 National Emissions Inventory (NEI). To address concerns about the accuracy of some of the categories in U.S. EPA's nonroad emissions model, Lake Michigan Air Directors Consortium (LADCO) contracted with two companies to review the base data and make recommendations. One of the contractors also estimated emissions for two nonroad categories not included in U.S. EPA's nonroad model. Emissions were estimated for commercial marine vessels and railroads. The recreational motorboat population and spatial surrogates (used to assign emissions to each) were significantly updated. The populations for the construction equipment category were also reviewed and updated based upon surveys completed in the Midwest and the temporal allocation for agricultural sources was also updated. A new nonroad estimation model was provided by U.S. EPA for the 2005 analysis.

Appendix C contains data tables and graphs of these emissions.

4.3 Emission Projections

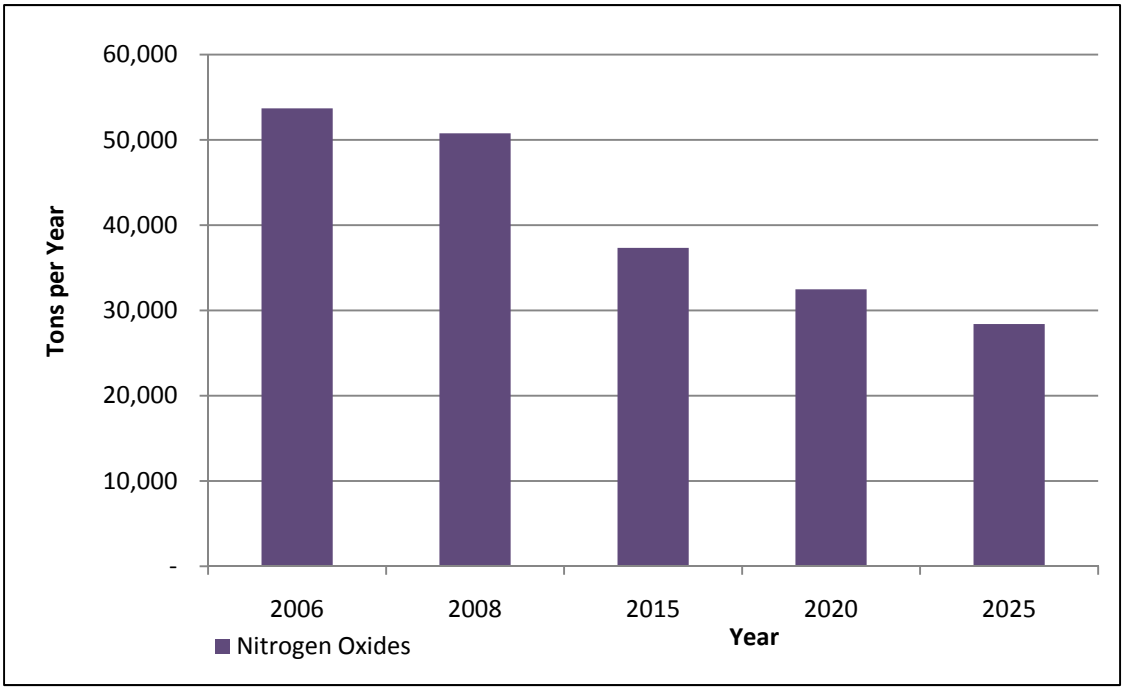
In consultation with the U.S. EPA and other stakeholders, IDEM selected the year 2025 as the maintenance year for this redesignation request. This document contains projected emission inventories for 2015, 2020, and 2025 for the Central Indiana Area. These emission projections were prepared by IDEM, with assistance from LADCO and the Indianapolis Metropolitan Planning Organization. The projected emission inventories for 2020 and 2025 were extrapolated from 2018 estimates developed by LADCO.

The detailed 2015, 2020, and 2025 emission inventory for the Central Indiana Area can be found in Appendix E. Emission trends are an important gauge for continued compliance with the annual standard for fine particles. Therefore, IDEM performed an initial comparison of the inventories for the base year of 2005/2006, secondary validation year of 2008, interim years of 2015 and 2020, and maintenance year of 2025 for the Central Indiana Area.

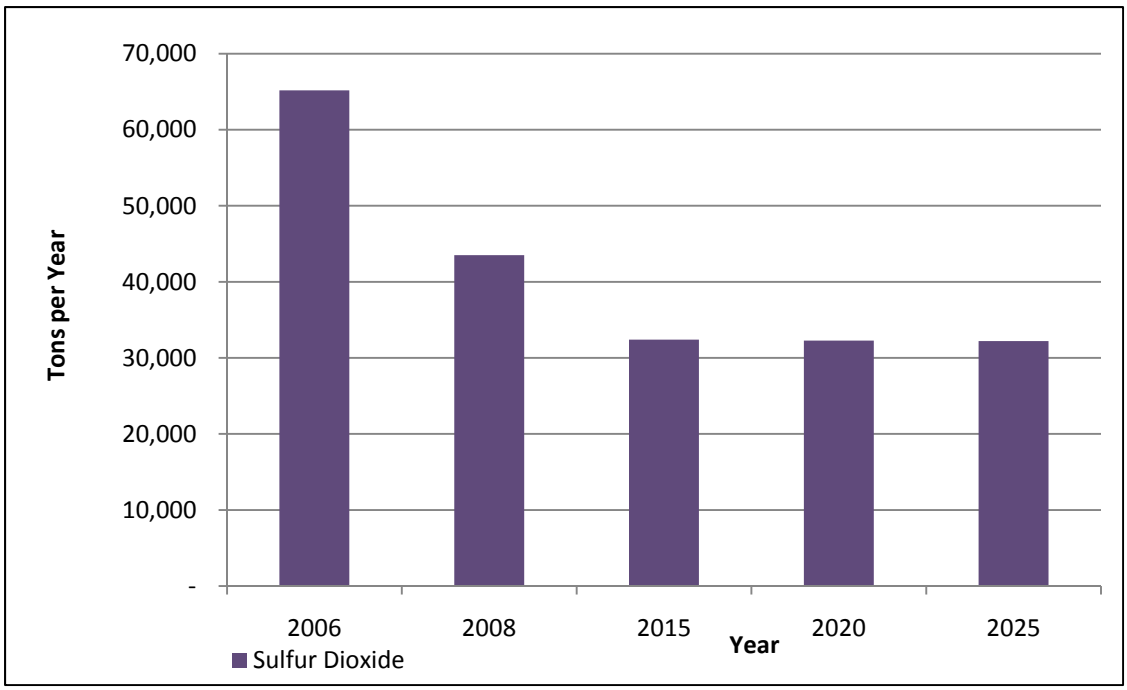
The 2005/2006 LADCO modeling inventory was used as the basis for estimated emissions for the years 2008, 2015, 2020, and 2025, using LADCO's growth factors, for all sectors except point sources (electrical generating units and non-electric generating units). Point source emissions for 2005/2006 and 2008 were compiled from Indiana's emission inventory database. The 2006 base year and 2008 secondary validation emissions were extrapolated from the 2005 emission inventory. The 2015 interim year emissions were interpolated based on the 2009 and 2018 LADCO modeling inventory, using LADCO's growth factors, for all sectors. The 2020 interim year emissions and the 2025 maintenance year emissions were extrapolated from the 2009 and 2018 LADCO modeling inventory.

Graphs 4.11, 4.12, and 4.13 visually compare 2008 NO_x, SO_2, and direct $PM_{2.5}$ county total estimated emissions with the 2015, 2020, and 2025 projected emissions for the Central Indiana Area. Mobile source emission inventories are further described in Section 5.0. In addition to LADCO's estimates, point source emissions were projected based upon the statewide EGU NO_x budgets from the Indiana NO_x rule. It should be noted that EGU emission estimates for 2015, 2020, and 2025 were projected utilizing the Department of Energy Information's Annual Energy Outlook Supplemental tables for the year 2018. These tables were generated for the reference case of the Annual Energy Outlook 2007 using the National Energy Modeling System. Graphs and data tables of emissions from the EGU source category can be found in Appendix D.

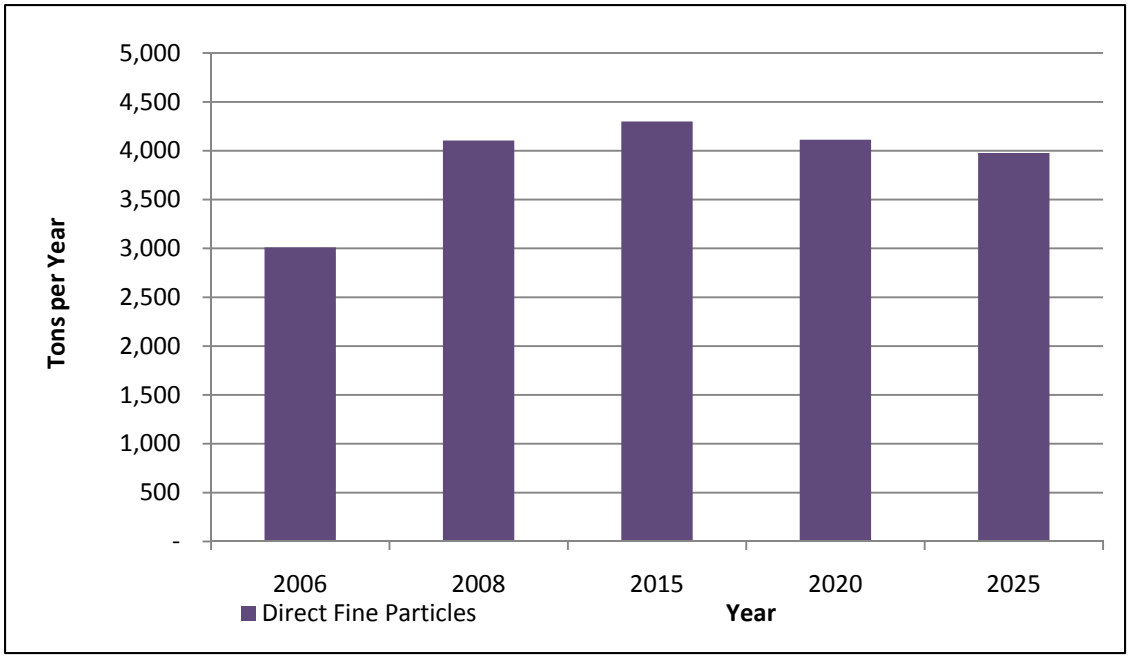
Graph 4.11
Comparison of 2005 and 2008 Estimated and 2015, 2020, and 2025 Projected NO_x Emissions for the Central Indiana Area



