REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE INDIANA PORTION OF THE CINCINNATI-HAMILTON, OHIO, KENTUCKY, INDIANA (OH-KY-IN) 2008 8-HOUR OZONE NONATTAINMENT AREA

Lawrenceburg Township, Dearborn County, Indiana

Developed By:
The Indiana Department of Environmental Management

February 2016

This page left intentionally blank

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 BACKGROUND 2
1.2 NATIONAL AMBIENT AIR QUALITY STANDARDS 2
1.3 GEOGRAPHICAL DESCRIPTION 4
1.4 STATUS OF AIR QUALITY 5

2.0 REQUIREMENTS FOR REDESIGNATION 5

2.1 GENERAL 5
2.2 OZONE MONITORING 5
2.3 EMISSION INVENTORY 6
2.4 MODELING DEMONSTRATION 6
2.5 CONTROLS AND REGULATIONS 6
2.6 CORRECTIVE ACTIONS FOR POTENTIAL FUTURE VIOLATIONS OF THE STANDARD 7

3.0 OZONE MONITORING 7

3.1 OZONE MONITORING NETWORK 7
3.2 AMBIENT OZONE MONITORING DATA 9
3.3 QUALITY ASSURANCE 12
3.4 CONTINUED MONITORING 12

4.0 EMISSION INVENTORY 13

4.1 EMISSION TRENDS 13
4.1.1 Point Sources *13*
4.1.2 Electric Generating Unit (EGU) Sources *16*
4.1.3 All Anthropogenic Sources *18*
4.2 INVENTORY YEARS 23
4.3 EMISSION PROJECTIONS 23
4.4 DEMONSTRATION OF MAINTENANCE 29
4.5 PERMANENT AND ENFORCEABLE EMISSION REDUCTIONS 30
4.6 PROVISIONS FOR FUTURE UPDATES 30

5.0 TRANSPORTATION CONFORMITY BUDGETS 30

5.1 ON-ROAD EMISSION ESTIMATES 30
5.2 OVERVIEW 31
5.3 EMISSION ESTIMATES 31

6.0 CONTROL MEASURES AND REGULATIONS 34

6.1 REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) AND OTHER STATE VOLATILE ORGANIC COMPOUND (VOC) RULES 34
6.2 IMPLEMENTATION OF PAST STATE IMPLEMENTATION PLAN (SIP) REVISIONS 34
6.3 NITROGEN OXIDES (NO_x) RULE 35
6.4 MEASURES BEYOND CLEAN AIR ACT (CAA) REQUIREMENTS 35
6.4.1 Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards *35*
6.4.2 Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards *35*
6.4.3 Heavy-Duty Diesel Engines *36*
6.4.4 Clean Air Non-road Diesel Rule *36*
6.4.5 Non-road Spark-Ignition Engines and Recreational Engine Standards *36*
6.4.6 Reciprocating Internal Combustion Engine Standards *36*
6.4.7 Category 3 Marine Diesel Engine Standards *37*
6.4.8 Clean Air Interstate Rule (CAIR)/Cross State Air Pollution Rule (CSAPR) *37*

6.4.9 Oil and Natural Gas Industry Standards 38
6.4.10 Mercury and Air Toxic Standards 39
6.4.11 Controls Specific to Lawrenceburg Township, Dearborn County, Indiana 39
6.5 CONTROLS TO REMAIN IN EFFECT 40
6.6 NEW SOURCE REVIEW (NSR) PROVISIONS 40
7.0 MODELING ANALYSIS 40
7.1 SUMMARY OF MODELING RESULTS FOR NATIONAL EMISSION CONTROL STRATEGIES IN FINAL RULEMAKINGS 40
7.2 U.S. EPA MODELING ANALYSIS FOR INTERSTATE TRANSPORT "GOOD NEIGHBOR" PROVISION 41
7.3 LADCO MODELING FOR 8-HOUR OZONE STANDARD 43
7.4 METEOROLOGICAL ANALYSIS OF HIGH-OZONE EVENTS 45
7.5 SUMMARY OF EXISTING MODELING RESULTS 45
8.0 CORRECTIVE ACTIONS 46
8.1 COMMITMENT TO REVISE PLAN 46
8.2 COMMITMENT FOR CONTINGENCY MEASURES 46
8.3 CONTINGENCY MEASURES 47
9.0 PUBLIC PARTICIPATION 48
10.0 CONCLUSIONS 49

FIGURES

Figure 3.1: Map of the Cincinnati-Hamilton, OH-KY-IN, 2008 8-Hour Ozone Nonattainment Area 8

GRAPHS

Graph 3.1: Design Values for the Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area, 2012-2014 11

Graph 3.2: Design Value Trends for the Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area, 2009-2014 12

Graph 4.1: NO_x Point Source Emissions, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year) 14

Graph 4.2: NO_x Point Source Emissions, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year) 14

Graph 4.3: VOC Point Source Emissions, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year) 15

Graph 4.4: VOC Point Source Emissions, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year) 15

Graph 4.5: NO_x Emissions from Lawrenceburg Township, Dearborn County, Indiana, Electric Generating Units, American Electric Power-Tanners Creek

Generating Station, 2003-2014 17

Graph 4.6: NO_x Emissions from Entire Nonattainment Area Electric Generating Units, 2003-2014 17

Graph 4.7: NO_x Emissions Trends, All Anthropogenic Sources, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year) 19

Graph 4.8: NO_x Emissions Trends, All Anthropogenic Sources, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year) 19

Graph 4.9: VOC Emissions Trends, All Anthropogenic Sources, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year) 20

Graph 4.10: VOC Emissions Trends, All Anthropogenic Sources, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year) 20

Graph 4.11: NO_x Emissions by Category and Year, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year) 21

Graph 4.12: NO_x Emissions by Category and Year, Entire Nonattainment Area 2011 (Base-Year) and 2014 (Attainment-Year) 21

Graph 4.13: VOC Emissions by Category and Year, Dearborn County, Indiana 2011 (Base-Year) and 2014 (Attainment-Year) 22

Graph 4.14: VOC Emissions by Category and Year, Entire Nonattainment Area 2011 (Base-Year) and 2014 (Attainment-Year) 22

Graph 4.15: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Sources, Dearborn County, Indiana 24

Graph 4.16: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Sources, Entire Nonattainment Area 24

Graph 4.17: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Sources, Dearborn County, Indiana 25

Graph 4.18: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Sources, Entire Nonattainment Area 25

Graph 4.19: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Sources, Dearborn County Indiana, Kentucky, and Ohio 26

Graph 4.20: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Sources, Dearborn County Indiana, Kentucky, and Ohio 26

Graph 4.21: NO_x Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Dearborn County, Indiana 27

Graph 4.22: NO_x Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Entire Nonattainment Area 27

Graph 4.23: VOC Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Dearborn County, Indiana 28

Graph 4.24: VOC Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Entire Nonattainment Area 28

TABLES

Table 1.1: National Ambient Air Quality Standards for Ozone 3

Table 3.1: Monitoring Data for Kentucky's Portion of the Nonattainment Area (Annual 4th High and Design Values in ppm) 9

Table 3.2: Monitoring Data for Ohio's Portion of the Nonattainment Area (Annual 4th High and Design Values in ppm) 10

Table 4.1: Comparison of 2014 (Attainment-Year) and 2030 (Maintenance-Year) NO_x and VOC Emissions, All Sources, Dearborn County, Indiana (tons per summer day) 29

Table 4.2: Comparison of 2014 (Attainment-Year) and 2030 (Maintenance-Year) NO_x and VOC Emissions, All Sources, Entire Nonattainment Area (tons per summer day) 29

Table 5.1: Emission Estimates for On-Road Mobile Sources for the Entire Nonattainment Area (NA) with Lawrenceburg Township Breakout (tons per summer day) 32

Table 5.2: Emission Estimates for On-Road Mobile Sources for the Ohio and Indiana Portions of the Nonattainment Area with Lawrenceburg Township Breakout (tons per summer day) 32

Table 5.3: Motor Vehicle Emission Budgets for the Ohio and Indiana Portions of the Nonattainment Area (tons per summer day) 33

Table 7.1: Comparison of Cincinnati Area Average Design Values with U.S. EPA "Good Neighbor" Provision Modeling Results (Values in Parts Per Million) 42

Table 7.2: Comparison of Cincinnati Area Average Design Values with U.S. EPA "Good Neighbor" Provision 2017 Modeling Results 43

Table 7.3: LADCO's Modeling Results for the Cincinnati Area (Values in Parts per Million) 44

Table 7.4: LADCO's 2017 Modeling Results for the Cincinnati Area (Values in Parts Per Million) 45

APPENDICES

A Air Quality System (AQS) Monitor Data Values for the Entire Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area

B Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOC) Point Source Emissions, 2011 and 2014, for Dearborn County, Indiana and Entire Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area

C Nitrogen Oxides (NO_x) Emissions from Electric Generating Units for Lawrenceburg Township and Entire Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area, 2003 – 2014

D Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOC) Emissions, All Sources, 2011 and 2014, for Dearborn County, Indiana and Entire Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area

E 2014 Attainment-Year Emissions Inventory and 2020 and 2030 Projected Emission Inventories for Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOC), All Sources, for Dearborn County, Indiana and Entire Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area

F Mobile Source Input/Output Calculation Files

G Classification and Regression Tree Analysis

H 2011 Base-Year Emission Inventory Submittal

I Public Participation Process Documentation

ACRONYMS/ABBREVIATIONS LIST

AEP	American Electric Power
AIM	Architectural and Industrial Maintenance
AQS	Air Quality System
CO	carbon monoxide
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CAM_x	Comprehensive Air Quality Model with Extensions
CART	Classification and Regression Tree
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
CTG	Control Technology Guidelines
CSAPR	Cross-State Air Pollution Rule
D.C.	District of Columbia

CFR	Code of Federal Regulations
CTG	Control Technology Guidelines
CSAPR	Cross-State Air Pollution Rule
D.C.	District of Columbia
EGUs	electric generating units
EISA	Energy Independence and Security Act
FR	Federal Register
HC	hydrocarbons
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
IN	Indiana
KDAQ	Kentucky Division of Air Quality
KDEP	Kentucky Department for Environmental Protection
km	kilometer
KY	Kentucky
LADCO	Lake Michigan Air Director's Consortium
MACT	Maximum Achievable Control Technology
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emission Budget
MWe	megawatt electrical
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
OAQ	Office of Air Quality
OH	Ohio
Ohio EPA	Ohio Environmental Protection Agency
OKI	Ohio-Kentucky-Indiana Regional Council of Governments
$PM_{2.5}$	particulate matter less than or equal to 2.5 $\mu g/m^3$ or fine particles
ppm	parts per million
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RICE	Reciprocating Internal Combustion Engine
RRF	Relative Response Factor
SIP	State Implementation Plan
SO_2	sulfur dioxide
SUVs	sport utility vehicles
TDM	travel demand model
tpy	tons per year
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound
VMT	vehicle miles traveled
WRF	Weather Research Forecasting

REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR ATTAINMENT IN THE INDIANA PORTION OF THE CINCINNATI-HAMILTON, OH-KY-IN, 2008 8-HOUR OZONE NONATTAINMENT AREA

LAWRENCEBURG TOWNSHIP, DEARBORN COUNTY, INDIANA

1.0 INTRODUCTION

This document supports Indiana's request that the Indiana portion (Lawrenceburg Township in Dearborn County, Indiana) of the Cincinnati-Hamilton, OH-KY-IN, area be redesignated from nonattainment to attainment for the 2008 8-hour ozone standard. In addition, the states of Kentucky and Ohio intend to submit requests for their portions of the Cincinnati-Hamilton, OH-KY-IN, marginal nonattainment area to be redesignated from nonattainment to attainment for the 2008 8-hour ozone standard. The Cincinnati-Hamilton, OH-KY-IN, area has recorded three (3) years of complete, quality-assured ambient air quality monitoring data for the years 2012 – 2014, demonstrating attainment of the 8-hour ozone standard.

Indiana's request is based on Section 107(d)(3)(D) of the Clean Air Act (CAA), which states:

> (D) The Governor of any State may, on the Governor's own motion, submit to the Administrator a revised designation of any area or portion thereof within the State. Within 18 months of receipt of a complete State redesignation submittal, the Administrator shall approve or deny such redesignation. The submission of a redesignation by a Governor shall not affect the effectiveness or enforceability of the applicable implementation plan for the State.

Section 107(d)(3)(E) of the CAA establishes specific requirements to be met in order for an area to be considered for redesignation including:

(a) A determination that the area (or a portion thereof) has attained the national ambient air quality standard (NAAQS).
(b) A state implementation plan (SIP) for the area under Section 110(k) that 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 or other federal requirements.
(d) A maintenance plan under Section 175A that 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, 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 2008 8-hour ozone standard.

1.1 Background

Ground level ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. Ozone formation is promoted by strong sunlight, warm temperatures, and light winds; elevated levels predominantly occur during the hot summer months. U.S. EPA mandates seasonal monitoring of ambient ozone concentrations in Indiana from March 1st through October 31st in accordance with 40 Code of Federal Regulations (CFR) Part 58 Appendix D.

Due to the fact that ozone is formed in the ambient air, control of ozone focuses upon reduction of precursor emissions (i.e. NO_x and VOC). NO_x is formed from the high-temperature reaction of nitrogen and oxygen during combustion processes in sources such as electric utility boilers, industrial fuel-burning sources, and motor vehicles. VOCs include many industrial solvents and coatings, as well as the hydrocarbons (HC) that are emitted by motor vehicles as evaporative losses from gasoline and tailpipe emissions of unburned hydrocarbon. Ground level ozone is associated with a number of adverse health and environmental impacts, including respiratory impairment and damage to crops and forests.

1.2 National Ambient Air Quality Standards

Ozone is one of the six criteria air pollutants that scientists have identified as being particularly harmful to humans and the environment. NAAQS have been developed for these six pollutants and are used as measurements of air quality. The CAA requires U.S. EPA to set primary standards at a level judged to be "requisite to protect the public health with an adequate margin of safety" and establish secondary standards that are requisite to protect public welfare from "any known or anticipated effects associated with the pollutant in the ambient air," including effects on crops, vegetation, wildlife, buildings and national monuments, and visibility.

The CAA requires areas designated nonattainment for the NAAQS for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997, U.S. EPA revised the air quality standards for ozone, replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm). The standard was challenged legally and upheld by the U.S. Supreme Court in February 2001. U.S. EPA designated areas under the 1997 8-hour ozone standard on April 15, 2004, as attainment, nonattainment, or unclassifiable.

The Indiana Department of Environmental Management (IDEM) submitted the final Request for Redesignation and Maintenance Plan for Ozone Attainment of the 1997 8-Hour Ozone Nonattainment Area for Indiana's portion of the Cincinnati-Hamilton, OH-KY-IN, nonattainment area, Lawrenceburg Township in Dearborn County, Indiana on January 21, 2010. U.S. EPA subsequently redesignated Lawrenceburg Township to attainment and classified it as maintenance under the 1997 8-hour ozone standard on May 11, 2010. Therefore, this document only pertains to the 2008 8-hour ozone standard.

On March 27, 2008, U.S. EPA significantly strengthened the 8-hour ozone standard to a level of 0.075 ppm, as shown in Table 1.1. An exceedance of the 2008 8-hour ozone NAAQS occurs when a monitor measures ozone above 0.075 ppm on average for an 8-hour period. A violation occurs when the average of the annual fourth highest daily maximum 8-hour ozone values over three consecutive years is greater than 0.075 ppm. This three-year average is termed the "design value" for the monitor. The design value for a nonattainment area is the highest monitor design value in the area.

Table 1.1: National Ambient Air Quality Standards for Ozone

	Primary Standards		Secondary Standards	
	Level	**Averaging Time**	**Level**	**Averaging Time**
1997 Ozone Standards	0.08 ppm*	Three-year average of the fourth highest 8-hour ozone value recorded each year.	Same as primary	
2008 Ozone Standards	0.075 ppm	Three-year average of the fourth highest 8-hour ozone value recorded each year.	Same as primary	
2015 Ozone Standard	0.070 ppm	Three-year average of the fourth highest 8-hour ozone value recorded each year.	Same as primary	

*Based on U.S. EPA's published data handling guidelines, values above 0.084 ppm were deemed to be in violation of the 1997 8-hour ozone standard.

On May 21, 2012, U.S. EPA designated Lawrenceburg Township in Dearborn County, Indiana, as a portion of the Cincinnati-Hamilton, OH-KY-IN, 2008 8-Hour Ozone Nonattainment Area (77 FR 30118) and classified the area as "marginal" under Subpart 2 of Part D of Title I of the CAA. The specific counties and partial counties that comprise the nonattainment area include Lawrenceburg Township in Dearborn County, Indiana; Butler, Clermont, Clinton, Hamilton, and Warren counties, Ohio; and Campbell County and portions of Boone and Kenton counties, Kentucky. This designation subjected the area to requirements, including development of a plan to reduce emissions of NO_x and VOC and a demonstration that the area will meet the federal 8-hour air quality standard for ozone by July 20, 2015. However, in the 2008 Ozone Implementation Rule, U.S. EPA extended the compliance date to December 31, 2015.[1] In a

1 http://www.gpo.gov/fdsys/pkg/FR-2013-06-06/pdf/2013-13233.pdf

recent ruling by the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit, the extension deadline was vacated, among other decisions.[2]

1.3 Geographical Description

The information below is a brief description of the Cincinnati-Hamilton, OH-KY-IN, 2008 8-Hour Ozone Marginal Nonattainment Area.