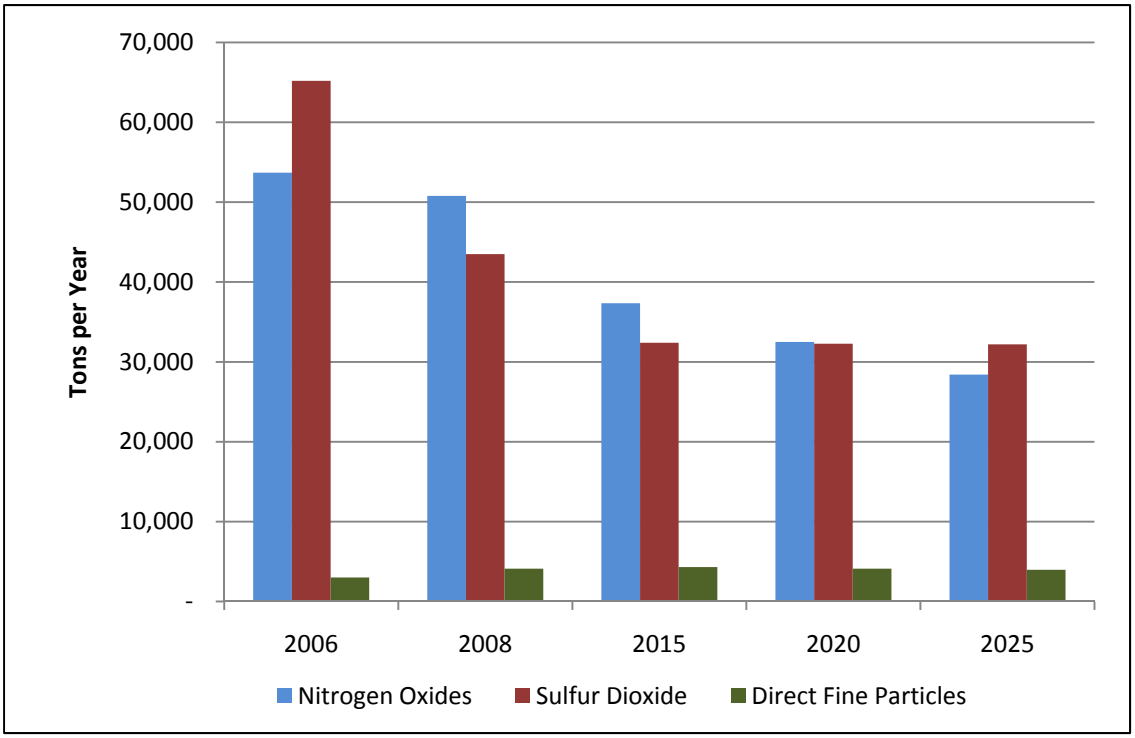
Graph 4.12
Comparison of 2005 and 2008 Estimated and 2015, 2020, and 2025 Projected SO_2 Emissions for the Central Indiana Area



Graph 4.13
Comparison of 2005 and 2008 Estimated and 2015, 2020, and 2025 Projected Direct $PM_{2.5}$ Emissions for the Central Indiana Area



Graph 4.14
Comparison of 2005 and 2008 Estimated and 2015, 2020, and 2025 Projected NO_x, SO_2, and Direct $PM_{2.5}$ Emission Trends for the Central Indiana Area



NO_x emissions within the Central Indiana Area are projected to decline by 44.07% between 2008 and 2025. Emission reduction benefits from U.S. EPA rules covering the NO_x SIP Call, Tier 2 Motor Vehicle Emission Standards and Gasoline Sulfur Control Requirements, Heavy-Duty Highway Engine Rule, and the Nonroad Diesel Engine Rule are factored into the changes. Additionally, due to implementation of the NO_x SIP Call across the eastern United States, NO_x and fine particle levels entering the Central Indiana Area will also be decreased. SO_2 emissions within the Central Indiana Area are projected to decline by 25.98% between 2008 and 2025. Direct $PM_{2.5}$ emissions from 2008 to 2025 are projected to decline by 3.11% within the Central Indiana Area. The 2015, 2020, and 2025 emission projections assume no additional controls will be installed. This approach over-predicts future year emissions as it is reasonable to assume a significant number of facilities will need to install additional controls to comply with CAIR or the proposed Clean Air Transport Rule.

Table 4.1
Comparison of 2008 Estimated and 2025 Projected Emission Estimates Central Indiana Area (Tons Per Year)

	2008	**2025**	**Change**	**% Change**
NO_x	50,777.76	28,399.04	-22,378.72	44.07% Decrease
SO_2	43,502.68	32,201.49	-11,301.19	25.98% Decrease
Direct $PM_{2.5}$	4,103.99	3,976.18	-127.81	3.11% Decrease

4.4 Demonstration of Maintenance

Quality-assured ambient air quality data from all the monitoring sites indicate that air quality in the Central Indiana Area met the annual standard for fine particles for the three-year period ending in 2010. U.S. EPA's Redesignation Guidance states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS." (Page 9) Section 3.0 of this document shows that the Central Indiana Area has in fact measured attainment for fine particles for the three consecutive periods ending in 2008, 2009 and 2010. Additionally, emission projections outlined in Section 4.0 of this document clearly illustrate that regional NO_x, SO_2, and direct $PM_{2.5}$ emissions in the area will continue to decline leading to local reductions between 2008 (base year) and 2025 (maintenance plan horizon). Section 7.0 further discusses the implications of these emission trends and provides an analysis to support these conclusions.

In Indiana, major point sources in all counties are required to submit air emissions information once every three years, or annually, if the SO_2 or NO_x potential to emit is greater than 2,500 tons per year in accordance with the Emission Reporting Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all precursor emission sectors every three years. These precursor emission inventories will be prepared for 2011, 2014 and 2017, as necessary, to comply with the inventory reporting requirements established in the CAA. Emissions information will be compared to the 2008 base year and the 2025 projected maintenance year inventories to assess emission trends, as necessary, to assure continued compliance with the annual standard for fine particles.

4.5 Permanent and Enforceable Emission Reductions

Permanent and enforceable reductions of NO_x and SO_2 have contributed to the attainment of the annual standard for fine particles. Some of these reductions were due to the implementation of the NO_x SIP Call rule, and some were due to the application of tighter federal standards on motor vehicles and fuels.

Section 6.0 identifies the emission control measures specific to the Central Indiana Area, as well as the implementation status of each measure.

4.6 Provisions for Future Updates

As required by Section 175A(b) of the CAA, Indiana commits to submit to the Administrator, eight years after redesignation, an additional revision of this SIP. The revision will contain Indiana's plan for maintaining the national primary fine particles air quality standard for ten years beyond the first ten-year period after redesignation.

5.0 TRANSPORTATION CONFORMITY BUDGETS

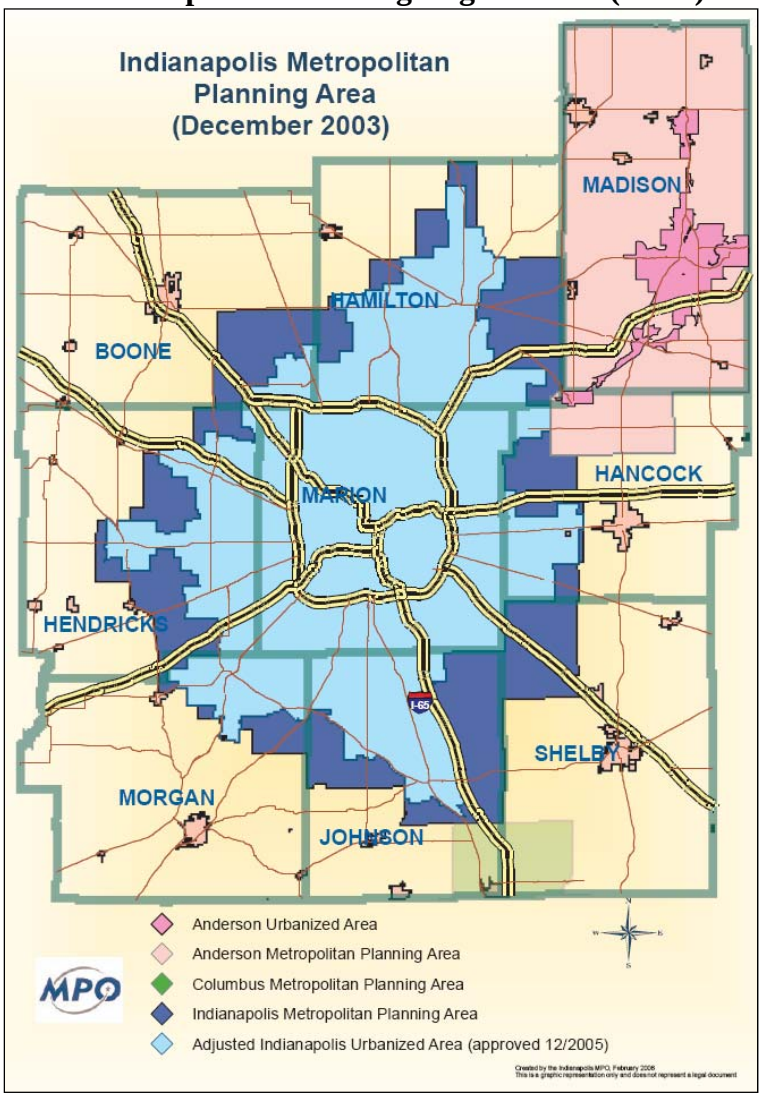
U.S. EPA requirements outlined in 40 CFR 93.118(e)(4) stipulate that mobile source emission budgets for direct $PM_{2.5}$ and NO_x be established as part of a SIP. The motor vehicle emission budgets (MVEBs) are necessary to demonstrate conformance of transportation plans and improvement programs with the SIP.

5.1 Onroad Emission Estimates

The Indianapolis Department of Metropolitan Development (DMD), the Madison County Council of Governments (MCCOG), and the Columbus Area Metropolitan Planning Organization are the Metropolitan Planning Organizations (MPOs), whose planning areas intersect the five county Central Indiana Area. In addition, significant portions of the nonattainment area are not under the jurisdiction of any MPO. These planning areas in relation to the counties in the $PM_{2.5}$ nonattainment area are illustrated in Figure 5.1.

An interagency consultation group consisting of representatives from the three MPOs, the Indiana Department of Transportation, IDEM, the Federal Highway Administration, and local transit and environmental quality providers jointly determine regional significance. Primary responsibility for modeling emissions falls under the purview of DMD, which runs the MOBILE6.2 model to arrive at emission rates, and its regional travel model to develop estimates of vehicle miles traveled (VMT) for all areas, except for the MCCOG planning area, which administers its own travel model. DMD then compiles all results into a regional emissions analysis, which all MPOs then adopt following a public involvement period.

Figure 5.1
Central Indiana Metropolitan Planning Organization (MPO) Jurisdictions



These models simulate the traffic in the area and are used to predict what the traffic would be like in future years given growth expectations. The models are used mostly to identify where travel capacity will be needed and to determine the infrastructure requirements necessary to meet that need. They are also used to support the calculation of mobile source emissions. The travel demand forecast model is used to predict the total daily VMT and the U.S. EPA software program, MOBILE6.2, is used to calculate per mile emissions. The product of these two outputs, once combined, is the estimated total amount of pollution emitted by the onroad vehicles for the area analyzed.

5.2 Overview

Broadly described, MOBILE6.2 is used to determine "emission factors", which are the average emissions per mile (grams/mile) for fine particles and fine particle precursors, including direct $PM_{2.5}$, NO_x and SO_2. There are numerous variables that can affect the emission factors. The vehicle-fleet (vehicles on the road) age and the vehicle types have a major effect on the emission factors. The facility-type on which the vehicles are traveling (MOBILE6.2 facility-types are Freeway, Arterial, Local, and Ramp) and the vehicle speeds also affect the emission factor values. Meteorological factors such as air temperature and humidity affect emission factors as well. These data are estimated using the *best available data* to create emission factors for fine particle precursors including direct $PM_{2.5}$, NO_x and SO_2. After emission factors are determined, they must be multiplied by the VMT to determine the quantity of vehicle-related emissions. This information is derived from the travel demand model.

It should be noted that each year analyzed will have different emission factors, volumes, speeds, and likely results in additional modeling. MOBILE6.2 input and output files are found in Appendix F.

5.3 Analysis Years

The travel demand model contains road networks that are time specific. The Central Indiana MPOs have modeled the years 2002, 2010, 2015, and 2025. Information, including emissions, has been interpolated from 2002 and 2010 for the years 2005, 2006, and 2008 and from 2015 and 2025 for the year 2020. This Redesignation Petition provides emission inventory estimates for 2002, 2005, 2006, 2008, 2015, 2020, and 2025 to meet the requirements specified by the CAA and U.S. EPA. The emission estimates outlined in Section 4.0 of this document reference the mobile source emissions data contained in Table 5.1.

5.4 Emission Estimates

Table 5.1 outlines onroad emission estimates for the entire nonattainment area for the years 2002, 2005, 2006, 2008, 2015, 2020, and 2025.

Table 5.1 - Emission Estimates for Onroad Mobile Sources

	2002	**2005**	**2006**	**2008**	**2015**	**2020**	**2025**
VMT (thousand miles/day)	52,979.53	49,540.45	48,394.10	46,101.38	46,614.09	49,355.27	52,096.44
$PM_{2.5}$ (tons/year)	670.50	423.11	416.63	403.67	289.67	275.11	260.54
NO_x (tons/year)	38,059.50	23,354.20	22,734.38	21,494.74	12,259.66	9,752.70	7,245.74

5.5 Motor Vehicle Emission Budget

Table 5.2 contains the motor vehicle emissions budget for the entire nonattainment area for the years 2015 and 2025. These MVEBs are intended to be direct replacements of those provided in Indiana's previous submittal.

Table 5.2 – Motor Vehicle Emission Budgets (Tons Per Year)

Year	2015	2025
$PM_{2.5}$	353.40	317.86
NO_x	14,956.79	8,839.80

Consistent with the federal implementation rule for fine particles, Indiana does not consider mobile source SO_2 to be a significant contributor to fine particles for this nonattainment area, as mobile source SO_2 constitutes less than 1.2% of the area's total anthropogenic emissions.

These budgets include emission estimates calculated for 2015 and 2025. The emission estimates are derived from the MPO's travel demand models and MOBILE6.2, as described above. Through the interagency consultation process, it was determined that an interim budget year of 2015, in addition to the horizon year budget of 2025, would be appropriate. A reasonable margin of safety has been applied to the 2015 and 2025 budgets in the amount of 22% for both $PM_{2.5}$ and NO_x. Margins of safety are used to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it is necessary to have a margin of safety that will accommodate the impact of refined assumptions in the process.

The rule at 40 CFR 93.101 defines safety margin as the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance. When compared to the overall safety margin as defined by 40 CFR 93.101, it is evident this allocation to mobile sources is significantly below the total safety margin for all sources in the Central Indiana Area as detailed in Table 4.1.

5.6 Commitment to Amend Motor Vehicle Emission Budgets Using Motor Vehicle Emission Simulator (MOVES)

On March 2, 2010, U.S. EPA published a Notice of Availability for the Motor Vehicle Emission Simulator (MOVES) model. IDEM is committed to submitting a revision to the MOBILE6.2 developed MVEBs using the MOVES model as soon as possible and well in advance of the March 2, 2012, expiration of the transportation conformity "grace period." IDEM recognizes that U.S. EPA will allow the MOBILE6.2 budgets to be replaced through an adequacy notice in place of a full publication to the Federal Register.

All methodologies, latest planning assumptions, margins of safety, and MOVES model commitments were determined appropriate through the interagency consultation process.

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures that have been or will be implemented in the Central Indiana Area, including CAA requirements and additional state or local measures implemented beyond CAA requirements.

6.1 Reasonably Available Control Technology (RACT)

As required by Section 172 of the CAA, in the mid-1990s, Indiana promulgated rules requiring RACT for emissions of VOCs. There were no specific rules required by the CAA, such as RACT for existing sources, beyond statewide rules. Statewide RACT rules have applied to all new sources locating in Indiana since that time. The Indiana rules are found in 326 IAC 8. The following is a listing of applicable rules:

326 IAC 8-1-6	BACT for Non-Specific Sources
326 IAC 8-2	Surface Coating Emission Limitations
326 IAC 8-3	Solvent Degreasing Operations
326 IAC 8-4	Petroleum Sources
326 IAC 8-5	Miscellaneous Operation
326 IAC 8-6	Organic Solvent Emission Limitations

Since the Central Indiana Area attained the annual standard for fine particles prior to an Attainment SIP or RACT SIP being due, and since the Implementation Rule for fine particles stipulates that states are only required to draft and implement RACT rules for the precursor emission reductions necessary to attain the standard, no further RACT rules are required for this area. These Indiana rules are CAA requirements already in the SIP and provide secondary benefits for $PM_{2.5}$.

6.2 Implementation of Past SIP Revisions

The area was only recently designated nonattainment for the annual standard for fine particles in 2003 and the area has now attained the standard well in advance of its attainment deadline of 2010. As a result, Indiana is no longer required to develop and submit an Attainment SIP or RACT SIP for this area under the annual NAAQS for fine particles.

6.3 Nitrogen Oxides Rule

The U.S. EPA NO_x SIP Call required twenty-two states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. The Indiana rule was adopted in 2001. Beginning in 2004, this rule accounts for a reduction of approximately 31% of all NO_x emissions statewide compared to previous uncontrolled years.

Twenty-one other states have also adopted these rules. The result is that significant reductions have occurred regionally and within the nonattainment area because of the number of affected units within the region. From Graphs 4.7, it can be seen that emissions covered by this program

have been trending downward since 1999. Table 6.1, compiled from data taken from the U.S. EPA Clean Air Markets web site, quantifies the gradual NO_x reductions that have occurred in Indiana as a result of Title IV (Acid Rain) of the CAA and the NO_x SIP Call Rule. The NO_x SIP Call cap stayed in place through 2008, at which time the caps in the CAIR program superseded it. Since CAIR is a regional cap and trade program, it cannot be predicted at this time what effect this will have on EGU units located in the nonattainment area or other upwind counties.

Further, U.S. EPA published Phase II of the NO_x SIP Call that established a budget for large (emissions of greater than 1 ton per day) stationary internal combustion engines. In Indiana, the rule decreases emissions statewide from natural gas compressor stations by 4,263 tons during the ozone season (April through September). The Indiana Phase II NO_x SIP Call Rule became effective February 26, 2006, and implementation began in 2007.

Table 6.1
Trends in EGU NO_x Emissions Statewide in Indiana

Year	NO_x Emissions (tons/year)
1999	347,216.5
2000	334,522.1
2001	315,419.7
2002	281,146.1
2003	260,980.0
2004	224,311.3
2005	207,981.6
2006	202,728.0
2007	196,553.1
2008	196,134.5
2009	110,968.9
Budget 2009-2014	108,935
Budget 2015 and later	90,779

6.4 Measures Beyond Clean Air Act SIP Requirements

Reductions in fine particles precursor emissions have occurred, or are anticipated to occur, as a result of local and federal programs. These additional control measures include those listed in this section.

Tier 2 Vehicle Standards[1]

Federal Tier 2 motor vehicle standards require all passenger vehicles in a manufacturer's fleet, including light-duty trucks and sport utility vehicles (SUVs), to meet an average standard of 0.07 grams of NO_x per mile. Implementation began in 2004 and was completed in 2007. The Tier 2

[1] http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm

standards also cover passenger vehicles over 8,500 pounds gross vehicle weight rating (larger pickup trucks and SUVs), which are not covered by the current Tier 1 standards. For these vehicles, the standards were phased in beginning in 2008, with full compliance in 2009. The new standards require vehicles to be 77% to 95% cleaner than those on the road prior to the program. The Tier 2 standards also reduced the sulfur content of gasoline to 30 parts per million (ppm) beginning in January 2006. Most gasoline sold in Indiana prior to January 2006 had a sulfur content of about 500 ppm. Sulfur occurs naturally in gasoline, but interferes with the operation of catalytic converters on vehicles resulting in higher NO_x emissions. Lower sulfur gasoline is necessary to achieve the Tier 2 vehicle emission standards.

Heavy-Duty Gasoline and Diesel Highway Vehicle Standards[2]

New U.S. EPA standards designed to reduce NO_x and VOC emissions from heavy-duty gasoline and diesel highway vehicles took effect in 2004. A second phase of standards and testing procedures, that began in 2007, reduced fine particles from heavy-duty highway engines and also reduced highway diesel fuel sulfur content to 15 ppm since the sulfur can damage emission control devices. The total program is expected to achieve a 90% reduction in direct $PM_{2.5}$ emissions and a 95% reduction in NO_x emissions for these new engines using low sulfur diesel, compared to existing engines using higher sulfur content diesel. There will also be SO_2 reductions from these rules. U.S. EPA has not quantified the expected reductions.