Lawrenceburg Township, located in Dearborn County in southeast Indiana, Boone, Campbell, and Kenton counties located in north central Kentucky, and Butler, Clermont, Clinton, Hamilton, and Warren counties located in southwestern Ohio are part of the Cincinnati Core Based Statistical Area (CBSA). This area is surrounded by the Indiana counties of Franklin, Ohio, Ripley, Switzerland, and Union, the Kentucky counties of Bracken, Gallatin, Grant, and Pendleton, and the Ohio counties of Brown, Fayette, Greene, Highland, Montgomery, and Preble. The Ohio River flows along the borders of Indiana, Kentucky, and Ohio and the area lies within the Ohio River Valley. The Cincinnati-Hamilton, OH-KY-IN, Marginal Nonattainment Area is depicted in Figure 3.1.

IDEM, on behalf of the State of Indiana, is requesting the redesignation of Lawrenceburg Township, Dearborn County, Indiana. The Kentucky Department for Environmental Protection (KDEP) is responsible for Boone, Campbell, and Kenton counties Kentucky. The Ohio Environmental Protection Agency (Ohio EPA) is responsible for Butler, Clermont, Clinton, Hamilton, and Warren counties Ohio. KDEP and Ohio EPA are requesting redesignation of their portions of the nonattainment area from U.S. EPA Regions IV and V concurrently. As such, this submittal only covers Lawrenceburg Township, Dearborn County, Indiana.

The Cincinnati-Hamilton, OH-KY-IN, 2008 8-hour ozone nonattainment area, as defined in Section 1.2, had been subject to nonattainment area rulemakings under the 1997 8-hour ozone standard. The Indiana and Ohio portions of the Cincinnati area were redesignated to attainment and classified as maintenance under the 1997 8-hour ozone standard on May 11, 2010. Kentucky's portion of the 1997 8-hour ozone nonattainment area was redesignated to attainment and classified as maintenance on August 5, 2010. The Cincinnati area, with the exceptions of Lawrenceburg Township, Dearborn County, Indiana, and Clinton County, Ohio, had also been subject to nonattainment area rulemakings under the 1-hour standard. The 1-hour ozone standard was revoked on June 15, 2005. The Cincinnati area, with the exception of Clinton County, Ohio, had also been subject to nonattainment rulemakings under the 1997 annual fine particles standard. The Indiana and Ohio portions of the Cincinnati area were redesignated to attainment and classified as maintenance under the 1997 annual fine particles standard on December 23, 2011. Kentucky's portion of the 1997 annual fine particle nonattainment area was redesignated to attainment and classified as maintenance on October 21, 2011.

2 http://www.cadc.uscourts.gov/internet/opinions.nsf/E97A64FFBFE4DC1D85257DB70054D5EE/$file/12-1321-1528834.pdf

1.4 Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2012-2014, demonstrates that the air quality meets the 2008 8-hour ozone standard in the Cincinnati area. This fact, accompanied by the permanent and enforceable decreases in emission levels discussed in Section 4.0, justifies a redesignation to attainment for Indiana's portion of the nonattainment area based on Section 107(d)(3)(E) of the CAA.

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110, as well as Part D, of the CAA lists 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 U.S. EPA Region V staff. The specific requirements for redesignation are listed below.

2.2 Ozone Monitoring

1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.15, has been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.

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

3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or affected downwind environs, are less than or equal to 0.075 ppm. This showing must rely on three (3) 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 maintenance of the attainment status.

2.3 Emission Inventory

1) A comprehensive emissions inventory of the precursors of ozone completed for the base-year.

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

3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

4) A demonstration that improvement in air quality between the years that violations occurred and 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 annual updates of the inventory to enable tracking of the emission levels, including an annual emission statement from major sources.

2.4 Modeling Demonstration

While no modeling is required for redesignating ozone nonattainment areas, IDEM has incorporated photochemical modeling information in Section 7 of this document to further support its request that Indiana's portion of the nonattainment area be redesignated to attainment.

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 ozone SIP revisions have been fully implemented.

3) Acceptable provisions to provide for New Source Review (NSR).

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 Standard

1) A commitment to submit a revised plan eight (8) 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 standards occur.

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

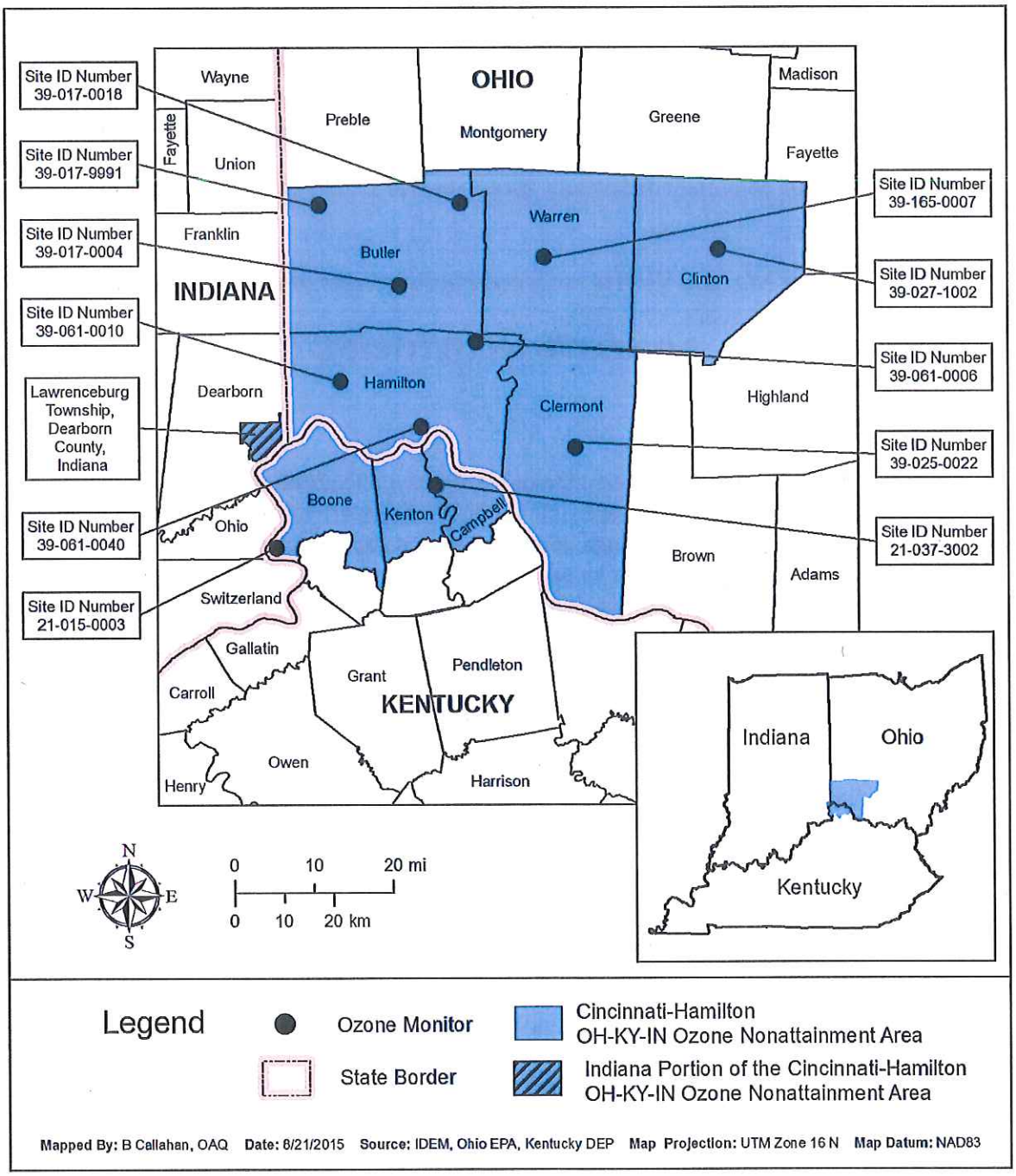
4) A list of NO_x and VOC sources potentially subject to future controls.

3.0 OZONE MONITORING

3.1 Ozone Monitoring Network

There are currently eleven (11) monitors measuring ozone concentrations in the Cincinnati-Hamilton, OH-KY-IN, nonattainment area. Two (2) monitors are located in Kentucky and nine (9) monitors are located in Ohio. Indiana does not have any ozone monitors located in Lawrenceburg Township in Dearborn County. A listing of the sites, along with their annual fourth highest readings from 2009-2014, are shown in Table 3.1 and Table 3.2 and were retrieved from U.S. EPA's AQS database. The locations of the monitoring sites for this nonattainment area are shown in Figure 3.1.

Figure 3.1: Map of the Cincinnati-Hamilton, OH-KY-IN, 2008 8-Hour Ozone Nonattainment Area



3.2 Ambient Ozone Monitoring Data

As explained in 40 CFR Part 50, Appendix P, three (3) complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.075 ppm. When this occurs the site is deemed to be in attainment. A maximum of three (3) significant digits are carried in the computations and digits to the right of the third decimal place are truncated (i.e. any computation greater than 0.075 ppm is truncated to 0.075 ppm). Values equal to or below 0.075 ppm meet the standard; values equal to or greater than 0.076 ppm exceed the standard. These data handling procedures are applied on an individual basis at each monitor in the area. An area complies with the 8-hour ozone standard if, and only if, every monitoring site in the area meets the NAAQS. An individual site's three-year average of the annual fourth highest daily maximum 8-hour average ozone concentration is called the site's design value. 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 fourth high values and three-year design values for 2009-2014 for the three (3) monitoring sites (two active and one discontinued) in Kentucky's portion of the nonattainment area. Table 3.2 outlines the annual fourth high values and three-year design values for 2009-2014 for the ten (10) monitoring sites (nine active and one discontinued) within Ohio's portion of the nonattainment area. None of the eleven active monitors within the Cincinnati-Hamilton, OH-KY-IN, nonattainment area has a 2012-2014 design value greater than 0.075 ppm.

Table 3.1: Monitoring Data for Kentucky's Portion of the Nonattainment Area (Annual 4th High and Design Values in ppm)

AQS#	County	Site	Annual Fourth High						Design Value			
			2009	2010	2011	2012	2013	2014	2009-2011	2010-2012	2011-2013	2012-2014
21-015-0003	Boone	KY 338	0.064	0.067	0.07	0.074	0.059	0.062	0.067	0.07	0.067	0.065
21-037-3002	Campbell	Highland Heights	0.068	0.073	0.08	0.084	0.072	0.071	0.073	0.079	0.078	0.075
21-117-0007	Kenton	Covington	0.074	0.064 *								

*Monitor discontinued mid-year
Indicates values are > 0.075 ppm

Table 3.2: Monitoring Data for Ohio's Portion of the Nonattainment Area (Annual 4th High and Design Values in ppm)

AQS#	County	Site	Annual Fourth High						Design Value			
			2009	2010	2011	2012	2013	2014	2009-2011	2010-2012	2011-2013	2012-2014
39-017-0004	Butler	Hamilton	0.073	0.077	0.078	0.083	0.068	0.070	0.076	0.079	0.076	0.073
39-017-1004	Butler	Middletown-Hook Field Municipal Airport	0.076 *									
39-017-0018	Butler	Middletown-Runway Drive		0.080	0.082	0.084	0.068	0.069		0.082	0.078	0.073
39-017-9991	Butler	Oxford-Miami University			0.079	0.085	0.069	0.069			0.077	0.074
39-025-0022	Clermont	Batavia	0.069	0.075	0.082	0.091	0.066	0.068	0.075	0.082	0.079	0.075
39-027-1002	Clinton	Wilmington	0.070	0.076	0.084	0.086	0.064	0.070	0.076	0.082	0.078	0.073
39-061-0006	Hamilton	Cincinnati-Grooms Road	0.072	0.080	0.088	0.087	0.069	0.070	0.080	0.085	0.081	0.075
39-061-0010	Hamilton	Cleves	0.065	0.079	0.078	0.083	0.064	0.073	0.074	0.080	0.075	0.073
39-061-0040	Hamilton	Cincinnati-Wm. Howard Taft	0.074	0.075	0.085	0.082	0.069	0.069	0.078	0.080	0.078	0.073
39-165-0007	Warren	Lebanon	0.077	0.076	0.082	0.080	0.067	0.071	0.078	0.079	0.076	0.072

*Monitor discontinued mid-year

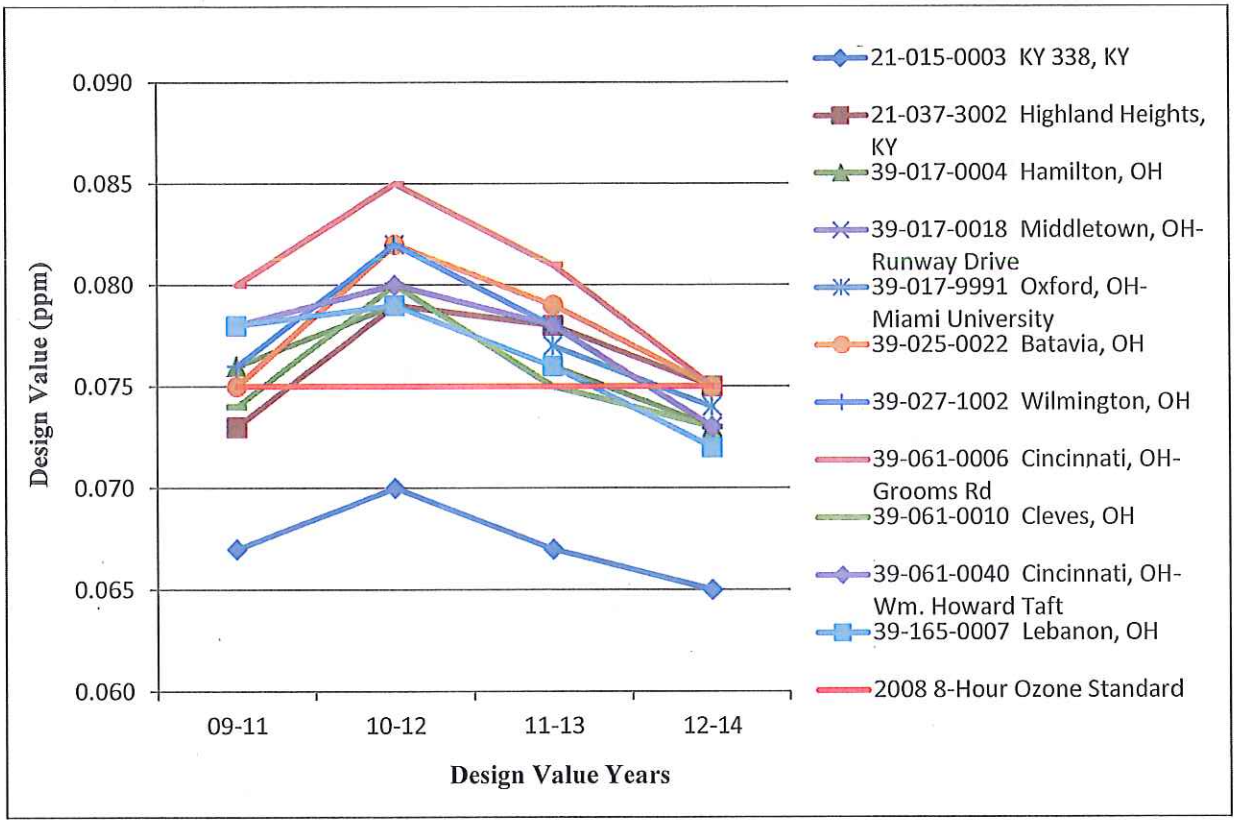
Indicates values are > 0.075 ppm

Graph 3.1 demonstrates 2012-2014 design values for this nonattainment area. The highest design value monitored within the nonattainment area is 0.075 ppm, demonstrating that the Cincinnati area attained the 2008 8-hour ozone standard at the end of the 2014 ozone season and is on schedule with the compliance date mandated in the CAA and upheld by the D.C. Circuit Court.

Graph 3.1: Design Values for the Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area, 2012-2014

Graph 3.2 shows the trend in design values for the Cincinnati-Hamilton, OH-KY-IN, nonattainment area over the past six years. A comprehensive list of the fourth highest daily maximum 8-hour average ozone concentrations over this period is included in Appendix A. The area's design values have recently trended downward as emissions have declined, due to such programs as the Acid Rain program and cleaner automobiles and fuels both regionally and locally. U.S. EPA's rule to control NO_x 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 Rules were approved on June 6, 2001, (326 Indiana Administrative Code (IAC) 10-3 and 326 Indiana Administrative Code (IAC) 10-4). EGUs are now regulated by the federal Cross-State Air Pollution Rule (CSAPR). The SIP submittals for NO_x reductions of other Midwest states were approved in this timeframe as well.

Graph 3.2: Design Value Trends for the Cincinnati-Hamilton, OH-KY-IN, Nonattainment Area, 2009-2014



3.3 Quality Assurance

Ohio and Kentucky have quality assured all data shown in Appendix A in accordance with 40 CFR 58.15 and the Quality Assurance Manual. Ohio and Kentucky have recorded the data in the AQS database and the data are available to the public.

3.4 Continued Monitoring

Ohio and Kentucky have committed to continue monitoring ozone levels at the sites indicated in Tables 3.1, 3.2, and Appendix A. IDEM will consult with Ohio, Kentucky, and U.S. EPA Regions IV and V staff prior to making changes to the existing monitoring network should changes become necessary in the future. Ohio and Kentucky will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Ohio and Kentucky will enter all data into AQS in a timely manner in accordance with federal guidelines.