Large Nonroad Diesel Engine Standards[3]

In May 2004, U.S. EPA promulgated new rules for large nonroad diesel engines, such as those used in construction, agricultural, and industrial equipment, to be phased in between 2008 and 2014. The nonroad diesel rules also reduce the allowable sulfur in nonroad diesel fuel by over 99%. Prior to 2006, nonroad diesel fuel averaged approximately 3,400 ppm sulfur. This rule limited nonroad diesel sulfur content to 500 ppm by 2006, with a further reduction to 15 ppm by 2010. The combined engine and fuel rules will reduce NO_x and PM emissions from large nonroad diesel engines by over 90%, compared to current nonroad engines using higher sulfur content diesel.

Nonroad Spark-Ignition Engines and Recreational Engine Standards

This new standard, effective in July 2003, regulates NO_x, VOCs, and carbon monoxide (CO) for groups of previously unregulated nonroad engines. The new standard applies to all new engines sold in the United States and imported after the standards went into effect. The standard applies to large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all-terrain vehicles), and recreational marine diesel engines. The regulation varies based upon the type of engine and vehicle.

The emissions from large spark-ignition engines contribute to ozone formation and ambient CO and $PM_{2.5}$ levels in urban areas. Tier 1 of this standard was implemented in 2004 and Tier 2 started in 2007. Like the large spark-ignition engines, emissions from recreational vehicles

[2] http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm
[3] http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm

contribute to ozone and fine particles formation and ambient CO and $PM_{2.5}$ levels. For Model Year 2006 off-highway motorcycles and all-terrain vehicles, at least 50% of a manufacture's fleet was required to meet the new exhaust emissions standard and 100% of the fleet was required to meet the standards in 2007. Recreational marine diesel engines over 37 kilowatts are used in yachts, cruisers, and other types of pleasure craft. Emissions from recreational marine engines contribute to ozone formation and PM levels, especially surrounding marinas.

When all of the nonroad spark-ignition engines and recreational engine standards are fully implemented, an overall 72% reduction in VOC, 80% reduction in NO_x, and 56% reduction in CO emissions are expected by 2020.

Reciprocating Internal Combustion Engine Standards[4]

This new standard, effective in May 2010, regulates emissions of air toxics emissions from existing diesel powered stationary reciprocating internal combustion engines that meet specific site rating, age and size criteria. These engines are typically used at industrial facilities (e.g. power, chemical, and manufacturing plants) to generate electricity for compressors and pumps and to produce electricity to pump water for flood and fire control during emergencies.

The standard applies to stationary diesel engines: (1) used at area sources of air toxics and constructed or reconstructed before June 12, 2006; (2) used at major sources of air toxics, having a site rating of less than or equal to 500 horsepower, and constructed or reconstructed before June 12, 2006; and (3) used at major sources of air toxics for non-emergency purposes, having a site rating of greater than 500 horsepower, and constructed or reconstructed before December 19, 2002.

Operators of existing engines will be required to: (1) install emissions control equipment that would limit air toxics up to 70% for stationary non-emergency engines with a site rating greater than 300 horsepower; (2) perform emission tests to demonstrate engine performance and compliance with rule requirements; and (3) burn ultra-low sulfur fuel in stationary non-emergency engines with a site rating greater than 300 horsepower.

When all of the reciprocating internal combustion engine standards are fully implemented in 2013, U.S. EPA estimates that emissions from these engines will reduce air toxics by approximately 1,000 tons per year (tpy), $PM_{2.5}$ by 2,800 tpy, CO by 14,000 tpy, and VOC by 27,000 tpy.

Category 3 Marine Diesel Engine Standards[5]

This new standard, effective in June 2010, promulgates more stringent exhaust emission standards for new large marine diesel engines with per-cylinder displacement at or above 30 liters (commonly referred to as Category 3 compression-ignition marine engines) as part of a coordinated strategy to address emissions from all ships that affect U.S. air quality. These emission standards are equivalent to those adopted in the amendments to Annex VI to the

[4] http://www.epa.gov/ttn/atw/rice/fr03mr10.pdf
[5] http://www.regulations.gov/search/Regs/home.html#documentDetail?R=0900006480ae43a6

International Convention for the Prevention of Pollution from Ships (MARPOL Annex VI). The emission standards apply in two stages—near-term standards for newly built engines will apply beginning in 2011; long-term standards requiring an 80% reduction in NO_x emissions will begin in 2016.

U.S. EPA is adopting changes to the diesel fuel program to allow for the production and sale of diesel fuel with up to 1,000 ppm sulfur for use in Category 3 marine vessels. The regulations generally forbid production and sale of fuels with more than 1,000 ppm sulfur for use in most U.S. waters, unless operators achieve equivalent emission reductions in other ways.

U.S. EPA is also adopting provisions to apply some emission and fuel standards to foreign-flagged and in-use vessels that are covered by MARPOL Annex VI.

When this strategy is fully implemented in 2030, U.S. EPA estimates that NO_x and $PM_{2.5}$ emissions in the U.S. will be reduced by approximately 1.2 million tpy and 143,000 tpy, respectively.

Clean Air Interstate Rule (CAIR)

On May 12, 2005, U.S. EPA promulgated the "Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NO_x SIP Call"; Final Rule (70 FR 25162). This rule established the requirement for states to adopt rules limiting the emissions of NO_x and SO_2 and provided a model rule for the states to use in developing their rules to meet federal requirements. The purpose of CAIR was to reduce interstate transport of precursors to fine particles and ozone.

CAIR applied to: (1) any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine, a generator with a nameplate capacity of more than 25 megawatt electrical (MWe) producing electricity for sale; and (2) a unit that qualifies as a cogeneration unit during the 12-month period starting on the date that the unit first produces electricity and continues to qualify as a cogeneration unit, a cogeneration unit serving at any time a generator with a nameplate capacity of more than 25 MWe and supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 megawatt hours (MWh), whichever is greater, to any utility power distribution system for sale.

This rule provides annual state caps for NO_x and SO_2 in two phases, with the Phase I caps for NO_x and SO_2 starting in 2009 and 2010, respectively. Phase II caps become effective in 2015. U.S. EPA is allowing the caps to be met through a cap and trade program if a state chooses to participate in the program.

In response to U.S. EPA's rulemaking, IDEM adopted a state rule in 2006 based on the model federal rule. IDEM's rule includes annual and seasonal NO_x trading programs, and an annual SO_2 trading program. This rule requires compliance effective January 1, 2009.

SO_2 emissions from power plants in the 28 eastern states and the District of Columbia covered by CAIR will be cut by 4.3 million tons by 2009 and reduced by an additional 5.4 million tons in

2015. NO_x emissions will be cut by 1.7 million tons by 2009 and reduced by an additional 1.3 million tons in 2015. The D.C. Circuit court's vacatur of CAIR in July of 2008 and subsequent remand without vacatur of CAIR in December of 2008 directs U.S. EPA to revise or replace CAIR in order to properly address the deficiencies outlined by the court.

Since the court's opinion made it clear that CAIR is deficient and must be revised or replaced, the program cannot be defined as permanent and enforceable for SIP purposes. On July 6, 2010, U.S. EPA proposed the Clean Air Transport Rule to replace CAIR. The Clean Air Transport Rule will result in even further benefits above and beyond CAIR than what is assumed within the emission inventories and modeling.

Together, these rules will substantially reduce local and regional sources of fine particle precursors. The modeling analyses discussed in Section 7.0 include these rules and show the reductions in annual fine particle concentrations expected to result from the implementation of these rules.

6.5 Controls to Remain in Effect

IDEM commits to maintain the control measures listed above after redesignation, or submit to U.S. EPA, as a SIP revision, any changes to its rules or emission limits applicable to SO_2, NO_x, or direct $PM_{2.5}$ sources as required for maintenance of the annual standard for fine particles in the Central Indiana Area.

Indiana, through IDEM's Office of Air Quality and its Compliance and Enforcement Branch, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of fine particles and fine particle precursors in the Central Indiana Area.

6.6 New Source Review Provisions

Indiana has a long standing and fully implemented New Source Review (NSR) program that is outlined in rule at 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 2-2 and the emissions offset rule in 326 IAC 2-3. Indiana's PSD program was conditionally approved on March 3, 2003 (68 FR 9892) and received final approval on May 20, 2004 (69 FR 29071) by U.S. EPA as part of the SIP.

Any emission unit that is not listed in the 2005 emission inventory, or for which credit through the shutdown or curtailment of operations was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting all applicable permit rule requirements. The review process will be identical to that used for new sources. Once the area is redesignated, OAQ will implement NSR through the PSD program, which requires an air quality analysis to evaluate whether the new source will threaten the NAAQS.

7.0 MODELING AND METEOROLOGY

Although U.S. EPA's Redesignation Guidance does not require modeling for nonattainment areas seeking redesignation, extensive modeling has been performed for the Central Indiana Area to determine the effect of national emission control strategies on fine particle levels. These modeling analyses determined that the Central Indiana Area, including Hamilton, Hendricks, Johnson, Marion, and Morgan counties are significantly impacted by regional transport of fine particles and its precursors, and that regional SO_2 and NO_x reductions are an effective way to attain the annual standard for fine particles in this area. Future year modeled annual fine particle concentrations are expected to be reduced by 2% to 10% from baseline design values. Examples of these modeling analyses are described in this section and can also be found in Appendix H.

7.1 Summary of Modeling Results to Support Rulemakings

U.S. EPA Modeling for Clean Air Transport Rule 2010[6]

U.S. EPA performed modeling to support the emission reductions associated with the proposed Clean Air Transport Rule. U.S. EPA used the Comprehensive Air Quality Model with Extension (CAMx, version 5), applied to the 2005 meteorology, as processed by the Mesoscale Model (MM5), version 3.7.4. Emissions input into CAMx included SO_2, NO_x, VOCs, NH_3, and direct $PM_{2.5}$ for 2005. The modeling was based on the annual fine particle design values calculated from 2003 through 2005, 2004 through 2006, and 2005 through 2007. Future year modeling was conducted, which included the Central Indiana Area, and the future year design values for 2012 and 2014 were evaluated for attainment of the annual NAAQS for fine particles of 15 $\mu g/m^3$, as shown in Table 7.1. Fine particle concentrations are accounted for by modeling both the base future year emissions and then the emission reductions associated with the Clean Air Transport Rule. U.S. EPA found model performance met suggested benchmark performance goals within or close to the ranges found in other comparable modeling applications.