4.0 EMISSION INVENTORY

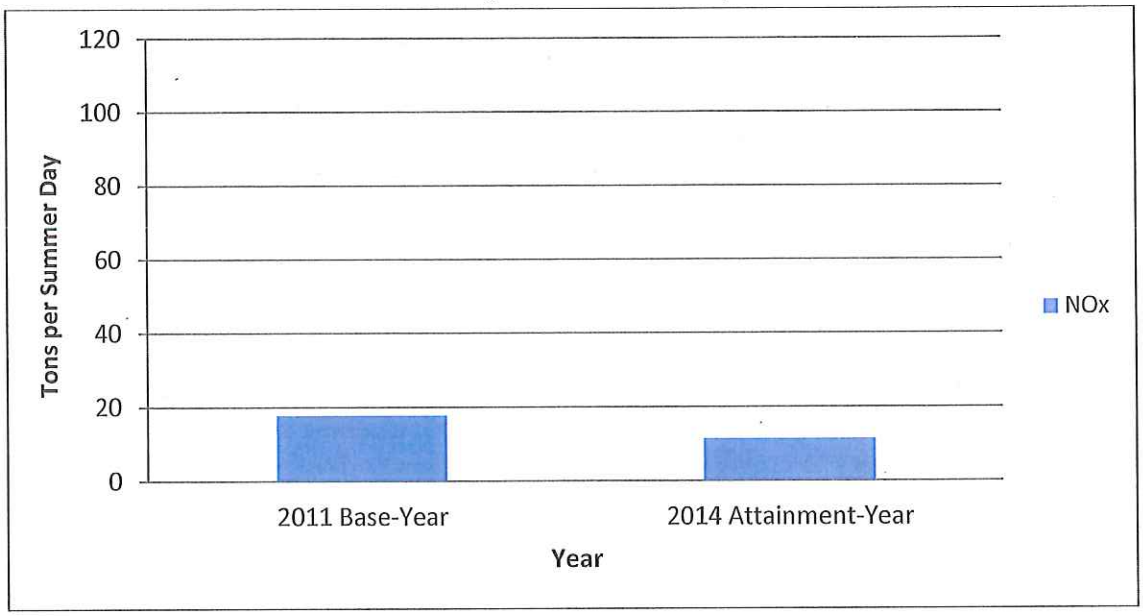
U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (NO_x and VOC) representative of the year when the area achieves attainment of the ozone air quality standard. IDEM is using 2011 as the base-year and 2014 as the attainment-year. The 2011 base-year derives from one of the three years used to designate the area nonattainment and the 2014 attainment-year was the year that attainment was achieved. Indiana must also demonstrate that the improvement in air quality between the years that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. The 2011 emission inventory represents a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutants in the 2008 8-hour ozone nonattainment area. This submittal is required by Section 182(a)(1) of the Clean Air Act. Other related requirements include a projection of the emission inventory to a year at least ten (10) years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the 2008 8-hour ozone standard, and a commitment to provide future updates of the inventory to enable tracking of emission levels during the ten (10) year maintenance period. The following subsections address each of these requirements.

4.1 Emission Trends

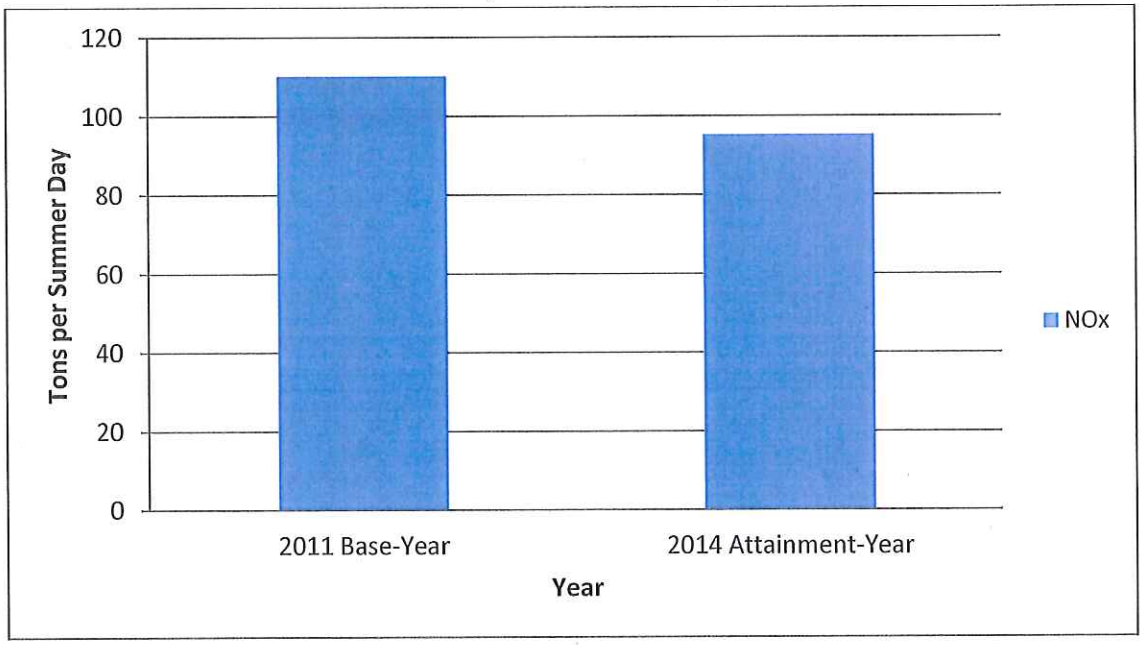
4.1.1 Point Sources

Graphs 4.1 and 4.3 show the trend in NO_x and VOC point source emissions for Dearborn County, Indiana, which generally correspond to the years of monitored values referenced in this plan. The point source data is taken from Indiana's annual emissions reporting program. Graphs 4.2 and 4.4 depict point source emission trends within the entire Cincinnati-Hamilton, OH-KY-IN, nonattainment area. Graphs and data tables of emissions for the point source category are available in Appendix B.

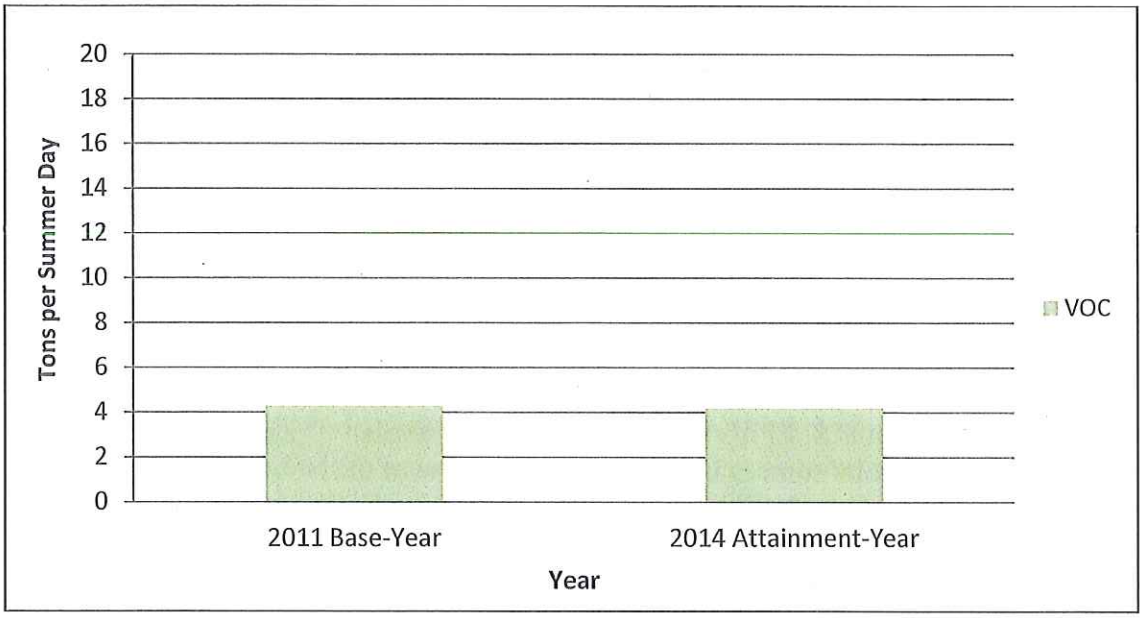
Graph 4.1: NO_x Point Source Emissions, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year)



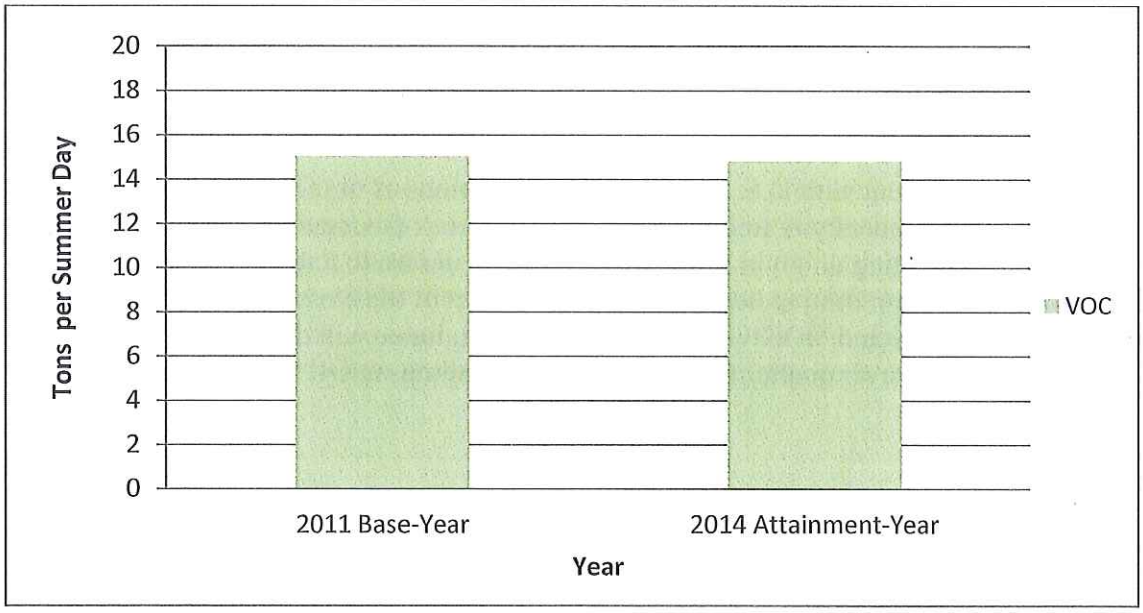
Graph 4.2: NO_x Point Source Emissions, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year)



Graph 4.3: VOC Point Source Emissions, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year)



Graph 4.4: VOC Point Source Emissions, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year)



4.1.2 Electric Generating Unit (EGU) Sources

Graph 4.5 shows the trend in NO_x emissions from the American Electric Power (AEP)-Tanners Creek Generating Station in Lawrenceburg Township, Dearborn County, Indiana. Graph 4.6 shows the trends in NO_x emissions from EGUs for the entire nonattainment area. While ozone and its precursors are also transported into this region from outside areas, this information does provide some indication of the impact that Indiana sources may have on the nonattainment area. The emissions are decreasing substantially in response to national programs affecting all EGUs, such as the Acid Rain program, CAIR, and now CSAPR. Other sectors of the inventory also impact ozone formation, but large regional sources, such as EGUs, have a substantial impact on the formation of ozone. Graphs and data tables of emissions for EGU sources are available in Appendix C.

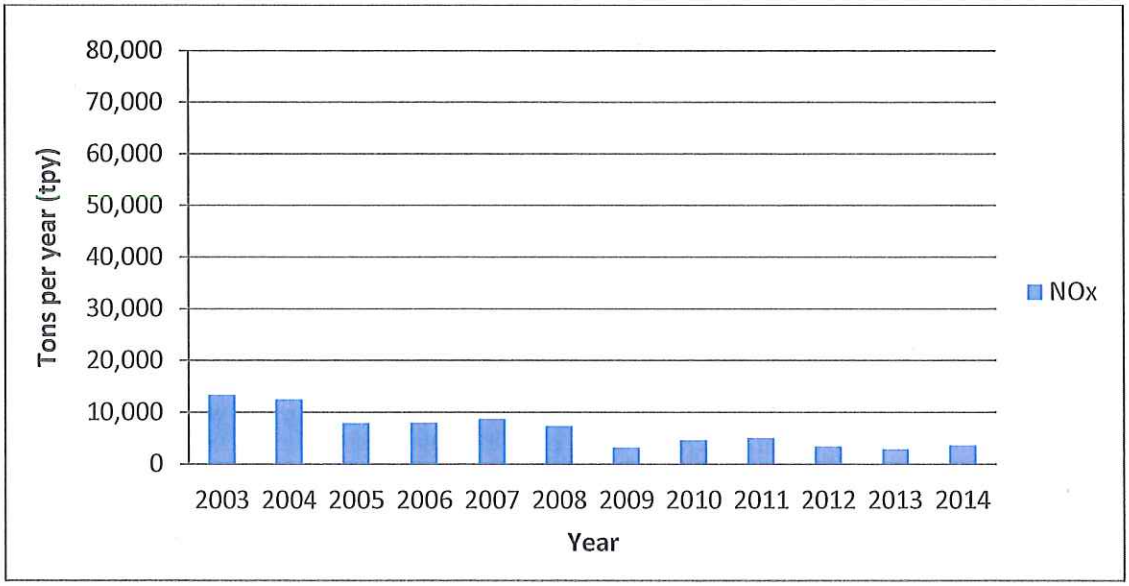
These data were taken from U.S. EPA's Clean Air Markets database.[3] Data are available sooner for these units than other point sources in the inventory because of the NO_x budgets and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO_x SIP Call controls in order to generate Early Reduction Credits for their future year NO_x budgets. The first season of the NO_x SIP Call budget period began May 31, 2004.

As part of the NO_x SIP Call, states were required to adopt into their rules a budget for all large EGUs. Indiana's budget, which represents a statewide cap on NO_x emissions, is now found in the federal transport rule NO_x ozone season trading rules at 40 CFR 97, Subpart BBBBB. 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 as represented on these graphs.

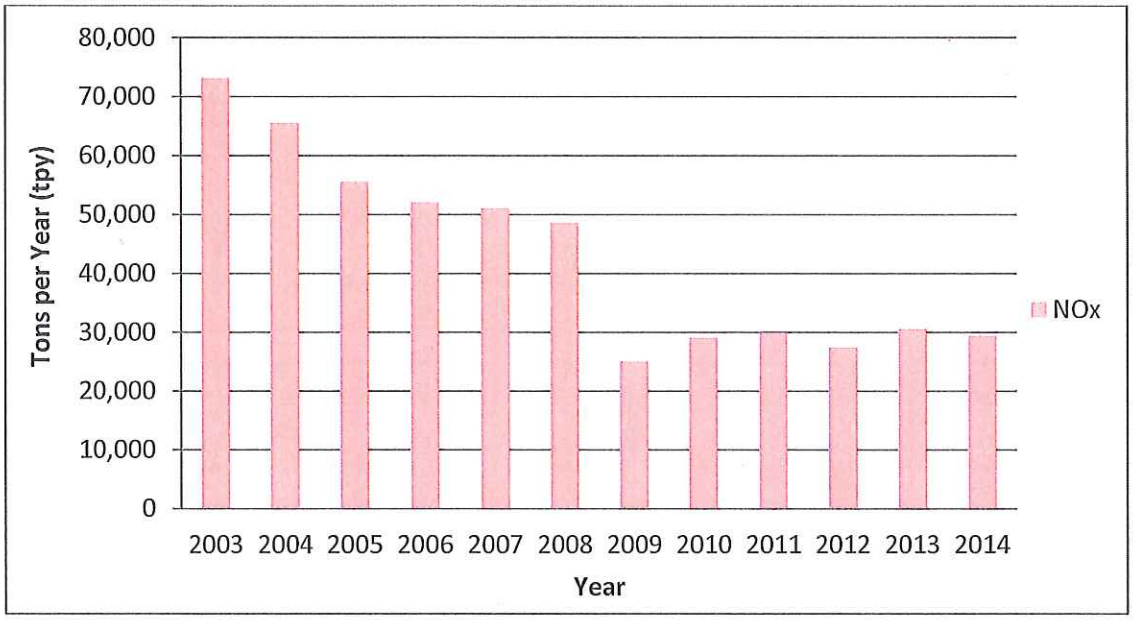
As the result of a settlement with U.S. EPA to resolve violations of the CAA's NSR requirements, AEP permanently retired its entire Tanners Creek Generating Station (i.e. all four coal-fired electric generating units) in May 2015. This will ensure that the facility does not restart without proper permitting under the CAA. As a result of the closure of this facility, ozone precursor emissions (NO_x and VOC) in Dearborn County, Indiana, will decrease significantly, helping to further improve air quality in the Cincinnati-Hamilton, OH-KY-IN, nonattainment area.

[3] http://www.epa.gov/airmarkets/

Graph 4.5: NO_x Emissions from Lawrenceburg Township, Dearborn County, Indiana, Electric Generating Units, American Electric Power-Tanners Creek Generating Station, 2003-2014



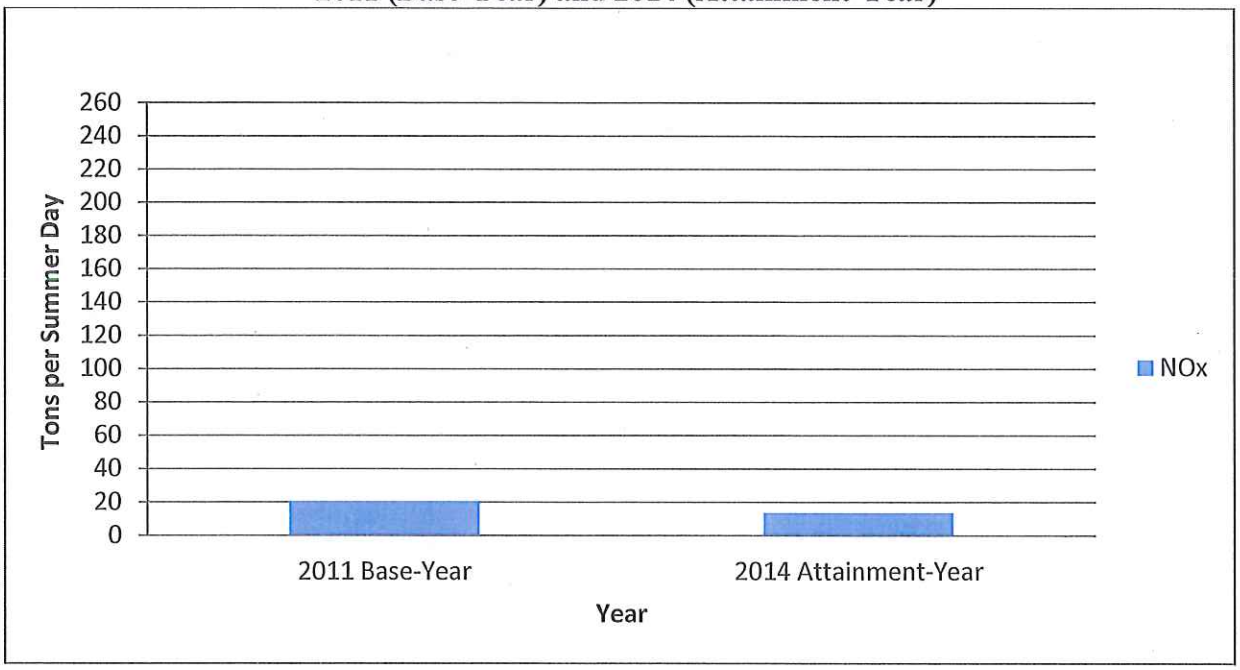
Graph 4.6: NO_x Emissions from Entire Nonattainment Area Electric Generating Units, 2003-2014



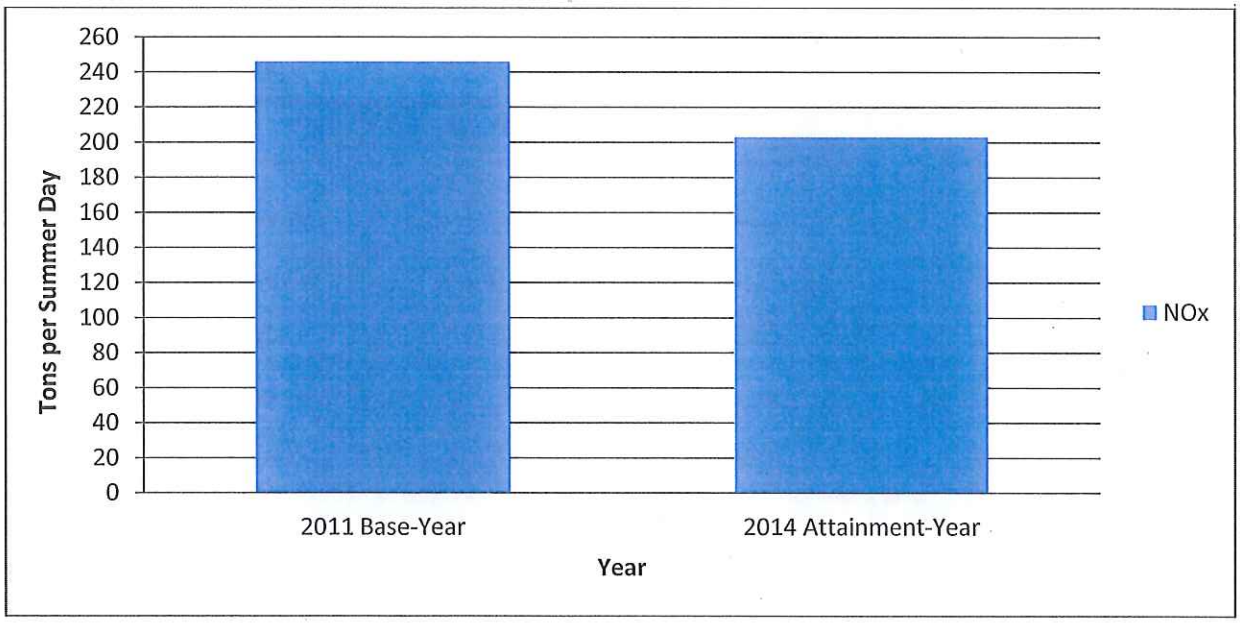
4.1.3 All Anthropogenic Sources

Periodic inventories, which include emissions from all sectors (mobile, area, non-road, and point sources), were prepared for 2011 and 2014, which roughly follows the years of monitored air quality trends discussed in Section 3.0. Graphs 4.7, 4.9, 4.11, and 4.13 shows NO_x and VOC emission trends for all anthropogenic source categories within Dearborn County, Indiana, while Graphs 4.8, 4.10, 4.12, and 4.14 shows NO_x and VOC emission trends for all anthropogenic source categories for the entire nonattainment area.

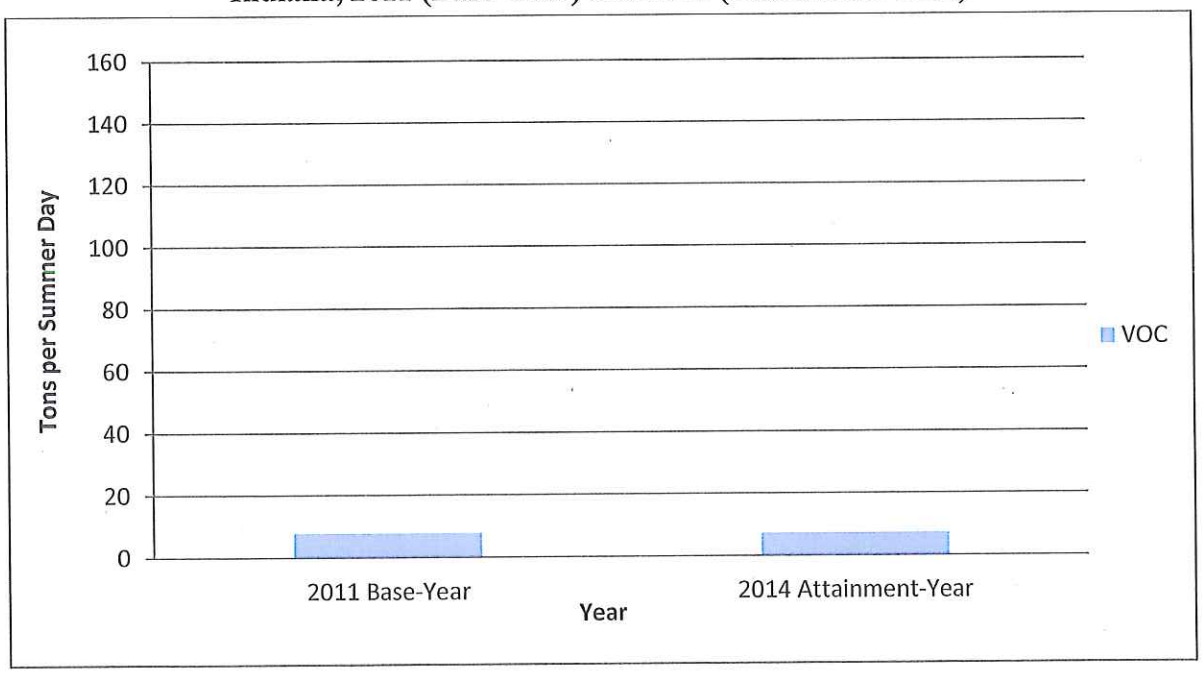
Graph 4.7: NO_x Emissions Trends, All Anthropogenic Sources, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year)



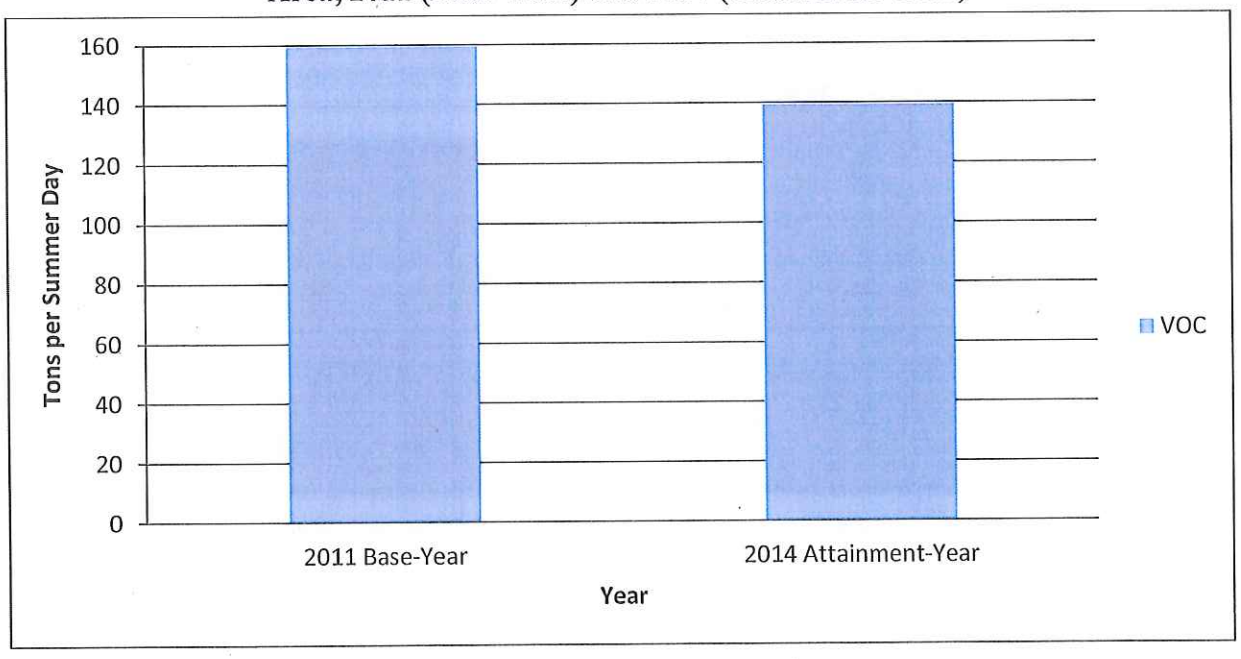
Graph 4.8: NO_x Emissions Trends, All Anthropogenic Sources, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year)



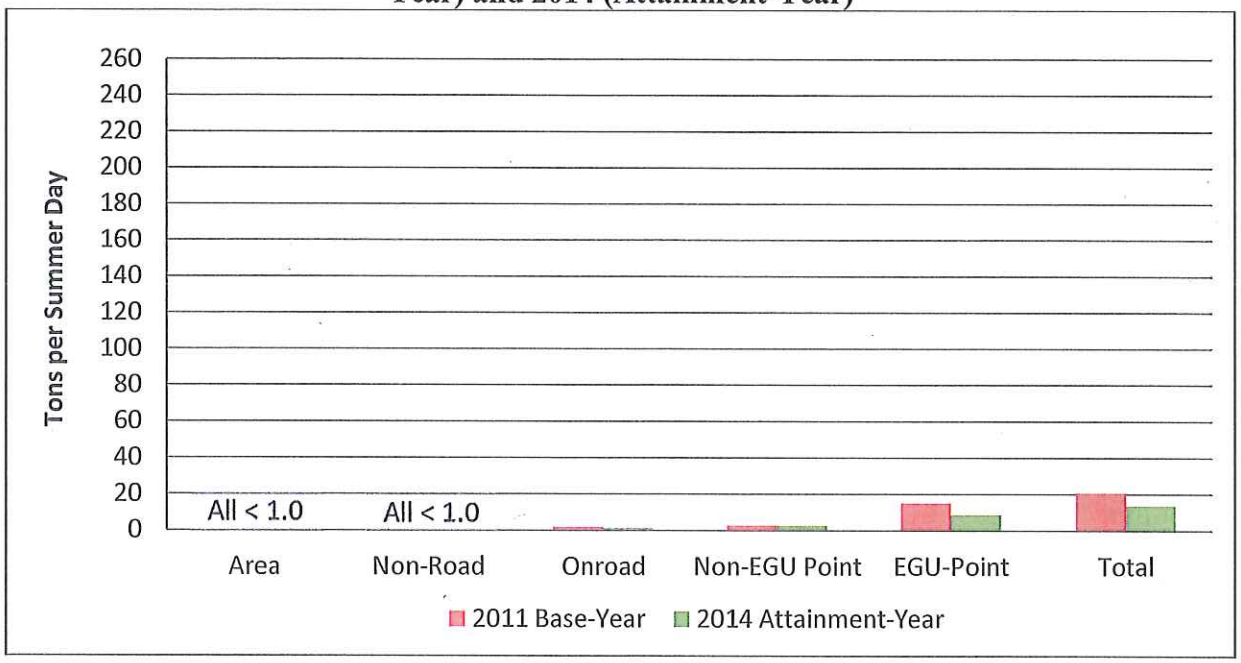
Graph 4.9: VOC Emissions Trends, All Anthropogenic Sources, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year)



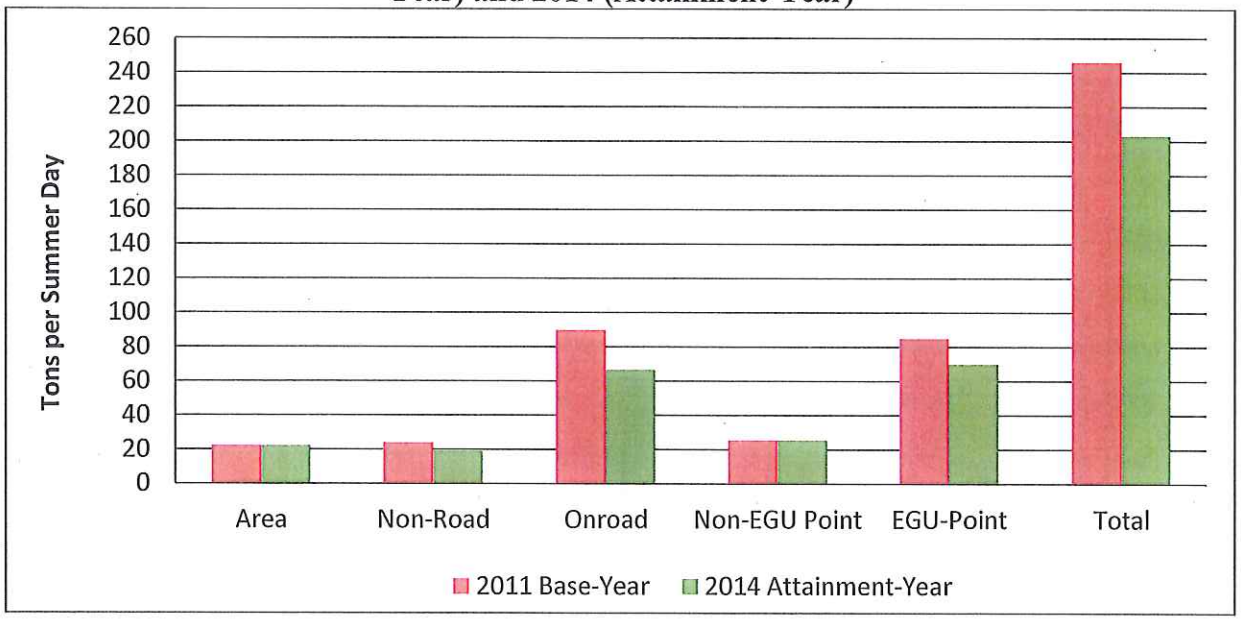
Graph 4.10: VOC Emissions Trends, All Anthropogenic Sources, Entire Nonattainment Area, 2011 (Base-Year) and 2014 (Attainment-Year)



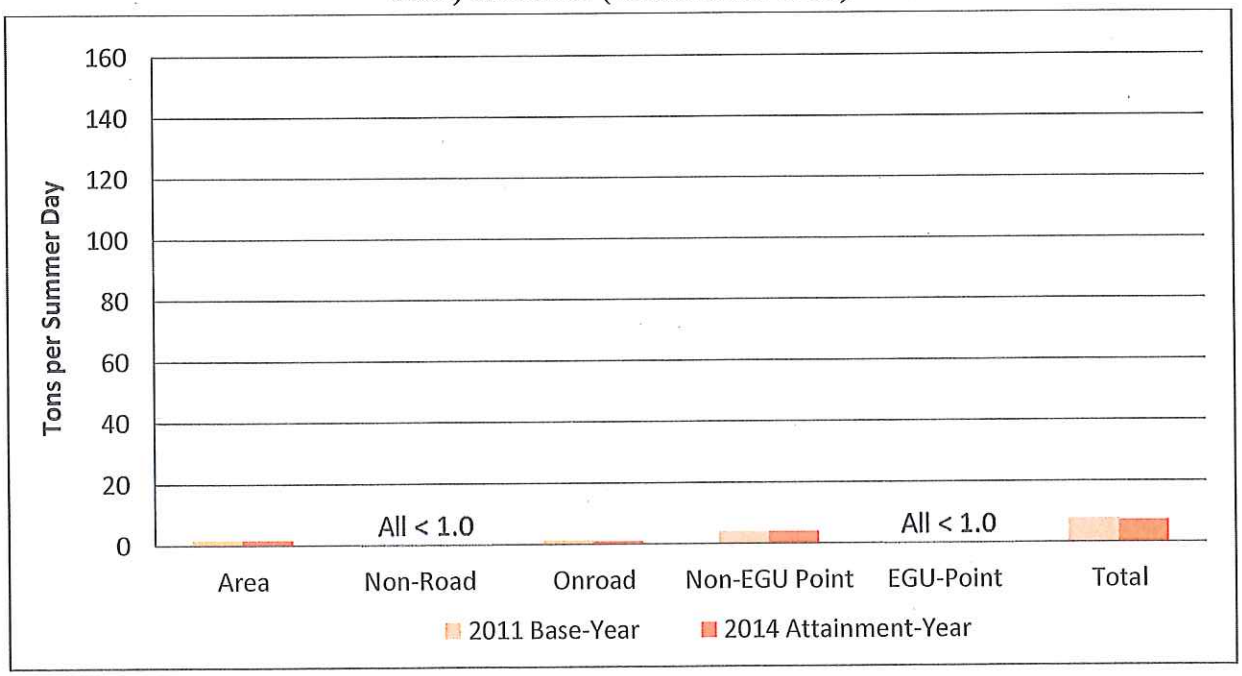
Graph 4.11: NO_x Emissions by Category and Year, Dearborn County, Indiana, 2011 (Base-Year) and 2014 (Attainment-Year)