Table 7.1
Clean Air Transport Rule Modeling Results from U.S. EPA – 2010

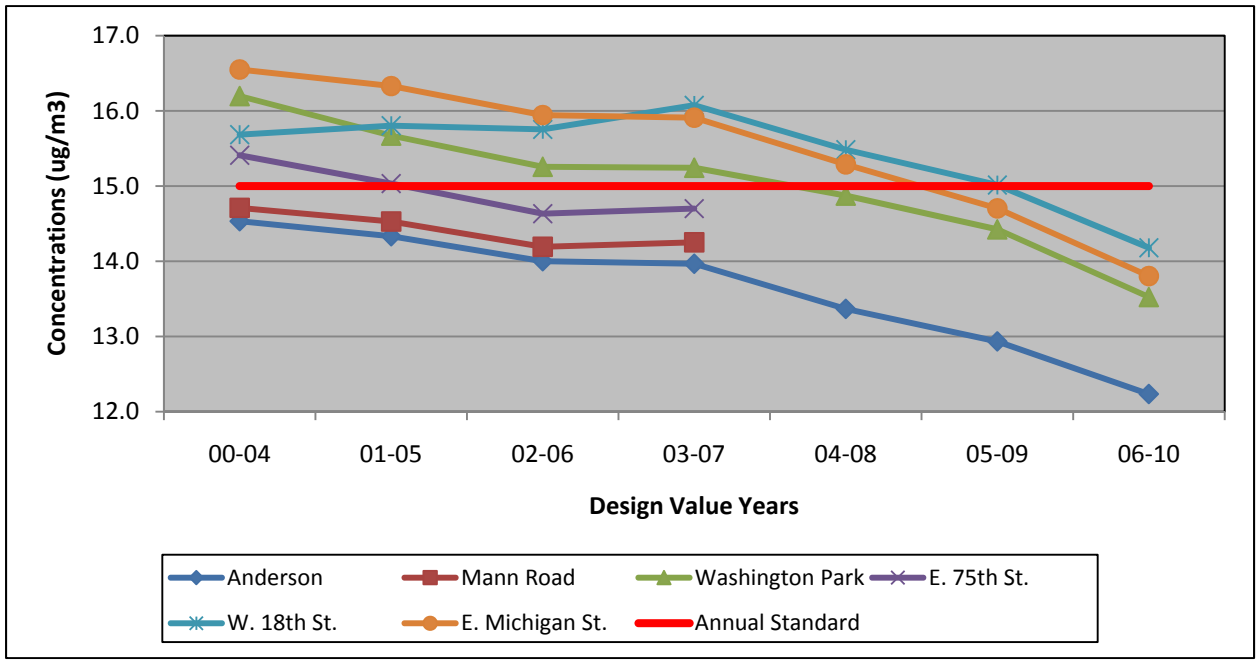
County	Monitor ID	Design Value 2003-2007 ($\mu g/m^3$)	Future Design Value 2012 Base ($\mu g/m^3$)	Future Design Value 2014 Base ($\mu g/m^3$)
Madison	180950009	13.96	13.80	13.35
Marion	180970042	14.24	14.26	13.78
Marion	180970078	15.26	15.18	14.69
Marion	180970079	14.71	14.61	14.12
Marion	180970081	16.05	15.93	15.43
Marion	180970083	15.90	15.77	15.27

[6] http://www.epa.gov/airquality/transport/pdfs/TR_AQModeling_TSD.pdf

Modeling results show that the base future year modeling with emission reductions from the Clean Air Transport Rule will account for a 0.2 µg/m^3 decrease in concentrations for 2012, as well as a 0.5 to 0.6 µg/m^3 decrease in concentrations for 2014 in Marion and Madison counties within the Central Indiana Area.

While results of U.S. EPA's Clean Air Transport Rule modeling indicate modeled concentrations above the standard using base case emissions at the Washington Park, West 18th Street, and East Michigan Street $PM_{2.5}$ monitoring sites, it should be noted that the base year design value used by U.S. EPA was taken from 2003 through 2007 and is higher than current 2006 through 2010 design values in the area. Graph 7.1 shows the downward trend of the design values from 2000 through 2010 for the $PM_{2.5}$ monitors in the Central Indiana Area. In fact, all design values for the Central Indiana Area are below the annual NAAQS for fine particles.

Graph 7.1
$PM_{2.5}$ Design Value Trends for the Central Indiana Area: 2000 – 2010



The decrease of the 2003-2007 design value compared to the 2006-2010 design value at the Washington Park $PM_{2.5}$ monitor is 1.74 µg/m^3 with all the area's $PM_{2.5}$ monitor design values decreasing from 1.73 µg/m^3 to 2.10 µg/m^3. Therefore, U.S. EPA's Clean Air Transport Rule modeling, using current 2006 through 2010 design values, shows all modeled concentrations well below the annual fine particle standard of 15.0 µg/m^3, as seen in Table 7.2.

Table 7.2
Clean Air Transport Rule Modeling Results from U.S. EPA – 2010
(using 2006-2010 design values)

County	Monitor ID	Design Value 2006-2010 ($\mu g/m^3$)	Future Design Value 2012 Base ($\mu g/m^3$)	Future Design Value 2014 Base ($\mu g/m^3$)
Madison	180950009	12.23	12.09	11.70
Marion	180970042	[a]	N/A	N/A
Marion	180970078	13.52	13.45	13.02
Marion	180970079	[a]	N/A	N/A
Marion	180970081	14.18	14.07	13.63
Marion	180970083	13.80	13.69	13.26

[a] Site was discontinued in 2007
N/A Not available

Results of the U.S. EPA's Clean Air Transport Rule modeling show that all Central Indiana counties would attain the annual fine particle NAAQS in 2012 with modeled impacts reduced by 1%, and will remain below 15 $\mu g/m^3$. With further reductions projected in the Clean Air Transport Rule for 2014, all design values decrease by 3% to 4% and the area will continue to attain the annual NAAQS for fine particles.

LADCO Modeling for Clean Air Interstate Rule (CAIR)

LADCO conducted modeling to determine the impact of CAIR in the Midwest. LADCO's modeling used the CAMx model applied to the year 2005 meteorology, as processed by the MM5. Emissions input into CAMx included SO_2, NO_x, VOCs, NH_3, and direct $PM_{2.5}$ for 2005. The modeling was based on 2003 through 2007 design values. Future year modeling for 2012 and 2018 was conducted and the future year design values were determined without the emission reductions associated with CAIR (Round 6), as shown in Table 7.3. The Clean Air Transport Rule is expected to provide reductions above and beyond CAIR.

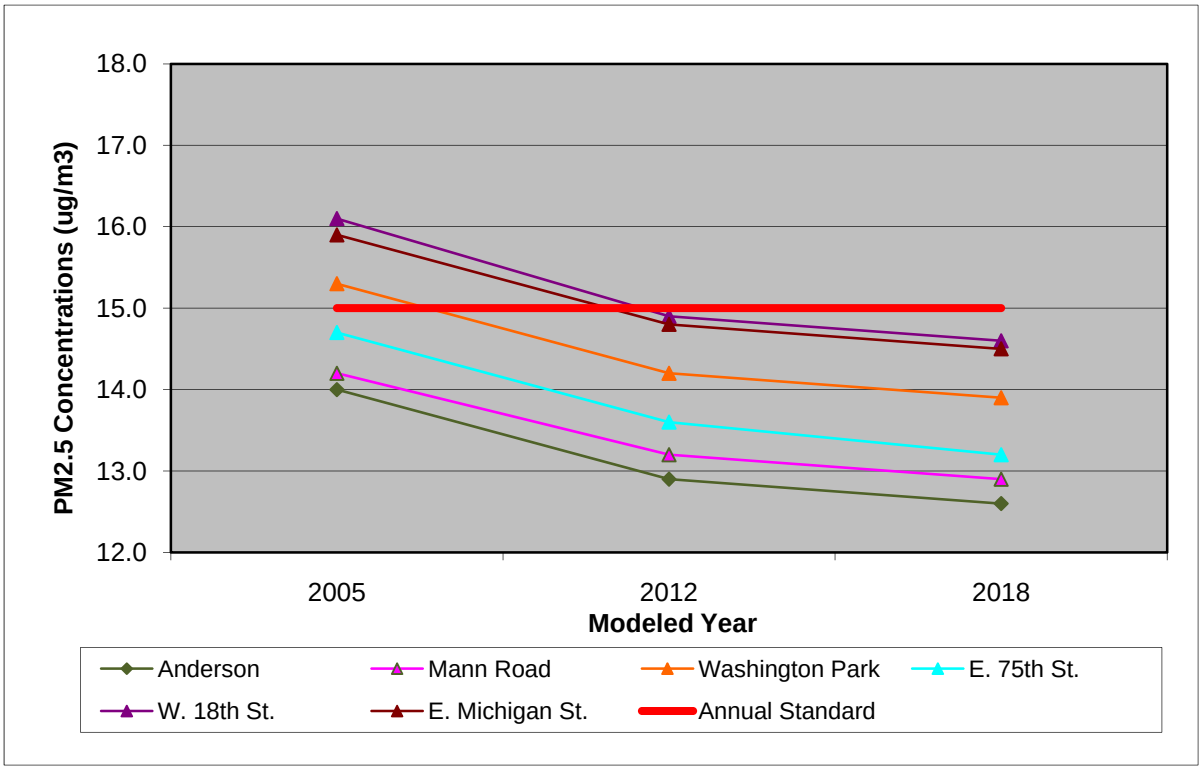
Table 7.3
LADCO Round 6 Modeling Results for Annual $PM_{2.5}$ – Without the Clean Air Interstate Rule Emission Reductions
(Using 2003 – 2007 Design Values)

Monitor ID	Monitor Name	County	Design Value 2003-2007 ($\mu g/m^3$)	Base-case 2012 ($\mu g/m^3$)	Base-case 2018 ($\mu g/m^3$)
180950009	Anderson	Madison	14.0	12.9	12.6
180970042	Mann Road	Marion	14.2	13.2	12.9
180970078	Washington Park	Marion	15.3	14.2	13.9
180970079	E. 75th St.	Marion	14.7	13.6	13.2
180970081	W. 18th St.	Marion	16.1	14.9	14.6
180970083	E. Michigan St.	Marion	15.9	14.8	14.5

Results of the LADCO Round 6 modeling show that the Central Indiana Area will attain the annual NAAQS for fine particles by 2012. As shown in Table 7.3, future year modeled annual fine particle concentrations for 2012 will be 7% to 8% lower than baseline annual fine particle design values, and 9% to 10% lower in 2018 and will continue to decrease thereafter.