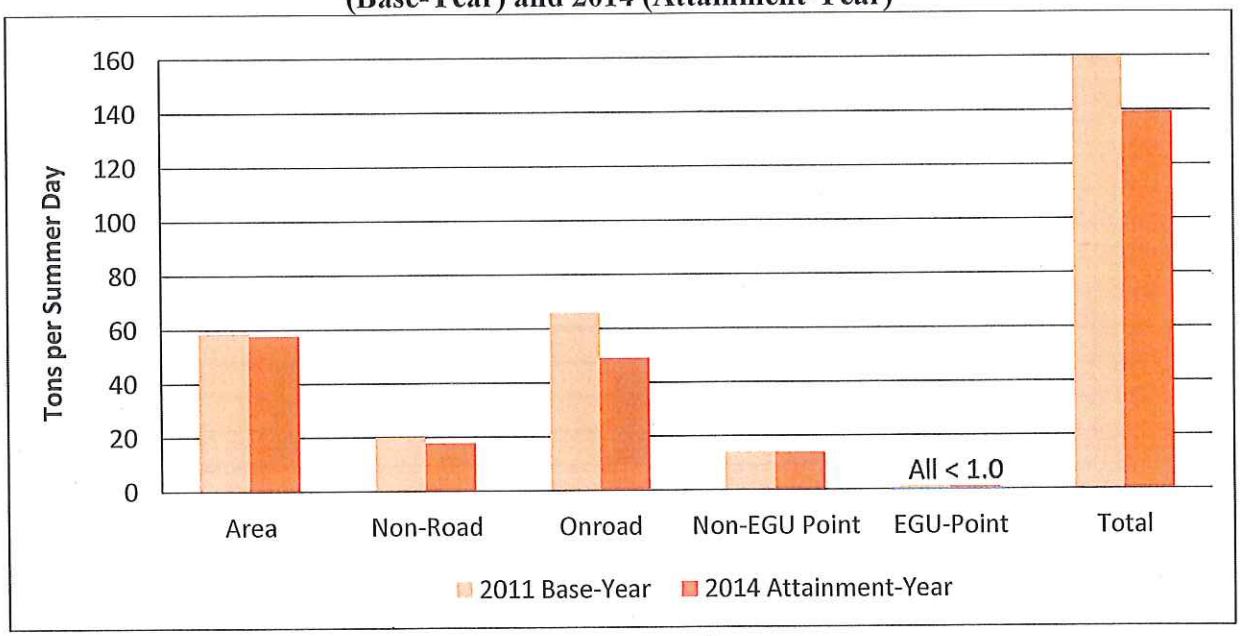
Graph 4.12: NO_x Emissions by Category and Year, Entire Nonattainment Area 2011 (Base-Year) and 2014 (Attainment-Year)



Graph 4.13: VOC Emissions by Category and Year, Dearborn County, Indiana 2011 (Base-Year) and 2014 (Attainment-Year)



Graph 4.14: VOC Emissions by Category and Year, Entire Nonattainment Area 2011 (Base-Year) and 2014 (Attainment-Year)



4.2 Inventory Years

IDEM has prepared a comprehensive emissions inventory for Dearborn County, Indiana, including area, mobile, nonroad, and point sources for precursors of ozone (NO_x and VOCs) for the base-year 2011.

Area, nonroad, and point source emissions were compiled from the data available on U.S. EPA's Emissions Modeling Clearinghouse website.[4] Using Ozone NAAQS Emissions Modeling platform (2011v6.1) data were collected together for the 2011 National Emissions Inventory (NEI) year and the 2018 and 2025 U.S. EPA-projected inventories. Using those datasets, intervening years, including the 2014 attainment-year, were interpolated between 2011 and 2018, and then between 2018 and 2025 for 2020. Beyond 2025, the projected year 2030 was estimated using the TREND function in Microsoft Excel. If the TREND function resulted in a negative value, the emissions were assumed to not change. Mobile source emissions were developed in conjunction with the Ohio EPA and Kentucky Division of Air Quality (KDAQ) and were calculated from emission factors produced by U.S. EPA's 2014 Motor Vehicle Emission Simulator (MOVES) software program and data extracted from the region's travel-demand model. Biogenic emissions are not included in these summaries.

Appendix D contains data tables and graphs of estimated emissions for all sources for the years 2011 and 2014.

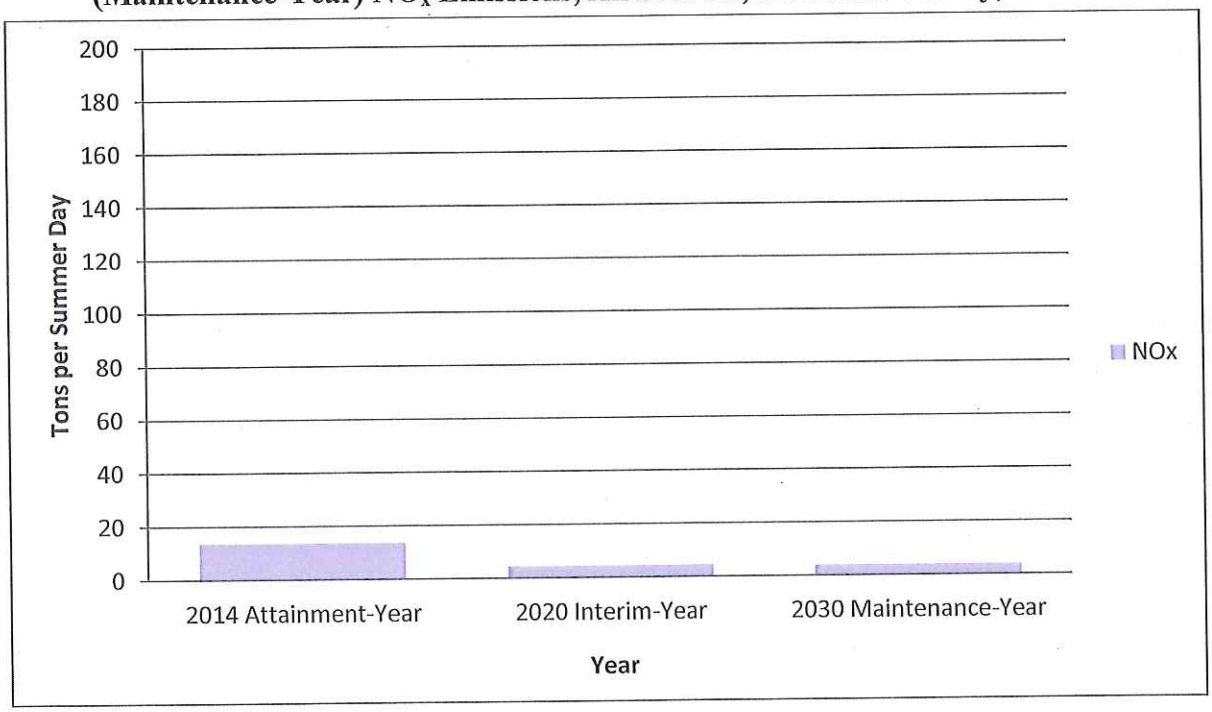
4.3 Emission Projections

In consultation with U.S. EPA and other stakeholders, IDEM selected the year 2030 as the maintenance-year for this redesignation request. This document contains projected emission inventories for 2020 and 2030. The detailed NO_x and VOC inventory information for the entire nonattainment area for 2020 and 2030 is in Appendix E.

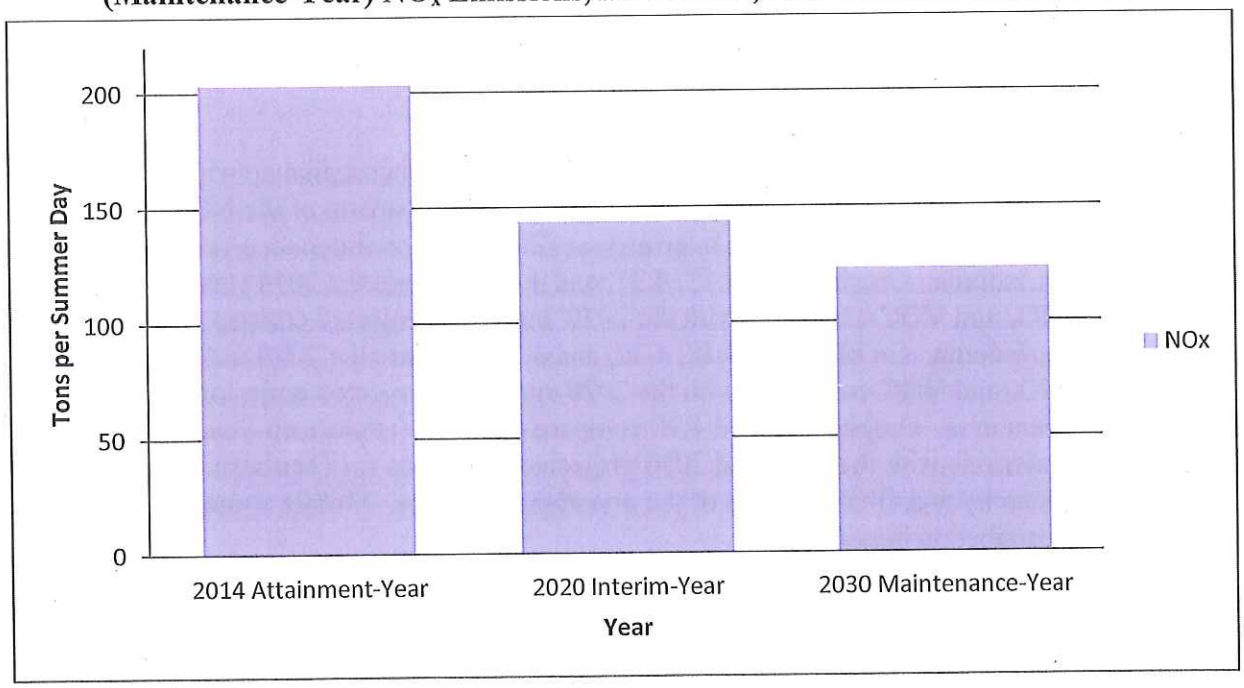
NO_x and VOC emission trends are an important gauge for continued compliance with the 2008 8-hour ozone standard. Therefore, IDEM performed an initial comparison of the NO_x and VOC inventories for the attainment-year (2014), interim-year (2020), and maintenance-year (2030) for Dearborn County, Indiana. Graphs 4.15, 4.17, 4.21, and 4.23 compare the 2014 (attainment-year) estimated NO_x and VOC emissions with the 2020 and 2030 projected emissions for Dearborn County, Indiana. Graphs 4.16, 4.18, 4.22, and 4.24 compare the 2014 (attainment-year) estimated NO_x and VOC emissions with the 2020 and 2030 projected emissions for the entire nonattainment area. Graphs 4.19 and 4.20 compare the 2014 (attainment-year) estimated NO_x and VOC emissions with the 2020 and 2030 projected emissions for Dearborn County, Indiana to the Kentucky and Ohio portions of the nonattainment area. Mobile source emission inventories are described in Section 5.0.

[4] http://www.epa.gov/ttn/chief/emch/index.html

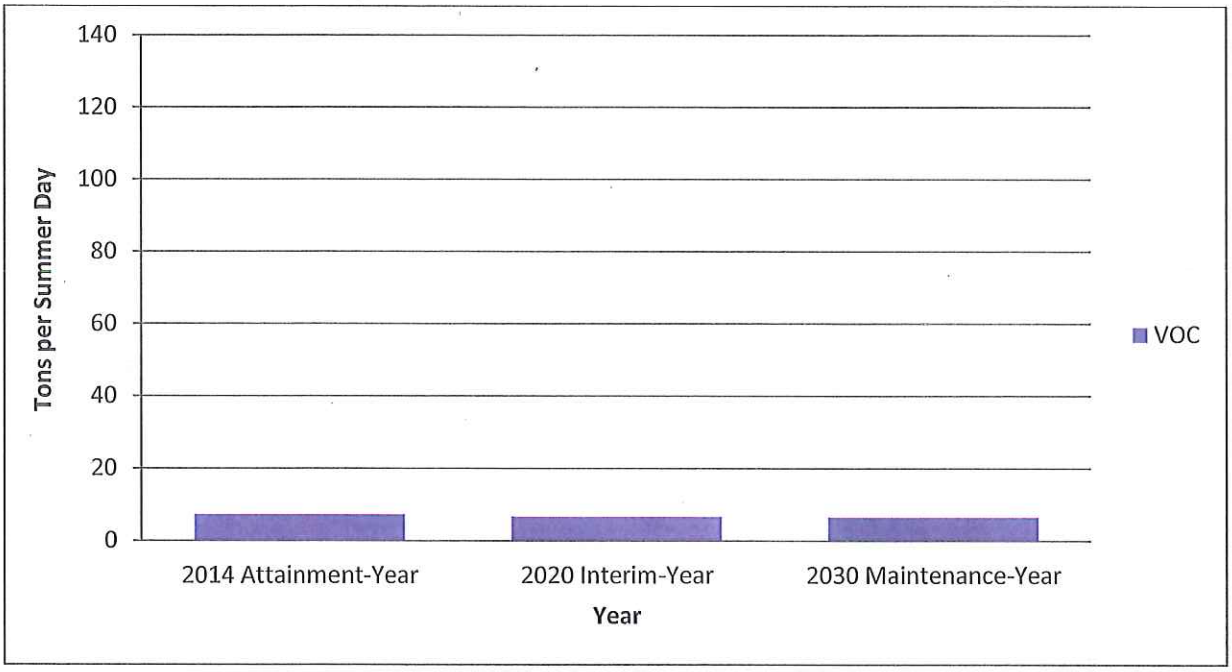
Graph 4.15: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Sources, Dearborn County, Indiana



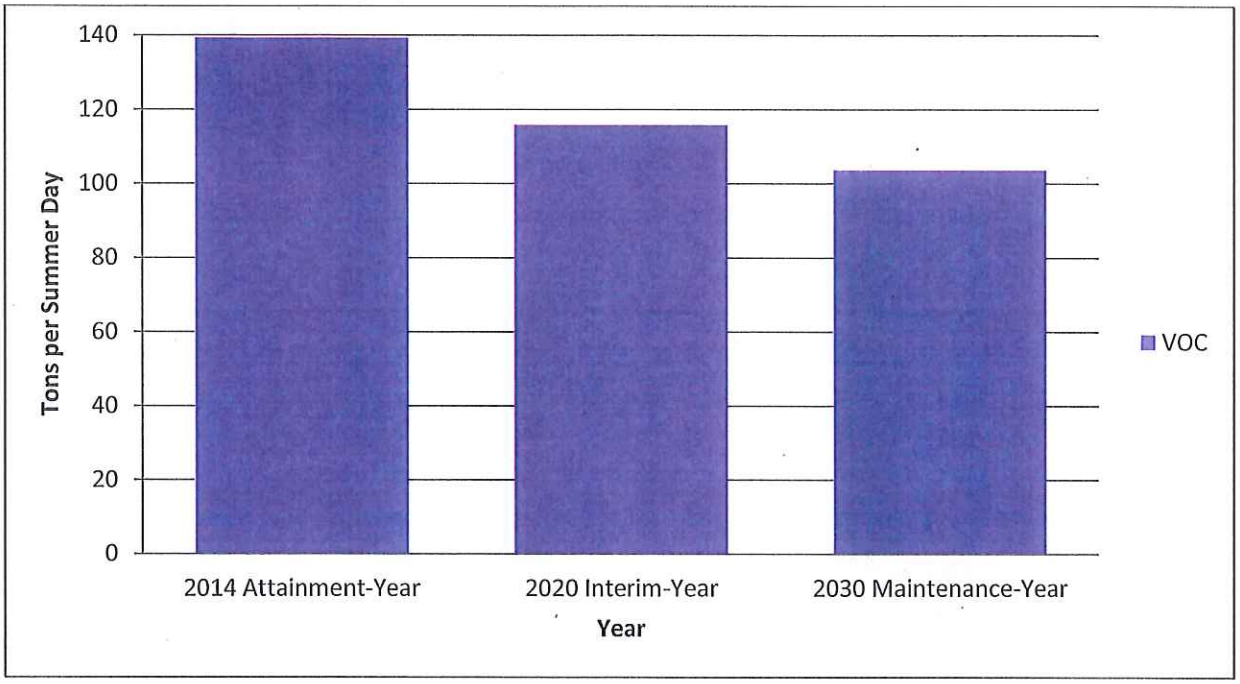
Graph 4.16: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Sources, Entire Nonattainment Area



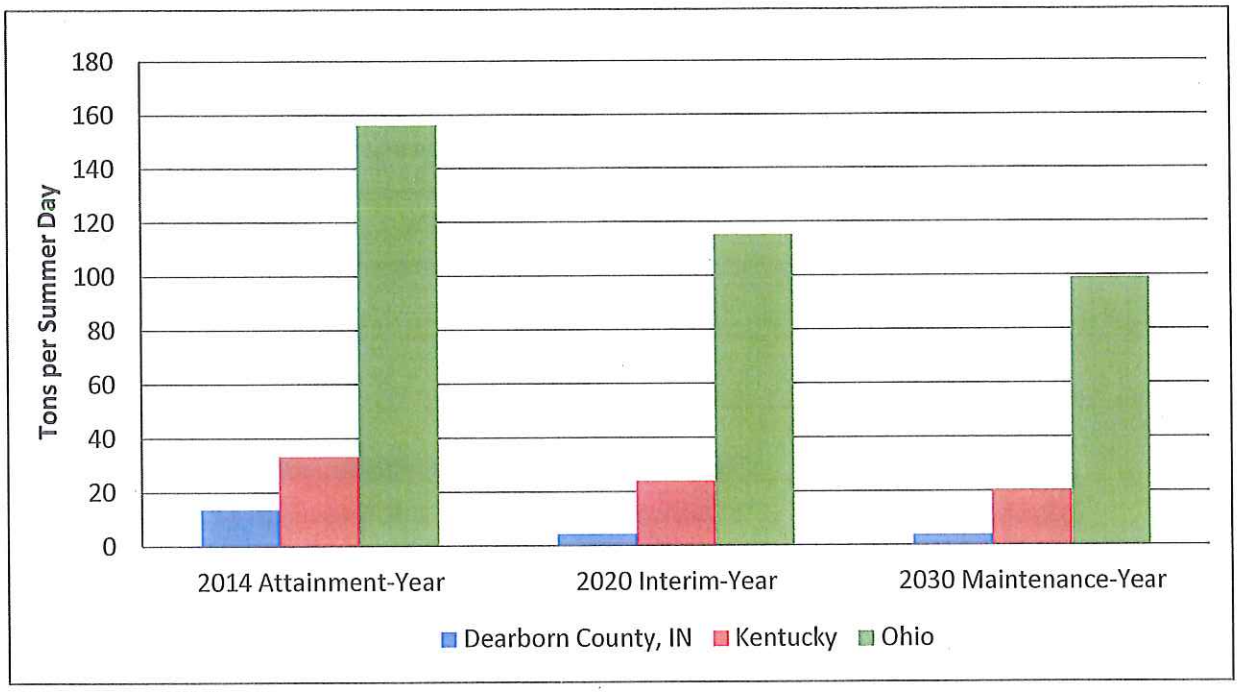
Graph 4.17: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Sources, Dearborn County, Indiana



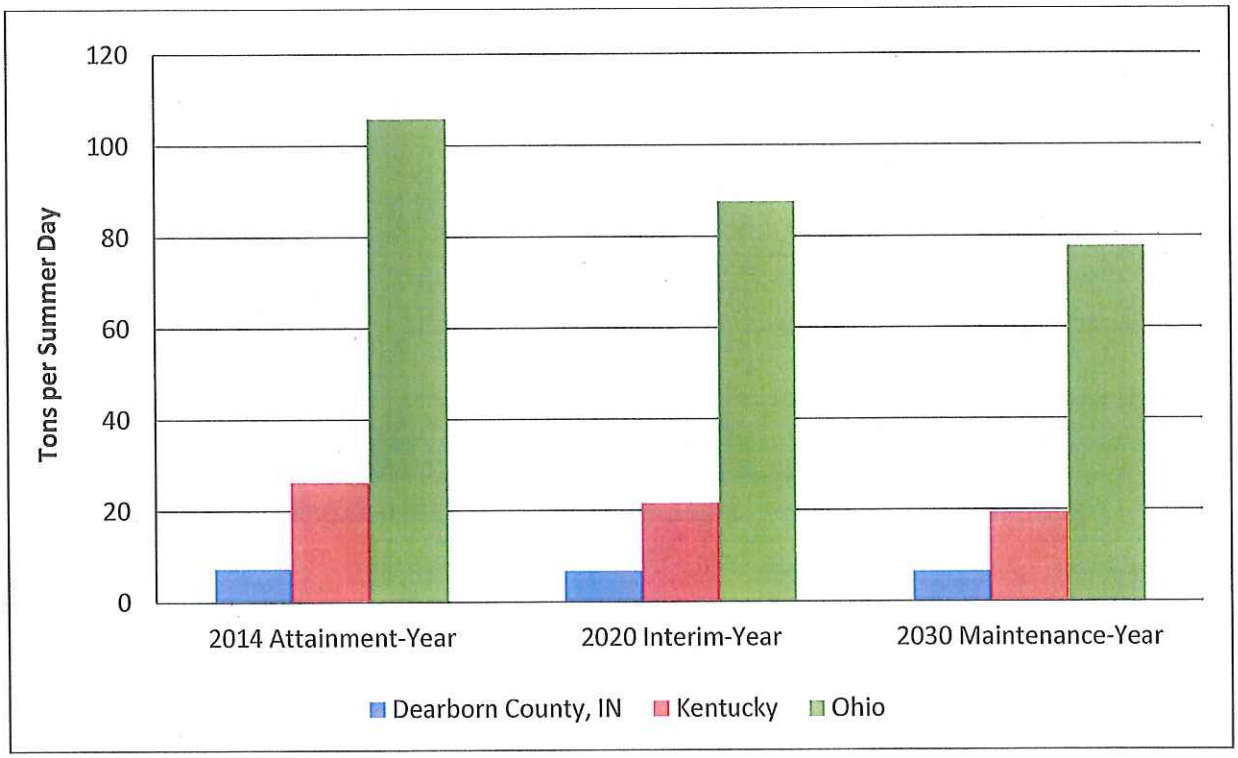
Graph 4.18: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Sources, Entire Nonattainment Area



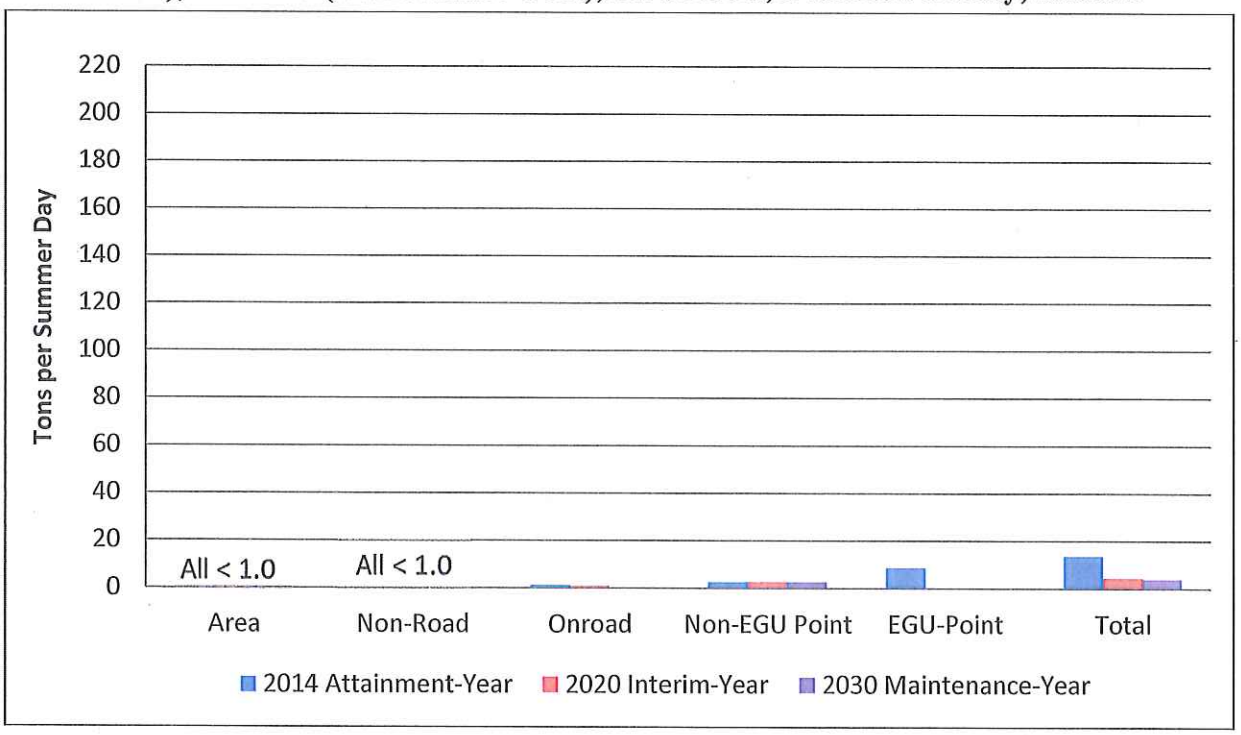
Graph 4.19: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Sources, Dearborn County Indiana, Kentucky, and Ohio



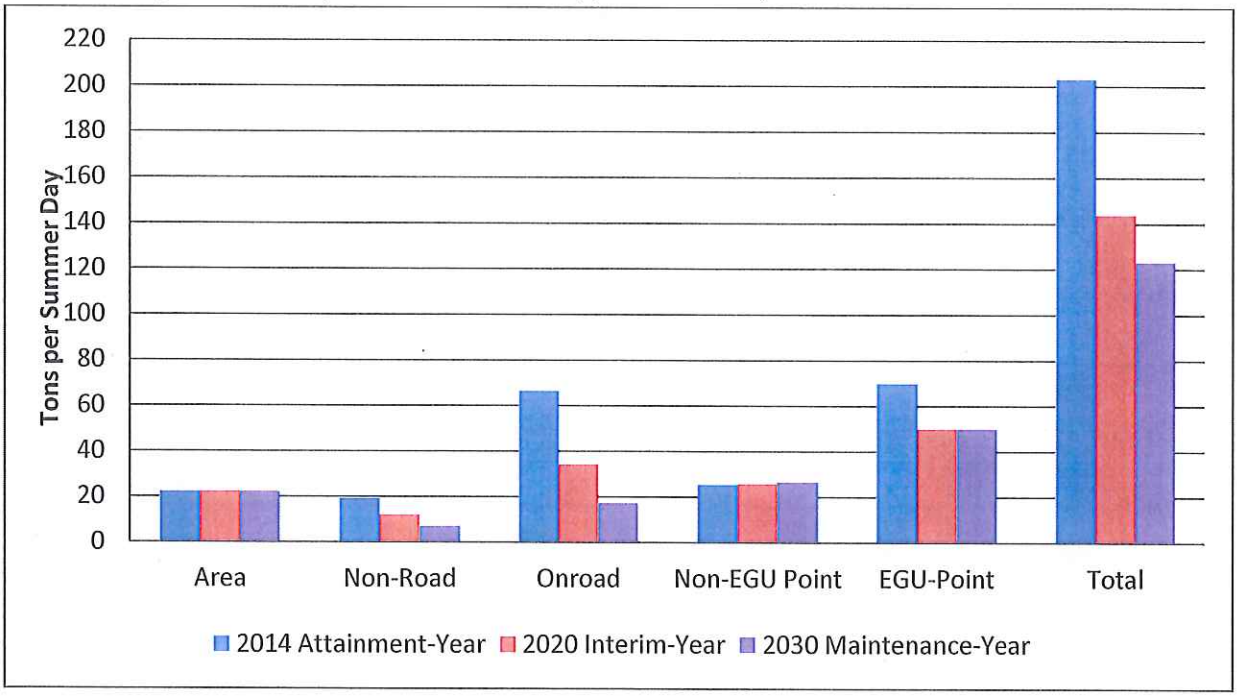
Graph 4.20: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Sources, Dearborn County Indiana, Kentucky, and Ohio



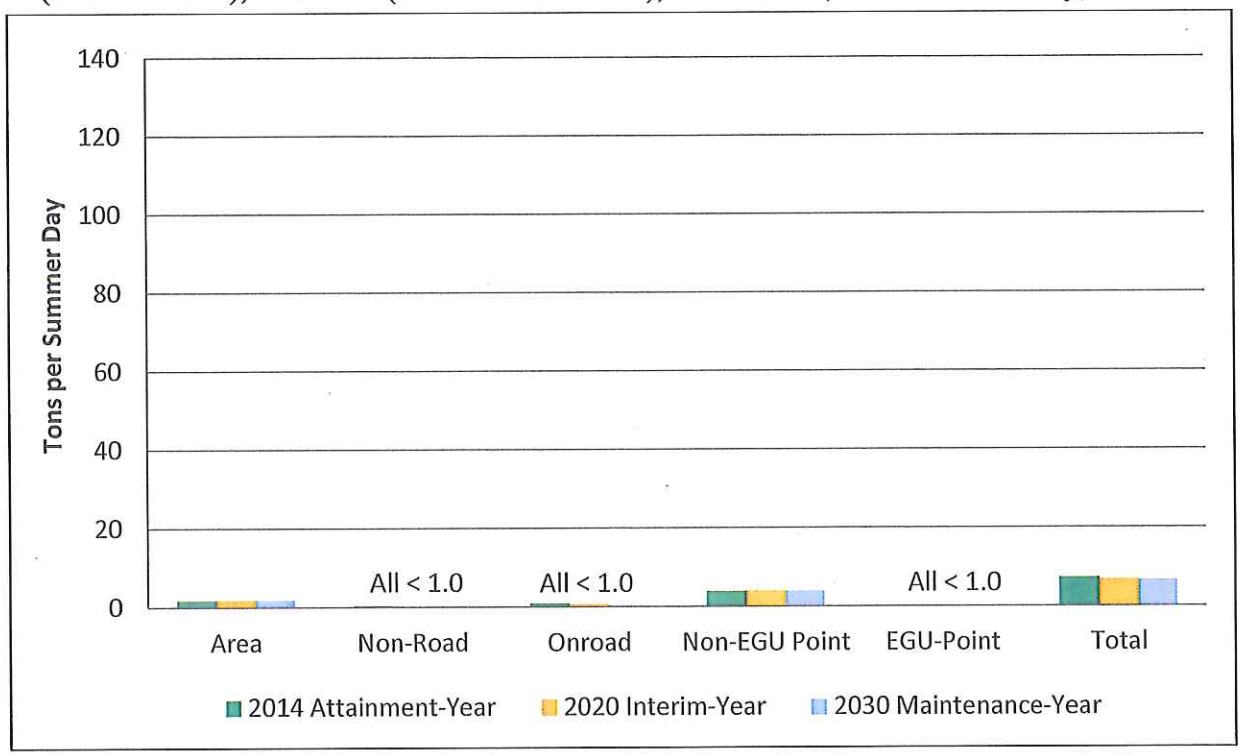
Graph 4.21: NO_x Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Dearborn County, Indiana



Graph 4.22: NO_x Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Entire Nonattainment Area



Graph 4.23: VOC Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Dearborn County, Indiana



Graph 4.24: VOC Emissions by Category and Year, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year), All Sources, Entire Nonattainment Area

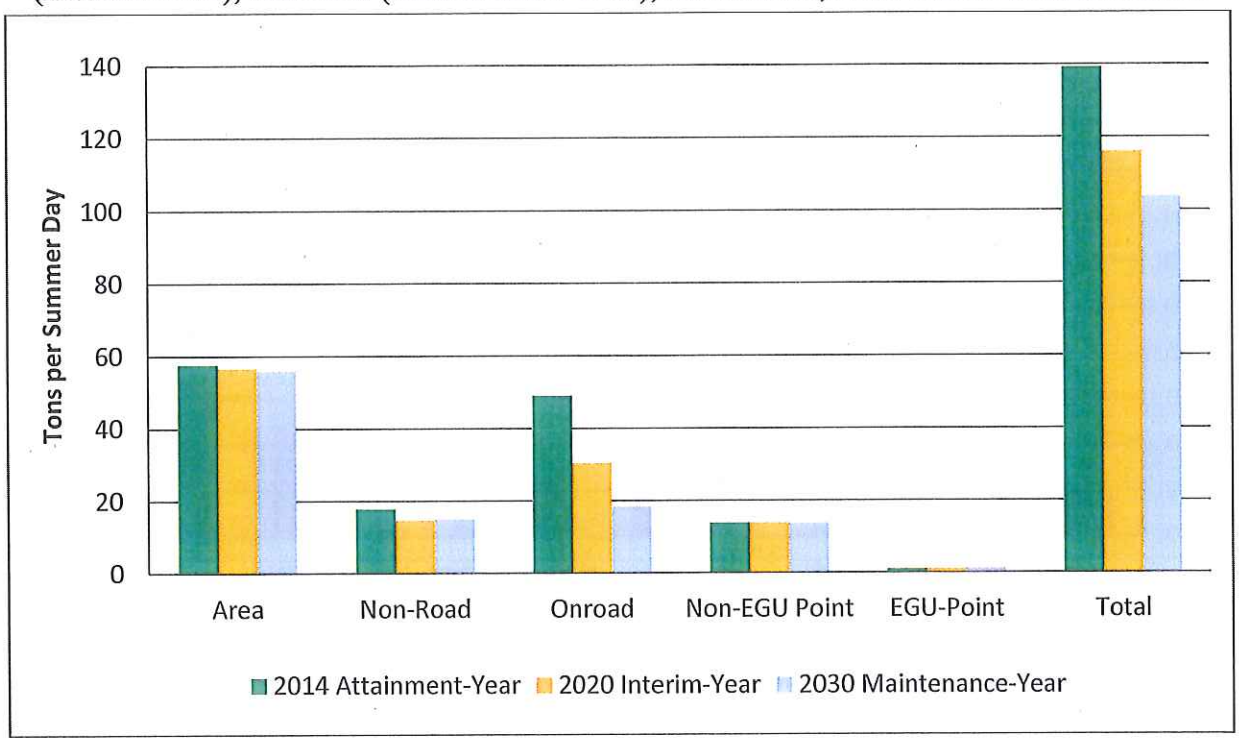


Table 4.1 compares estimated NO_x and VOC emissions for all sources for the years 2014 and 2030 for Dearborn County, Indiana. Table 4.2 compares estimated NO_x and VOC emissions for all sources for the years 2014 and 2030 for the entire nonattainment area. NO_x emissions within Dearborn County are projected to decline by 70.77% between 2014 and 2030 and by 39.40% in the entire nonattainment area. VOC emissions within Dearborn County are projected decline by 10.15% between 2014 and 2030 and by 25.54% in the entire nonattainment area. The decrease in emissions shown between the attainment-year (2014) and the maintenance-year (2030) in Tables 4.1 and 4.2 illustrates that continued maintenance of the 2008 8-hour ozone NAAQS is expected in Lawrenceburg Township, as well as the entire nonattainment area. Emission reduction benefits from major federal emission strategies, as outlined in Section 6.0 of this document, are factored into these changes. Further, due to implementation of the NO_x SIP Call, and subsequent CAIR and CSAPR programs, across the eastern United States, NO_x and ozone levels entering this area will continue to decline.