A graphical representation is shown in Graph 7.2. The Mann Road and E. 75th Street monitors were shut down at the end of 2007. However, at the time the modeling was conducted, both monitors were still in operation and therefore are included in this analysis.

Graph 7.2
LADCO Modeling Results for Central Indiana $PM_{2.5}$ Monitors for 2012 and 2018



7.2 LADCO Round 5 Speciated Modeled Attainment Test Results

The Speciated Modeled Attainment Test (SMAT) is the attainment test for annual fine particles. To determine the future year annual fine particle concentrations, speciated data is calculated. The different species that were modeled and are associated with fine particles include sulfates, nitrates, organic carbon, elemental carbon, ammonium, particle bound water, "other" primary inorganic fine particles, and passively collected mass. The SMAT results from LADCO's Round 5 modeling are listed below. Round 5 modeled the emission reductions associated with CAIR, so the results reflect the impacts from CAIR. Percent ranges of the model results from the five fine particle monitors in Central Indiana were broken down into the speciated constituents of fine particle emissions. The percent change from the observed speciated data in 2005 to the future year modeled results are listed in Table 7.4. While these modeling results are outdated, this

weight of evidence demonstration shows the reduction potential from national emission control measures for the $PM_{2.5}$ species in Central Indiana. An updated analysis will be conducted at a later time, using more current emissions and meteorological data and for a relevant future year projection.

Table 7.4
LADCO Round 5 SMAT Modeling Results for Central Indiana
(Percent decrease from observed to modeled concentrations)

Species of $PM_{2.5}$	**2009**
Sulfates	23% - 26%
Nitrates	0% - 6%
Organic Carbon	0% - 3%
Elemental Carbon	17%
Ammonium	16% - 19%
Particle Bound Water	19% - 24%

The results demonstrate that sulfate, ammonium, elemental carbon, and particle bound water concentration decreases are projected to be at least 16% in 2009. Lesser nitrate reductions are projected to occur, up to 6%, with organic carbon reductions up to 3%. LADCO modeling shows good performance for sulfates and elemental carbon predicted baseline concentrations, slight over-prediction for nitrate concentrations, and under-predictions of organic carbon concentrations. Overall, model performance is adequate for SIP planning and gives a good idea of the effects of emission reductions from national emission control measures on the Central Indiana Area.

7.3 LADCO Round 5 Particulate Source Apportionment Results

Particulate Source Apportionment (PSAT) modeling was conducted by LADCO. The results of the PSAT Round 5 modeling show the regional contributions by emission sectors on each monitor that was modeled. Chart 7.1 displays the PSAT modeling results for the E. Michigan Street fine particles monitor in Marion County. Indiana was the biggest regional contributor to the E. Michigan Street fine particles monitor. Illinois, Ohio, and the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) Regional Planning Organization (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia and the Eastern Band of the Cherokee Indians) also contributed.

The PSAT Round 5 modeling results indicate the majority of Indiana's emission sector contributions to fine particle concentrations come from EGUs, ammonium emission sources, mobile, off-road (including marine, aircraft and railroad), area, and non-EGU sources. These results are considered to be representative of the entire Central Indiana Area as EGU, ammonium, and non-EGU emissions impact the entire area.

Chart 7.1
Regional/Emission Sector PSAT Results by Sector for Marion County at E. Michigan Street $PM_{2.5}$ Monitor

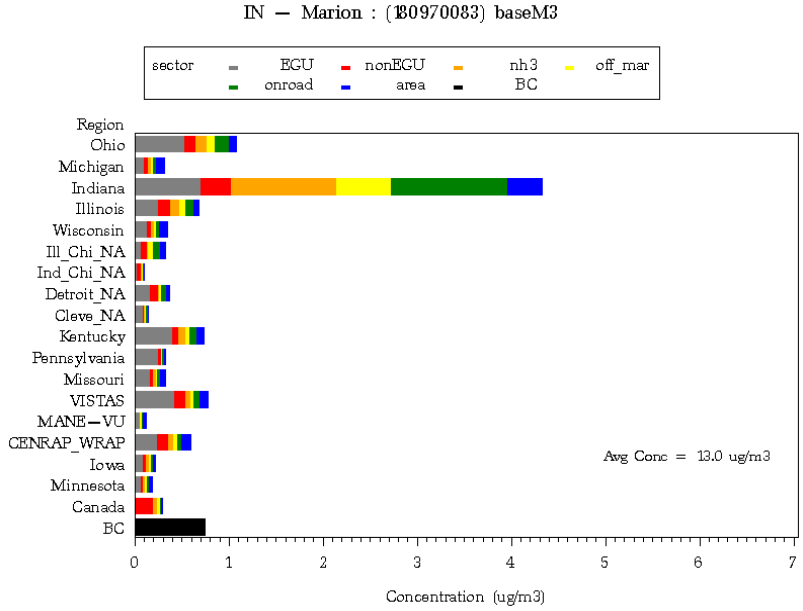
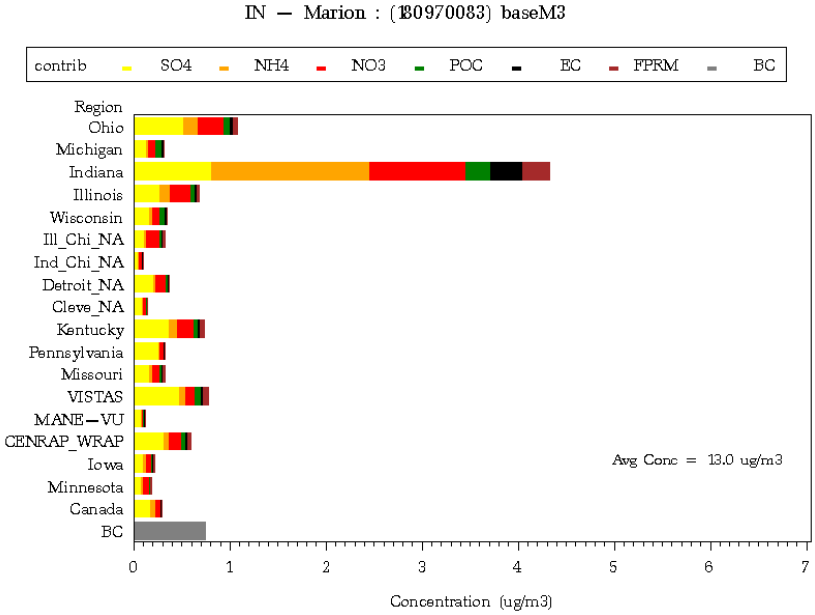


Chart 7.2 displays the modeled pollutant contributions on the E. Michigan Street fine particles monitor. The PSAT modeling results show the majority of Indiana's pollutant contributions come from ammonium, nitrate, sulfate, elemental carbon, primary fine particles and organic carbon. Pollutant contributions from other regions consist mainly of sulfates and nitrates.

Chart 7.2
Regional/Pollutant PSAT Results by Contribution for Marion County at E. Michigan Street $PM_{2.5}$ Monitor



The following pie charts depict the contributions by species to fine particle concentrations at the Central Indiana Area monitors. The pie charts include both the observed 2005 contributions and 2009 modeled contributions for each monitor. Since the monitors are in close proximity to each other, results are fairly similar in the distribution of species concentrations among the monitors. Charts 7.3 through 7.7 cover the fine particle monitors in the Central Indiana Area that are used to determine compliance with the annual NAAQS for fine particles.

The speciation listed in the pie charts include SO_4 – sulfate mass, NO_3 – nitrate mass, OC – organic carbon mass, EC – elemental carbon mass, Soil – crustal material mass, NH_4 – ammonium mass, PBW – particles bound water mass, and BLAN – passively collected mass.

Chart 7.3
Modeled Contributions by Species to W. 18th Street $PM_{2.5}$ Monitor in Marion County
(Base Year Modeled Concentrations = 15.6 µg/m^3) (Future Year Modeled Concentrations =13.2 µg/m^3)

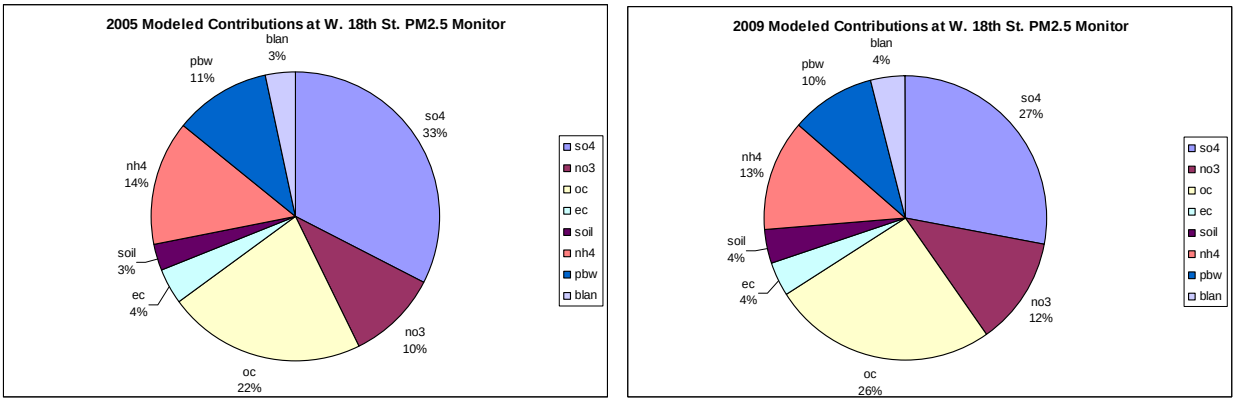


Chart 7.4
Modeled Contributions by Species to Washington Park $PM_{2.5}$ Monitor in Marion County
(Base Year Modeled Concentrations = 14.7 µg/m^3) (Future Year Concentrations =12.6 µg/m^3)