Table 4.1: Comparison of 2014 (Attainment-Year) and 2030 (Maintenance-Year) NO_x and VOC Emissions, All Sources, Dearborn County, Indiana (tons per summer day)

	2014	2030	Change	%Change
NO_x	13.72	4.01	-9.71	-70.77%
VOC	7.29	6.55	-0.74	-10.15%

Table 4.2: Comparison of 2014 (Attainment-Year) and 2030 (Maintenance-Year) NO_x and VOC Emissions, All Sources, Entire Nonattainment Area (tons per summer day)

	2014	2030	Change	%Change
NO_x	203.10	123.06	-80.04	-39.40%
VOC	139.26	103.69	-35.57	-25.54%

4.4 Demonstration of Maintenance

Ambient air quality data from all monitoring sites indicate that air quality in the Cincinnati-Hamilton, OH-KY-IN, nonattainment area met the 2008 8-hour ozone standard at the end of the 2014 ozone season. U.S. EPA's Redesignation Guidance (pg. 9) 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 emissions rates will not cause a violation of the NAAQS." Emission projections outlined in Section 4.0 of this document clearly illustrate that NO_x and VOC emissions in Dearborn County, Indiana, and the entire nonattainment area will continue to decline between 2014, the attainment –year, and 2030, the maintenance-year. Section 7.0 further discusses the implications of these emission trends and provides an analysis to support these conclusions. Therefore, air quality should meet the 2008 8-hour ozone standard through the projected years of 2020 and 2030. In Indiana, major point sources in all counties are required to submit air emissions information once every three (3) years or annually if the NO_x potential to emit is greater than 2,500 tons per year (tpy) or the VOC potential to emit is greater than 250 tons per year, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2017, 2020, and 2023, as necessary, to comply

with the inventory reporting requirements established in the CAA. Emissions information will be compared to the 2014 attainment-year and the 2030 projected maintenance-year inventories to assess emission trends, as necessary, to assure continued compliance with the 2008 8-hour ozone standard.

4.5 Permanent and Enforceable Emission Reductions

Permanent and enforceable emission reductions of NO_x and VOC have resulted in attainment of the 2008 8-hour standard for ozone. Some of these reductions were due to the application of RACT rules and some were due to the application of tighter federal standards on new vehicles. Also, Title IV of the CAA and the NO_x SIP Call, and subsequent CAIR and CSAPR programs, required the reduction of NO_x from utility sources. Covered sources are prohibited from reducing or removing emissions controls (anti-backsliding) following the redesignation of the area unless such a change is first approved by U.S. EPA as a revision to Indiana's SIP, consistent with Section 110(l) of the CAA. Section 6.0 identifies the emission control measures specific to Lawrenceburg Township, Dearborn County, Indiana, 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 (8) years after redesignation, an additional revision of the SIP. The revision will contain Indiana's plan for maintaining the national primary 2008 8-hour NAAQS for ozone for ten (10) years beyond the first ten (10) year period after redesignation, which will be 2040 in this case.

5.0 TRANSPORTATION CONFORMITY BUDGETS

U.S. EPA requirements outlined in 40 CFR 93.118(e)(4) stipulate that motor vehicle emissions budget(s) (MVEB[s]) for NO_x and VOC be established as part of a SIP. The MVEBs are necessary to demonstrate conformance of transportation plans and improvement programs with the SIP. A general summary of the 2014 MOVES methodology used in this area can be found in Appendix F. In addition, MOVES input and output files are being provided electronically with this submittal.

5.1 On-Road Emission Estimates

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) is the Metropolitan Planning Organization (MPO) for the Cincinnati-Hamilton OH-KY-IN, area that includes Dearborn County in Indiana; Butler, Clermont, Clinton, Hamilton, and Warren counties in Ohio; as well as, Boone, Campbell, and Kenton counties in Kentucky. This organization maintains a travel demand forecast model that is used to simulate traffic in the area and is used to predict what that traffic will be like in future years given growth expectations. The model is used mostly to identify where travel capacity will be needed and to determine the infrastructure requirements necessary to meet that need. It is also used to support the calculation of mobile source emissions. The travel demand forecast model is used to predict the total daily Vehicle Miles Traveled (VMT) and U.S. EPA's MOVES software program is used to calculate the emissions

per mile. The product of these two outputs, once combined, is the total amount of pollution emitted by on-road vehicles for the particular analyzed area.

5.2 Overview

Broadly described, MOVES is used to generate "emission factors," which are the average emissions per mile (grams/mile) for ozone precursors: NO_x and VOCs. 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 the vehicles are traveling on (MOVES facility-types are Freeway, Arterial, Local, and Ramp) and the vehicle speeds also affect the emission factors. Meteorological factors such as air temperature and humidity affect the emission factors, as does fuel type, such as low Reid Vapor Pressure gasoline. These data are estimated using the *best available data* to generate emission factors for appropriate ozone precursors, NO_x and VOC. After emission factors are generated, the emission factors must be multiplied by the VMT to determine the quantity of vehicle-related emissions. This information derives from the travel demand model (TDM). It should be noted that each year analyzed will have different emission factors, volumes, speeds, and likely some additional roadway links. MOVES input and output procedures can all be found in Appendix F.

5.3 Emission Estimates

Table 5.1 outlines the on-road emission estimates for the entire nonattainment area for the years 2011 (Base-Year), 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance Horizon Year). Emission estimates are based on the actual travel demand model network runs for the years 2011, 2014, 2020, and 2030. Table 5.2 outlines the on-road emission estimates for the Ohio and Indiana portions of the nonattainment area for the same years.

Table 5.1: Emission Estimates for On-Road Mobile Sources for the Entire Nonattainment Area (NA) with Lawrenceburg Township Breakout (tons per summer day)

Cincinnati-Hamilton OH-KY-IN NA Area	2011	2014	2020	2030
NO_x	86.57	64.07	32.97	16.79
VOC	64.37	47.89	29.64	17.83
Lawrenceburg Township (Dearborn County Indiana) subtotal				
NO_x	1.03	0.74	0.40	0.21
VOC	0.86	0.64	0.40	0.24
Lawrenceburg Township Percent Contribution				
NO_x (percent of total)	1.19%	1.16%	1.21%	1.25%
VOC (percent of total)	1.34%	1.34%	1.35%	1.35%

Table 5.2: Emission Estimates for On-Road Mobile Sources for the Ohio and Indiana Portions of the Nonattainment Area with Lawrenceburg Township Breakout (tons per summer day)

Ohio and Indiana Portions of the NA Area	2011	2014	2020	2030
NO_x	68.85	50.03	26.77	14.10
VOC	55.90	41.39	26.10	15.84
Lawrenceburg Township (Dearborn County Indiana) subtotal				
NO_x	1.03	0.74	0.40	0.21
VOC	0.86	0.64	0.40	0.24
Lawrenceburg Township Percent Contribution				
NO_x (percent of total)	1.50%	1.48%	1.49%	1.49%
VOC (percent of total)	1.54%	1.55%	1.53%	1.52%

Table 5.3 contains the 2020 and 2030 regional MVEBs for the Ohio and Indiana portions of the nonattainment area.

Table 5.3: Motor Vehicle Emission Budgets for the Ohio and Indiana Portions of the Nonattainment Area (tons per summer day)

	2020	2030
NO_x	30.79	16.22
VOC	30.02	18.22

This document creates an interim-year budget for 2020 and a horizon year budget for 2030 for the Ohio and Indiana portions of the nonattainment area. These budgets are based on the 2011 onroad emission inventory used to support photochemical modeling for the same year, and has incorporated a fifteen (15) percent safety margin as described below.

In an effort to accommodate future variations in TDMs and vehicle miles traveled forecast when no change to the network is planned, Indiana consulted with the interagency consultation group, including U.S. EPA – Regions IV and V, to determine a reasonable approach to address this variation. Based on this discussion, a fifteen (15) percent safety margin was approved and has been added to the MVEBs for the Ohio and Indiana portions of the nonattainment area. A fifteen (15) percent safety margin is appropriate because: 1) there is an acknowledged potential variation in VMT forecast and potential estimated mobile source emissions due to expected modifications to TDM and mobile emissions models; and 2) the total decrease in emissions from all sources is sufficient to accommodate this fifteen (15) percent allocation of safety margin to mobile sources while still continuing to maintain total emissions in the Cincinnati-Hamilton OH-KY-IN area well below the 2014 attainment level emissions. This fifteen (15) percent safety margin was calculated by adding a straight-line fifteen (15) percent to the mobile source emission estimates for the years 2020 and 2030. The safety margin, as defined by the conformity rule, looks at the total emissions from all sources in the nonattainment area. The actual allocation is less than fifteen (15) percent of the total emission reduction from all sources as can be seen from Table 4.2.

In summary, for the Ohio and Indiana portions of the nonattainment area, the MVEBs safety margin allocations translate into:

- An allocation of 4.02 tons per summer day for NO_x and 3.92 tons per summer day for VOC for 2020; and,
- An allocation of 2.12 tons per summer day for NO_x and 2.38 tons per summer day for VOC for 2030.

40 CFR 93.101 defines safety margin as the amount by which the total projected emissions from all sources of a given pollutant area 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 Cincinnati-Hamilton OH-KY-IN area as detailed in Table 4.2.

While Indiana believes that this is sufficient to support the requested increase, Indiana and its partners will be conducting additional air quality modeling which will include the adjusted on-road mobile emissions, as well as any additional corrections and modifications that may be necessary due to the constant review and evaluation of the model inputs. Appendix F of this document provides a detailed description of how the MVEBs were established, as well as documentation of the consultation and coordination process among the effected environmental and transportation planning agencies in establishing the budgets.

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in Lawrenceburg Township, Dearborn County, Indiana, including CAA requirements and additional state or local measures implemented beyond CAA requirements.

6.1 Reasonably Available Control Technology (RACT) and other State Volatile Organic Compound (VOC) Rules

As required by Section 172 of the CAA, Indiana has promulgated several rules requiring RACT for emissions of VOCs since the mid-1990s. In addition, other statewide rules for controlling VOCs have also been promulgated. The Indiana VOC rules are found in 326 IAC 8. The following is a listing of statewide rules that assist with the reduction of VOCs in the state:

326 IAC 8-1-6	New facilities; general reduction requirements
326 IAC 8-2	Surface Coating Emission Limitations
326 IAC 8-3	Organic Solvent Degreasing Operations
326 IAC 8-4	Petroleum Sources
326 IAC 8-5	Miscellaneous Operations
326 IAC 8-6	Organic Solvent Emission Limitations
326 IAC 8-10	Automobile Refinishing
326 IAC 8-14	Architectural and Industrial Maintenance (AIM) Coatings
326 IAC 8-15	Standards for Consumer and Commercial Products

Additional rules specifically applicable to Lawrenceburg Township, Dearborn County, Indiana, are summarized in Section 6.4.11.

6.2 Implementation of Past State Implementation Plan (SIP) Revisions

Lawrenceburg Township, Dearborn County, was not required to develop an Attainment Demonstration SIP for the 1-hour ozone standard. Lawrenceburg Township was designated nonattainment for ozone under the 1997 8-hour standard on April 15, 2004. Since that time, Lawrenceburg Township has attained the 1997 8-hour ozone standard and was redesignated to attainment on May 11, 2010. Therefore, no further SIP revisions are required under the 1997 8-hour ozone standard.

6.3 Nitrogen Oxides (NO_x) Rule[5]

On October 27, 1998, U.S. EPA established the NO_x SIP Call, which required 22 states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana adopted this rule in 2001. Beginning in 2004, this rule accounts for a reduction of approximately thirty-one percent (31%) of all NO_x emissions statewide, compared to the previous uncontrolled years.

These rules were also adopted by 21 other states, which have resulted in significant reductions occurring within Indiana and regionally due to the number of affected units within the region. The historical trend charts show that air quality has improved due to the decreased emissions resulting from this program and for EGUs. The EGU portion of the NO_x SIP Call has been replaced by CAIR and now CSAPR, but continues to result in NO_x controls.

On April 21, 2004, U.S. EPA published Phase II of the NO_x SIP Call that established a budget for large (emissions of greater than one ton per day) stationary internal combustion engines. In Indiana the rule decreased NO_x emissions statewide from natural gas compressor stations by 4,263 tons during May through September. The Indiana Phase II NO_x SIP Call rule became effective in 2006 and implementation began in 2007 (326 IAC 10-5).

6.4 Measures Beyond Clean Air Act (CAA) Requirements

Reductions in ozone precursor emissions have occurred, or are anticipated to occur, as a result of state and federal control programs. These additional control measures are summarized below.

6.4.1 Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards[6]

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light duty trucks, including sport utility vehicles (SUVs). This rule required automakers to produce cleaner cars and refineries to make cleaner, lower sulfur gasoline. This rule was phased in between 2004 and 2009 and resulted in a 77% decrease in NO_x emissions from passenger cars, an 86% decrease from smaller SUVs, light duty trucks, and minivans, and a 65% decrease from larger SUVs, vans, and heavier duty trucks. This rule also resulted in a 12% decrease in VOC emissions from passenger cars, an 18% decrease from smaller SUVs, light duty trucks, and minivans, and a 15% decrease from larger SUVs, vans, and heavier duty trucks.

6.4.2 Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards[7]

In March 2014, U.S. EPA finalized a federal rule to further strengthen Tier II vehicle emission and fuel standards. This rule will require automakers to produce cleaner vehicles and refineries to make cleaner, lower sulfur gasoline. This rule will be phased in between 2017 and 2025. Tier III requires all passenger vehicles to meet an average standard of 0.03 gram/mile of NO_x. Compared to Tier II, the Tier III tailpipe standards for light-duty vehicles are expected to reduce

[5] http://www.gpo.gov/fdsys/pkg/FR-1998-10-27/pdf/98-26773.pdf
[6] http://www.gpo.gov/fdsys/pkg/FR-2000-02-10/pdf/00-19.pdf
[7] http://www.gpo.gov/fdsys/pkg/FR-2014-04-28/pdf/2014-06954.pdf

NO_x and VOC emissions by approximately 80%. Tier III vehicle standards also include evaporative standards using onboard diagnostics that will result in a 50% reduction in VOC emissions compared to Tier II reductions. The rule reduces the sulfur content of gasoline to 10 ppm, beginning in January 2017.

6.4.3 Heavy-Duty Diesel Engines[8]

In January 2001, U.S. EPA issued a final rule for Highway Heavy-Duty Engines, a program that includes low-sulfur diesel fuel standards. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule was phased in from 2004 - 2007 and resulted in a 40% decrease in NO_x emissions from diesel trucks and buses.

6.4.4 Clean Air Non-road Diesel Rule[9]

In May 2004, U.S. EPA issued the Clean Air Non-road Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard similar to the highway diesel program. The engine standards for non-road engines took effect in 2008 and resulted in a 90% decrease in sulfur dioxide (SO_2) emissions from non-road diesel engines. Sulfur levels were also reduced in non-road diesel fuel by 99.5% from approximately 3,000 ppm to 15 ppm.

6.4.5 Non-road Spark-Ignition Engines and Recreational Engine Standards[10]

Effective in January 2003, this standard regulates NO_x, VOCs, and carbon monoxide (CO) for groups of previously unregulated non-road engines. This 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. When all of the non-road spark-ignition engines and recreational engine standards are fully implemented, an overall 80% reduction in NO_x, 72% reduction in VOC, and 56% reduction in CO emissions are expected by 2020.

6.4.6 Reciprocating Internal Combustion Engine Standards[11]

This standard, was effective May 2010, and regulates emissions of air toxics 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) that are located at a major source of air toxics emissions and that were installed prior to June 12, 2006; (2) used at major sources of air toxics, having a site rating of less than or equal to 500 horsepower and were constructed or reconstructed before

---

[8] http://www.gpo.gov/fdsys/pkg/FR-2001-01-18/pdf/01-2.pdf
[9] http://www.gpo.gov/fdsys/pkg/FR-2004-06-29/pdf/04-11293.pdf
[10] http://www.gpo.gov/fdsys/pkg/FR-2002-11-08/pdf/02-23801.pdf
[11] http://www.gpo.gov/fdsys/pkg/FR-2010-03-03/pdf/2010-3508.pdf

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 were constructed or reconstructed before December 19, 2002.