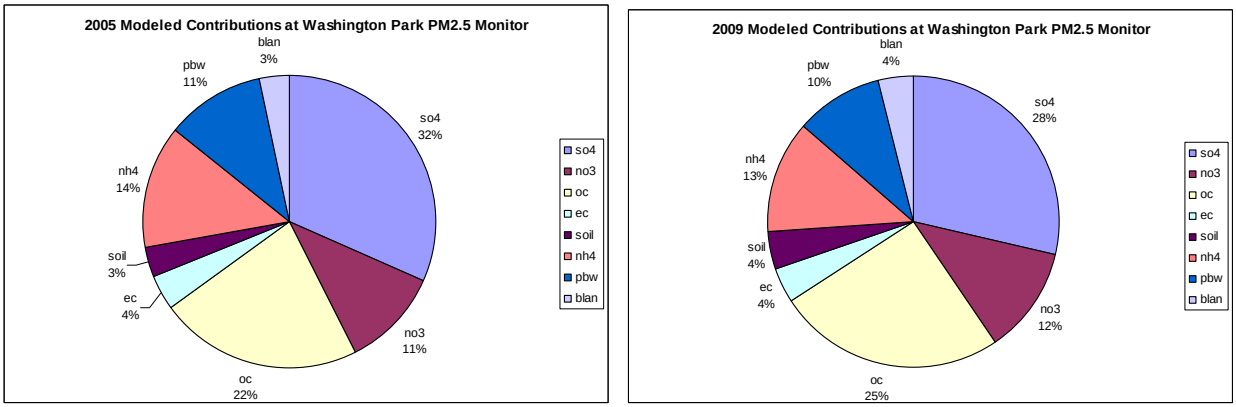
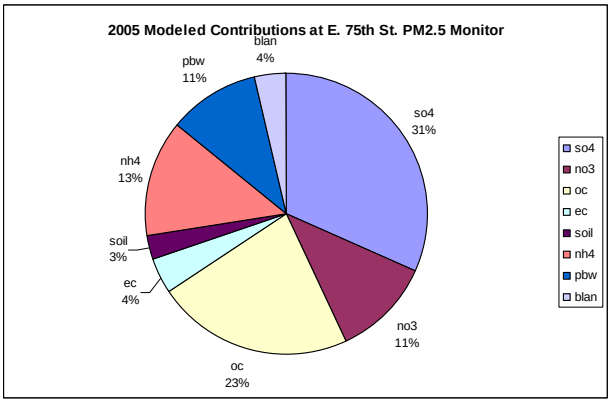


Chart 7.5
Modeled Contributions by Species to E. 75th Street $PM_{2.5}$ Monitor in Marion County
(Base Year Modeled Concentrations = 14.2 µg/m^3) (Future Year Modeled Concentrations =12.3 µg/m^3)



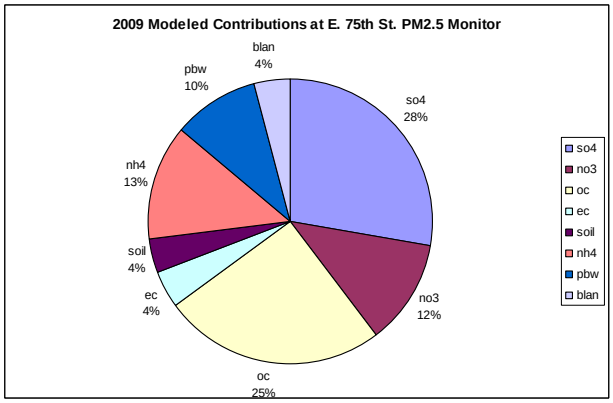
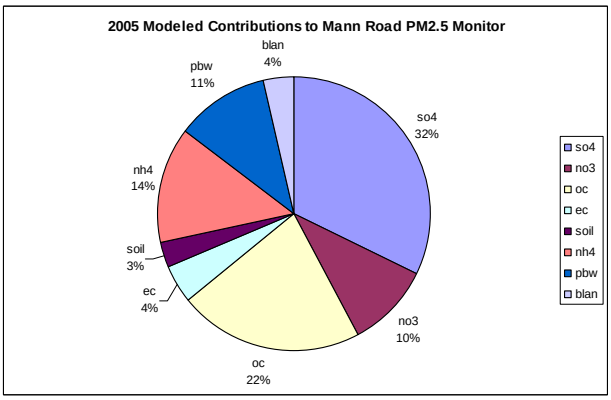


Chart 7.6
Modeled Contributions by Species to Mann Road $PM_{2.5}$ Monitor in Marion County
(Base Year Modeled Concentrations = 13.7 µg/m^3) (Future Year Modeled Concentrations =11.9 µg/m^3)



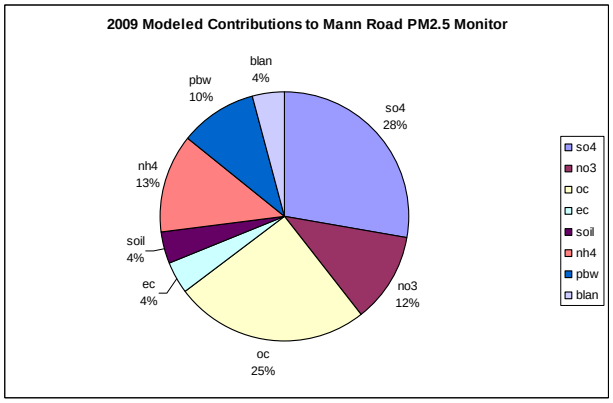
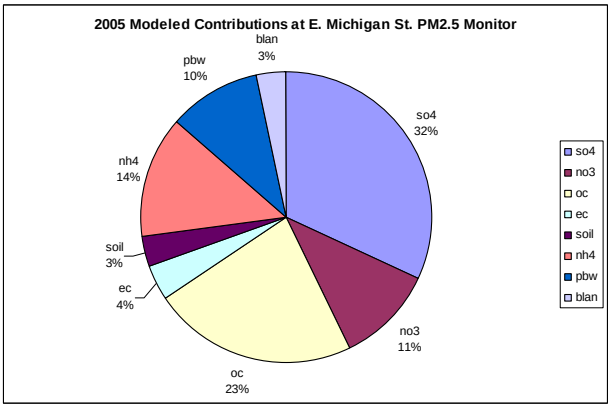
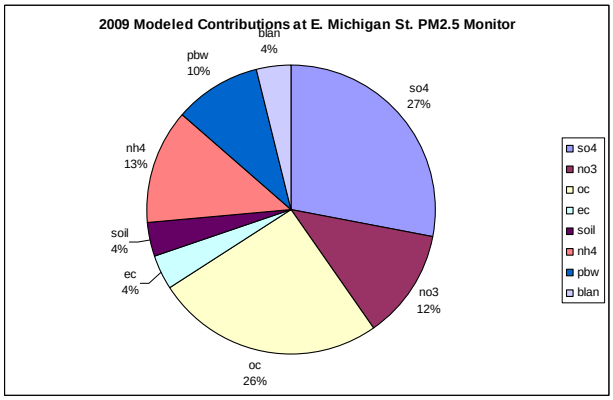


Chart 7.7
Modeled Contributions by Species to E. Michigan Street $PM_{2.5}$ Monitor in Marion County
(Base Year Modeled Concentrations = 15.4 µg/m^3) (Future Year Modeled Concentrations =13.2 µg/m^3)





Results of the Round 5 PSAT modeling for Central Indiana fine particle monitors show the highest pollutant contributors to base-case and future year fine particle concentrations are sulfate, organic carbon, ammonium, and nitrate. Future year modeling shows decreases in sulfates (due to the emission reductions from CAIR) and ammonium. The future year modeling did show slight increases in organic carbon and nitrates from the base-case modeled concentrations.

7.4 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling for future year design values have consistently shown that existing national emission control measures will bring the Central Indiana Area into attainment of the annual NAAQS for fine particles. Emission control measures to be implemented in the next several years will provide even greater assurance that air quality will continue to meet the standard into the future. Modeling support for CAIR has shown that future year design values for the Central Indiana Area will continue to attain the annual standard for fine particles with modeled future year design values below 15 $\mu g/m^3$. U.S. EPA future year modeling of national emission control strategies will ensure that the Central Indiana Area will maintain lower fine particle concentrations with an increasing margin of safety.

7.5 Meteorological Analysis for Central Indiana

Meteorological conditions are one of the most important factors that influence development and transport of fine particles. Stagnant surface conditions during any time of the year and upper air ridging provides conducive conditions for development and transport of fine particles. Ultimately, passage of surface cold fronts with a clean air mass change will lower fine particle readings in the Central Indiana Area.

7.6 Surface Air Conditions Present During High Fine Particle Concentration Days

Higher annual concentrations of fine particles tend to correlate with warmer temperatures and lighter wind speeds, although high fine particle episodes can occur in the summer or winter. It should be noted that higher annual fine particle concentrations are driven by individual days with higher fine particle concentrations throughout the monitored year. Therefore, it is difficult to attribute higher fine particle concentrations to annualized meteorological rankings. Review of several of the higher fine particle concentration episodes over the past few years reveal that conditions were hot in the summer with temperatures in the middle 80^os Fahrenheit or higher and average wind speeds were fairly light. Fall and winter days with higher fine particle concentrations had near normal temperatures, but wind speeds were very light and humidity was higher.

7.7 Upper Air Conditions Present During High Fine Particle Concentrations Days

Upper air ridges and more stagnant surface wind conditions predominately affect development and build up of fine particles. Slow moving upper air ridges can effectively suppress mixing within the many levels of the atmosphere and cause pollutants to build up over time. Inversions or increases in temperature with a rise in altitude will prevent mixing with air from the upper atmosphere. These conditions can occur at any time of the year and are evident in elevated fine

particle episodes in spring, summer, fall, and winter months. Review of surface and upper air features of higher fine particle concentration days showed stagnant surface conditions and upper air ridges existed on those days and helped in the buildup of fine particle concentrations.

7.8 Analyses of Atmospheric Conditions During High Fine Particle Concentration Days

Analyses have been conducted to determine the atmospheric conditions that are most prevalent during higher fine particle concentration days in Indiana. LADCO applied a Classification and Regression Tree (CART) analysis to data from Indiana that correlated different levels of fine particle concentrations to meteorological conditions from 1999 to 2004 (Donna Kenski, 2005). This type of analysis evaluates meteorological conditions, such as temperature, pressure, wind speed, wind direction, relative humidity, and dew point temperatures at the surface, as well as morning and evening mixing heights in the upper atmosphere which were present when higher concentrations of fine particles were monitored. Results of this CART analysis indicated factors that played a larger role in higher fine particle concentrations in Indiana were warm-weather conditions with high dew points, southwest winds, and high evening mixing heights. Previous day's concentrations of fine particles play a key role in higher impacts as well.

Fine particles are made up of several constituents, including direct $PM_{2.5}$, sulfates, nitrates, ammonium, organic carbon, and elemental carbon. Depending on the time of the year, concentrations of fine particle constituents vary, with nitrates being more prevalent in the winter and sulfates more prevalent in the summer. Sulfate and nitrate emission reductions have the biggest impact on lower future year fine particle concentrations.

7.9 Summary of Air Quality Index Days in Central Indiana

An analysis was conducted to review the daily fine particle concentrations over a year to determine the Air Quality Index (AQI) trends. Chart 7.8 shows by year (2001 through 2010), the percentage number of days during the calendar year which fine particle concentrations reached the AQI ranges for "Good" (0 to 15.3 $\mu g/m^3$), "Moderate" (15.4 $\mu g/m^3$ to 40.4 $\mu g/m^3$), and "Unhealthy for Sensitive Groups (USG)" (40.5 $\mu g/m^3$ to 65.4 $\mu g/m^3$). There were no days during which fine particle levels reached the "Unhealthy" level of 65.5 $\mu g/m^3$ to 150.4 $\mu g/m^3$.

Chart 7.8
Distribution of $PM_{2.5}$ Concentration Days in Central Indiana on the AQI Levels of Health

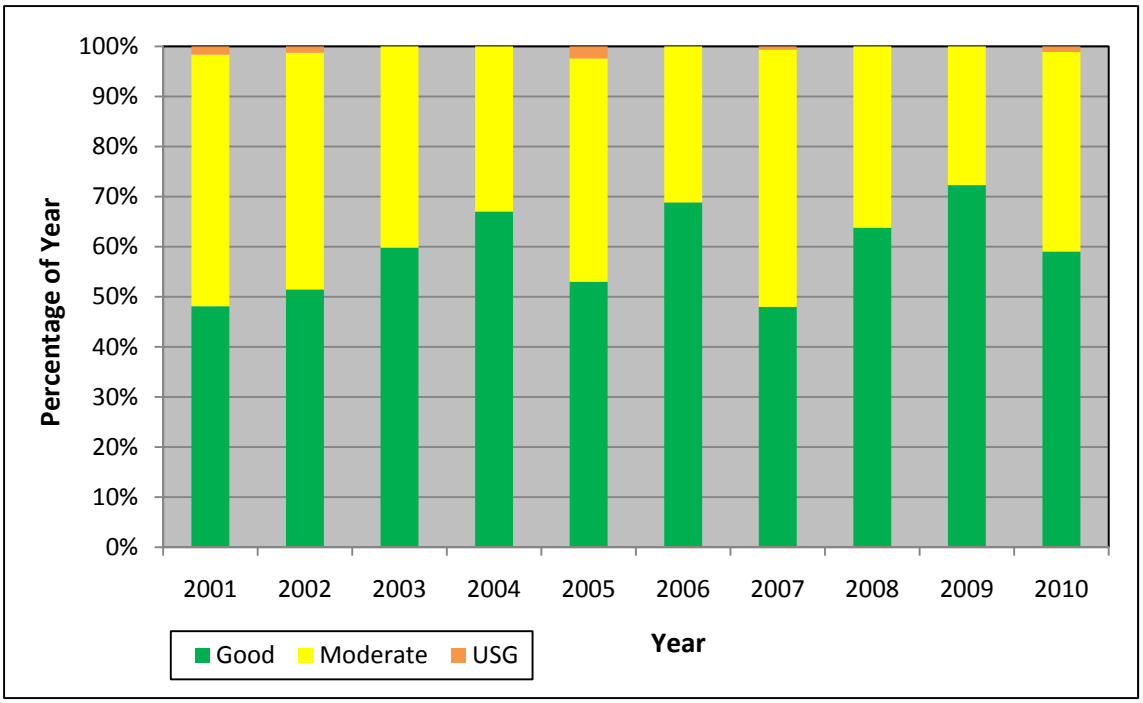


Table 7.5 shows how the years ranked for the three AQI ranges. The year 2009 had the most "Good" concentration days during the 10-year period analyzed (2001 through 2010). The year 2007 had the most "Moderate" concentration days and the year 2005 had the most "USG" concentration days with no days recorded in 2003, 2004, 2006, 2008, and 2009. As can be seen, weather plays a large role in fine particle concentration development and transport as 2001, 2002, 2005, and 2007 were warmer than normal summers which translated to moderate and unhealthy for sensitive group levels of air quality.

Table 7.5
Ranking and Percentage of Highest Number of Days at AQI Levels of Health Concern

Ranking	Good	Moderate	Unhealthy for Sensitive Group
1st	**2009** – 72%	**2007** – 51%	**2005** – 2%
2nd	**2006** – 69%	**2001** – 50%	**2001** – 2%
3rd	**2004** – 67%	**2002** – 47%	**2002** – 1%
4th	**2008** – 64%	**2005** – 45%	**2010** – 1%
5th	**2003** – 60%	**2003** – 40%	**2007** – 1%
6th	**2010** – 59%	**2010** – 40%	
7th	**2005** – 53%	**2008** – 36%	
8th	**2002** – 52%	**2004** – 33%	
9th	**2001** – 48%	**2006** – 31%	
10th	**2007** – 48%	**2009** – 28%	

7.10 Summary of Meteorological Analysis for Central Indiana

Annual fine particle concentrations in the Central Indiana Area are driven by higher fine particle concentration days that can occur during any time of the year. Conditions that are most prevalent during higher fine particle concentration days are lighter winds, higher relative humidity, and above average temperatures in the summer, and near normal temperatures in the fall, winter, or spring. Approximately 70% of the days when $PM_{2.5}$ concentrations were in the USG range occurred in the summer months with maximum high temperatures of 80ºF or above. Weather plays a large role in fine particle concentration development and transport as 2001, 2002, 2005, and 2006 were warmer than normal summers which translated to more days of moderate and unhealthy for sensitive group levels of air quality. Upper air weather patterns generally include ridging over the area with stagnant conditions at the surface caused by lower mixing heights and stable conditions for summer episodes and ridging or troughs over the area in the fall, winter, or spring episodes. Surface winds from any direction can transport pollutants from surrounding areas into the Central Indiana Area. Nitrates are bigger contributors to fine particle concentrations in the winter and sulfates are bigger contributors to fine particle concentrations in the summer.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.6, IDEM commits to review and revise, as appropriate, its Maintenance Plan eight years after redesignation, as required by Section 175A of the CAA.

8.2 Commitment for Contingency Measures

IDEM will monitor fine particle concentrations to determine whether trends indicate higher values or whether emissions appear to be increasing. If it is determined that fine particle levels and emissions are increasing and action is necessary to reverse that trend, IDEM will take action to reverse the noted trend, prior to a violation of the standard occurring.

IDEM commits to adopt and expeditiously implement necessary corrective action in accordance with an Action Level Response described below.

Action Level Response

An Action Level Response shall be prompted whenever a violation of the standard (three-year average annual arithmetic mean value of 15.1 $\mu g/m^3$ or greater) occurs. In the event that the Action Level is triggered and is not found to be due to an atypical unfavorable meteorological condition, exceptional event, malfunction or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of the annual NAAQS for fine particles. In this case, measures that can be implemented in a short time will be selected in order to be in place within eighteen months from the end of the year that prompted the Action Level Response.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal processes. This process will include publication of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by state environmental boards.

If a new measure or control is already promulgated and scheduled to be implemented at the federal or state level, and that measure or control is determined to be sufficient to address the upward trend in air quality, additional local measures may be unnecessary. Furthermore, IDEM will submit to U.S. EPA an analysis to demonstrate the proposed measures are adequate to return the area to attainment.

8.3 Contingency Measures

Contingency measures to be considered will be selected from a comprehensive list of measures deemed appropriate and effective at the time the selection is made. Listed below are example measures that may be considered. The selection of measures will be based upon cost-effectiveness, emission reduction potential, economic and social considerations, or other factors that IDEM deems appropriate. IDEM will solicit input from interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. All of the listed contingency measures are potentially effective or proven methods of obtaining significant reductions of fine particle precursor emissions. Because it is not possible at this time to determine what control measure will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive. IDEM anticipates that if contingency measures should ever be necessary, it is unlikely that a significant number (i.e., all those listed below) will be required.

1) Alternative fuel and diesel retrofit programs for fleet vehicle operations.
2) Require NO_x or SO_2 controls on new minor sources (less than 100 tons).
3) Wood stove change out program.
4) Idle restrictions.
5) Broader geographic applicability of existing measures.
6) One or more transportation control measures sufficient to achieve at least a 0.5% reduction in actual area wide precursor emissions. Transportation measures will be selected from the following, based upon the factors listed above, after consultation with affected local governments:
    a) Trip reduction programs, including, but not limited to, employer-based transportation management plans, area-wide rideshare programs, work schedule changes, and telecommuting.
    b) Transit improvements.
    c) Traffic flow improvements.
    d) Other new or innovative transportation measures not yet in widespread use that affected state and local governments deem appropriate.

No contingency measure shall be implemented without providing the opportunity for full public participation during which the relative costs and benefits of individual measures, at the time they are under consideration, can be fully evaluated.

9.0 PUBLIC PARTICIPATION

Indiana published notification for a public hearing and solicitation for public comment concerning the draft Redesignation Petition and Maintenance Plan in the Indianapolis Star, Indianapolis, Indiana on April 15, 2011.

A public hearing to receive comments concerning the redesignation request was conducted on May 17, 2011 at the Indianapolis-Marion County Library-West Indianapolis Branch, located at 1216 S. Kappes Street, Indianapolis, Indiana. The public comment period closed on May 19, 2011; no comments were received by the agency concerning this submission. Appendix K documents the public hearing process and includes a copy of the public notice, certifications of publication, and transcript from the public hearing.

10.0 CONCLUSIONS

The Central Indiana Area has attained the annual NAAQS for fine particles. This petition demonstrates that the Central Indiana Area has complied with the applicable provisions of the CAA regarding redesignation of nonattainment areas for fine particles. IDEM has prepared a State Implementation and Maintenance Plan that meets the requirement of Section 110(a)(1) of the CAA.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures and that additional significant regional NO_x and SO_2 reductions following implementation of the Phase II NO_x SIP Call rule, and CAIR or its replacement rule will ensure continued compliance (maintenance) with the standard. Furthermore, emission projections indicate that NO_x and SO_2 emissions will continue to decline, ensuring that the area continues to maintain compliance with the standard and provide for an increased margin of safety. Based on this presentation, the Central Indiana nonattainment area for fine particles meets the requirements for redesignation under the CAA (Section 107(d)(3)) and U.S. EPA guidance for fine particles.

Consistent with the authority granted to U.S. EPA, the State of Indiana requests that the Central Indiana nonattainment area for fine particles be redesignated to attainment for the annual fine particles standard simultaneously with U.S. EPA approval of this Indiana State Implementation and Maintenance Plan.