Operators of existing engines were required to: (1) install emission 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. These engine standards took effect in 2013. According to U.S. EPA estimates, this rule has resulted in emission reductions from existing diesel-powered stationary reciprocating internal combustion engines of approximately 1,000, 2,800, and 27,000 tpy of air toxics, fine particles ($PM_{2.5}$), and CO, respectively.

6.4.7 Category 3 Marine Diesel Engine Standards[12]

This standard, was effective in June 2010, and promulgated 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 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, which took effect in 2011, and long-term standards requiring an 80% reduction in NO_x emissions that 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.

6.4.8 Clean Air Interstate Rule (CAIR)/Cross State Air Pollution Rule (CSAPR)[13]

On May 12, 2005, U.S. EPA published the following regulation: "Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (CAIR); Revisions to Acid Rain Program; Revisions to the NO_x SIP Call; Final Rule." 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 in order to meet federal requirements. The purpose of CAIR was to reduce interstate transport of $PM_{2.5}$, SO_2, and ozone precursors (NO_x).

---

[12] http://www.gpo.gov/fdsys/pkg/FR-2010-04-30/pdf/2010-2534.pdf
[13] http://www.epa.gov/crossstaterule/actions.html

CAIR applied to any stationary, fossil fuel-fired boiler or stationary, fossil fuel-fired combustion turbine, or a generator with a nameplate capacity of more than 25 megawatt electrical (MWe) producing electricity for sale. This rule provided annual state caps for NO_x and SO_2 in two phases, with Phase I caps for NO_x and SO_2 taking effect in 2009 and 2010, respectively. Phase II caps were to become effective in 2015. U.S. EPA allowed limits to be met through a cap and trade program if a state chose to participate in the program. SO_2 emissions from power plants in the 28 eastern states, as well as Washington D.C subject to CAIR were to be cut by 4.3 million tons from 2003 levels by 2010 and 5.4 million tons from 2003 levels by 2015. NO_x emissions were to be cut by 1.7 million tons by 2009 and reduced by an additional 1.3 million tons by 2015. In response to U.S. EPA's rulemaking, Indiana adopted a state rule in 2006 based on the model federal rule (326 IAC 24-1, 326 IAC 24-2, and 326 IAC 24-3). Indiana's rule included annual and seasonal NO_x trading programs, and an annual SO_2 trading program. This rule required compliance effective January 1, 2009.

In July 2008, the D.C. Circuit court vacated CAIR and issued a subsequent remand without vacatur of CAIR in December 2008. The court then directed U.S. EPA to revise or replace CAIR in order to address the deficiencies identified by the court. On July 6, 2011, U.S. EPA finalized CSAPR as a replacement for CAIR. On August 21, 2012, the U.S. Court of Appeals for the D.C. Circuit vacated CSAPR and directed U.S. EPA to continue administering CAIR "pending the promulgation of a valid replacement." In a subsequent decision on the merits, the Court vacated CSAPR based on a subset of petitioners' claims, but on April 29, 2014, the U.S. Supreme Court reversed that decision and remanded the case to the D.C. Circuit court for further proceedings. Throughout the initial round of D.C. Circuit proceedings and the ensuing U.S. Supreme Court proceedings, the stay remained in place and U.S. EPA had continued to implement CAIR. In order to allow CSAPR to replace CAIR in an equitable and orderly manner while further D.C. Circuit Court proceedings were held to resolve petitioner's remaining claims, U.S. EPA filed a motion asking the D.C. Circuit Court to lift the stay. U.S EPA also asked the court to toll all CSAPR compliance deadlines that had not passed as of the date of the stay order by three years. On October 23, 2014, the Court granted U.S. EPA's motion. CSAPR became effective on January 1, 2015, for SO_2 and annual NO_x, and May 1, 2015 for ozone season NO_x. When combined with other final state and U.S. EPA actions it will reduce power plant SO_2 emissions by 73% and NO_x emissions by 54% from 2005 levels in the CSAPR region, which includes the states of Indiana, Kentucky, and Ohio.

6.4.9 Oil and Natural Gas Industry Standards[14]

This standard was issued on April 17, 2012, and regulates VOC and air toxic emissions from hydraulically fractured natural gas wells and also includes requirements for several other sources of pollution in the oil and natural gas industry that were previously unregulated in the United States. U.S. EPA estimates that these standards will apply to approximately 11,400 new natural gas wells hydraulically fractured each year and an additional 1,400 existing natural gas wells refractured annually. These standards took effect in 2015. According to U.S. EPA estimates, this rule has resulted in emission reductions of VOC and air toxics of approximately 190,000 to 290,000 tpy and 12,000 to 20,000 tpy respectively since the rule was fully implemented last year.

[14] http://www.gpo.gov/fdsys/pkg/FR-2012-08-16/pdf/2012-16806.pdf

6.4.10 Mercury and Air Toxic Standards[15] [16]

This standard was effective in April 2012, and regulates emissions of mercury, acid gases, and non-mercury metallic toxic pollutants from new and existing coal and oil-fired EGUs. U.S. EPA estimates that this rule will apply to approximately 1,100 coal-fired and 300 oil-fired EGUs at 600 power plants in the U.S. According to U.S. EPA, most facilities will comply with these standards through a range of strategies, including the use of existing emission controls, upgrades to existing emission controls, installation of new pollution controls, and fuel switching.

Following promulgation of the rule, U.S. EPA received petitions for reconsideration of various provisions of the rule, including requests to reconsider the work practice standards applicable during startup periods and shutdown periods. U.S. EPA granted reconsideration of the startup and shutdown provisions as no opportunity to comment was provided to the public regarding the work practice requirements contained in the final rule. On November 30, 2012, U.S. EPA published a proposed rule reconsidering certain new source standards and startup and shutdown provisions in MATS. U.S. EPA proposed certain minor changes to the startup and shutdown provisions contained in the 2012 final rule based on information obtained in the petitions for reconsideration. On April 24, 2013, U.S. EPA took final action on the new source standards that were reconsidered and also the technical corrections contained in the November 30, 2012, proposed action. U.S. EPA did not take final action on the startup and shutdown provisions and, on June 25, 2013, added new information and analysis to the docket and reopened the public comment period for the proposed revisions. U.S. EPA took final action on the remaining topics open for reconsideration on November 19, 2014. The compliance date for existing sources was April 16, 2015, while the compliance date for new sources was April 16, 2012.

On November 25, 2014, the U.S. Supreme Court accepted several challenges to the rules brought by the utility industry and a coalition of nearly two dozen states. On June 29, 2015, the U.S. Supreme Court ruled that U.S. EPA did not properly account for compliance costs when crafting the MATS rule and remanded the decision to the D.C. Circuit Court for reconsideration. On November 20, 2015, after assessing costs in several different ways, U.S. EPA is proposing to find that considering costs does not alter the determination that it is appropriate to regulate the emissions of toxic air pollution from power plants in response to a decision by the U.S. Supreme Court.

6.4.11 Controls Specific to Lawrenceburg Township, Dearborn County, Indiana

As the result of a settlement with U.S. EPA to resolve violations of the CAA's NSR requirements, AEP permanently retired its entire Tanners Creek Generating Station located in Lawrenceburg Township, Dearborn County (i.e. all four coal-fired electric generating units) on June 1, 2015. As a result of the closure of this facility, ozone precursor emissions (NO_x and VOC) in Dearborn County, Indiana, will decrease significantly, helping to further improve air quality in the Cincinnati-Hamilton, OH-KY-IN, nonattainment area.

[15] http://www.gpo.gov/fdsys/pkg/FR-2012-02-16/pdf/2012-806.pdf,
[16] .http://www.epa.gov/mats/actions.html

6.5 Controls to Remain in Effect

Indiana 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 NO_x or VOC sources, as required for maintenance of the 8-hour ozone standard in Lawrenceburg Township, Dearborn County, Indiana. Indiana, through IDEM's Office of Air Quality (OAQ) 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, IDEM intends to continue enforcing all rules that relate to the emission of ozone precursors in Lawrenceburg Township, Dearborn County, Indiana.

6.6 New Source Review (NSR) Provisions[17]

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

Any facility that is not listed in the 2014 emission inventory, or for which emission reduction credit through closing 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 Cincinnati nonattainment area is redesignated to attainment, OAQ will implement NSR for major sources through the PSD program, which requires an air quality analysis to evaluate whether the new source will threaten the NAAQS.

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

7.0 MODELING ANALYSIS

7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings

Although U.S. EPA's Redesignation Guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering the Cincinnati, OH-KY-IN, area to determine the effect of national emission control strategies on ozone levels. This area includes Lawrenceburg Township in Dearborn County, Indiana. These modeling analyses determined that this area was significantly impacted by ozone and ozone

[17] https://www.federalregister.gov/articles/2004/05/20/04-11337/approval-and-promulgation-of-implementation-plans-indiana

precursor transport and regional NO_x reductions will help the area attain the 2008 8-hour ozone NAAQS of 0.075 ppm.

7.2 U.S. EPA Modeling Analysis for Interstate Transport "Good Neighbor" Provision

U.S. EPA conducted modeling for the Interstate Transport "Good Neighbor" Provision. This analysis was performed in 2014 and included in the "Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment" to assist states in developing "Good Neighbor SIPs," as required by the CAA to address interstate transport of air pollution that affects downwind states' ability to attain and maintain the 2008 8-hour ozone NAAQS. Some of the major federal emission strategies included in the modeling are: National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Reciprocating Internal Combustion Engines (RICE), NESHAPs for cement manufacturing plants, the Boiler Maximum Achievable Control Technology (MACT) rule, the Energy Independence and Security Act (EISA) renewable fuel standard mandate, New Source Performance Standards (NSPS) for VOC controls, the Mobile Source Air Toxics rule, Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards, Emission Standards for Locomotives and Marine Compression-Ignition Engines, and the Non-road Spark-Ignition Engines and Recreational Engine Standards.

This modeling was conducted to identify monitoring sites that may have difficulty attaining the 2008 8-hour Ozone NAAQS in 2018 and identify states that were contributing to attainment issues at a given monitoring site. The air quality model used for this rulemaking was the Comprehensive Air Quality Model with Extensions (CAMx) version 6.10. The modeling domain consisted of a 12 kilometer (km) x 12 km coarse grid covering the continental United States and portions of Canada and Mexico and 25 vertical layers from the surface up through the troposphere to a height of 50 millibars of pressure. Base-year 2011 emissions were modeled. Meteorology from 2011 was created using the Weather Research Forecasting (WRF) Model version 3.4 and was used for the base case and projected year modeling runs. More detailed information on the CAMx input file and additional data used for the photochemical modeling can be found in U.S. EPA's "Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment," dated January 2015.

Table 7.1 shows the results of U.S. EPA's "Good Neighbor" Provision modeling for ozone impacts at the ozone monitors in the Cincinnati area. The monitor identification number, county, and state locations are listed, as well as the 2009-2013 8-hour ozone base period average design values that were used to calculate 2018 projected average design values. Note that the 2009-2013 average design values were calculated by averaging the three 3-year design values from 2009-2011, 2010-2012, and 2011-2013.

Model results are used in a relative rather than absolute sense. Relative use of the model results calculates the fractional change in maximum concentrations based on two different emission scenarios, 2011 NEI emissions and 2018 projected emissions for this exercise. This fractional change, also known as a relative response factor (RRF), can be applied to each monitor's average base period design value to determine ozone impacts. This approach differs from using the absolute or actual modeled result, which may show under- or over-predictions with the actual monitored values. The 2009–2013 average design values were multiplied by the corresponding

RRF to determine all 2018 projected average design values. As can be seen in Table 7.1, the results show all modeled 8-hour ozone design values in the entire Cincinnati nonattainment area are projected to be well below the 2008 8-hour ozone standard of 0.075 ppm.

Table 7.1: Comparison of Cincinnati Area Average Design Values with U.S. EPA "Good Neighbor" Provision Modeling Results (Values in Parts Per Million)

Monitor ID	County	State	Monitored Average Design Value 2009 – 2013 Base Period	U.S. EPA Projected Average Design Value 2018 Base Case
39-017-0004	Butler	OH	0.0770	0.0700
39-017-0018	Butler	OH	0.0797*	0.0709
39-017-9991	Butler	OH	0.0770**	0.0676
39-025-0022	Clermont	OH	0.0787	0.0679
39-027-1002	Clinton	OH	0.0787	0.0671
39-061-0006	Hamilton	OH	0.0820	0.0732
39-061-0010	Hamilton	OH	0.0763	0.0678
39-061-0040	Hamilton	OH	0.0787	0.0708
39-165-0007	Warren	OH	0.0777	0.0676
21-015-0003	Boone	KY	0.0680	0.0598
21-037-3002	Campbell	KY	0.0767	0.0685

* Represents an average of two design values (2010 – 2012 and 2011 – 2013)
** Represents one design value (2011 – 2013)

U.S. EPA updated this modeling in August 2015 to reflect the requirement of 3 full ozone seasons to demonstrate compliance with the 2008 8-hour ozone NAAQS. This changed the projection year to 2017, with the base-year remaining 2011. Details on the emission projections for the projection year 2017 are provided in the "Notice of Availability of the Environmental Protection Agency's Updated Ozone Transport Modeling Data for the 2008 Ozone National Ambient Air Quality Standard", released in August 2015. The air quality modeling results were released in August 2015 in the "Updated Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment." Table 7.2 shows the modeled results for all the Cincinnati area ozone monitors.

Table 7.2: Comparison of Cincinnati Area Average Design Values with U.S. EPA "Good Neighbor" Provision 2017 Modeling Results

Monitor ID	County	State	Monitored Average Design Value 2009 – 2013 Base Period	U.S. EPA-Projected Average Design Value 2017 Base Case
39-017-0004	Butler	OH	0.0770	0.0715
39-017-0018	Butler	OH	0.0797*	0.0730
39-017-9991	Butler	OH	0.0770**	0.0701
39-025-0022	Clermont	OH	0.0787	0.0710
39-027-1002	Clinton	OH	0.0787	0.0697
39-061-0006	Hamilton	OH	0.0820	0.0763
39-061-0010	Hamilton	OH	0.0763	0.0703
39-061-0040	Hamilton	OH	0.0787	0.0731
39-165-0007	Warren	OH	0.0777	0.0702
21-015-0003	Boone	KY	0.0680	0.0626
21-037-3002	Campbell	KY	0.0767	0.0714

* Represents an average of two design values (2010-2012 and 2011-2013)
** Represents one design value (2011-2013)

Table 7.2 shows that only one monitor, 39-061-0006, models non-attainment in 2017. However, this monitor does model attainment in 2018. Furthermore, if the base period were change to 2010-2014 or 2011-2015, this monitor would model attainment in 2017, using the relative reduction factor obtained from the 2009-2013 base period modeling (0.0763/0.082 = 0.93). The monitor has a 2010-2014 design value of 0.080 ppm, and a 2011-2015 design value of 0.075 ppm. Applying a relative reduction factor of 0.93 to these design values gives a 2017 design value of 0.0744 ppm (2010-2014 base period) and 0.0697 ppm (2011-2015 base period) These values are well below the 2008 Ozone NAAQS.

7.3 LADCO Modeling for 8-Hour Ozone Standard

The Lake Michigan Air Directors Consortium (LADCO) performed photochemical modeling for ozone that, used the most recent emissions inventories and model updates. This modeling was performed to support attainment demonstrations for the six-state LADCO region. The photochemical model used by LADCO and Indiana for the 8-hour ozone standard analysis is CAMx version 6.11 that was developed by Environ. This model has been accepted by U.S. EPA as an approved air quality model for regulatory analysis and attainment demonstrations. Requirements of 40 CFR 51.112, as well as the "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS" (EPA-454/R-05-002, Oct. 2005), are satisfied with the use of CAMx for attainment demonstrations. Meteorology from 2011, as well as 2011 base-year emissions (based on legally enforceable emission controls required by consent decrees, state rules, or permit), was used to conduct this modeling. The base period average design values for attainment purposes were calculated from the periods 2009 – 2011, 2010 – 2012, and 2011 – 2013. The projected year modeled was 2018.

Table 7.3 shows that modeled ozone concentrations in the Cincinnati area for 2018 will be below the 8-hour ozone standard of 0.075 ppm. As shown in Table 7.2 above, the current 2010-2014 average design values decreased from the 2009-2013 average design values, with the exception of the Campbell County, Kentucky monitor, which increased by 0.005 ppm. At the other monitors, where the design values have decreased, the projected average design values would be lower than the LADCO modeling results using the latest average design values. For the Campbell County, Kentucky monitor, the projected average design value was well below the 2008 8-hour ozone NAAQS at 0.0719 ppm. As with U.S. EPA's modeling, even if the LADCO modeling was performed using the slightly higher 2010 – 2014 average design value, it is expected that the 2018 projected average design value would still be well below the standard for the Campbell County monitor.

Table 7.3: LADCO's Modeling Results for the Cincinnati Area (Values in Parts per Million)

Monitor ID	County	State	Monitored Average Design Value 2009 – 2013 Base Period	LADCO-Projected Average Design Value 2018 Base Case
39-017-0004	Butler	OH	0.0770	0.0717
39-017-0018	Butler	OH	0.0800*	0.0729
39-017-9991	Butler	OH	0.0770**	0.0704
39-025-0022	Clermont	OH	0.0787	0.0713
39-027-1002	Clinton	OH	0.0787	0.0707
39-061-0006	Hamilton	OH	0.0820	0.0736
39-061-0010	Hamilton	OH	0.0763	0.0718
39-061-0040	Hamilton	OH	0.0787	0.0738
39-165-0007	Warren	OH	0.0777	0.0692
21-015-0003	Boone	KY	0.0680	0.0640
21-037-3002	Campbell	KY	0.0767	0.0719

* Represents an average of two design values (2010 – 2012 and 2011 – 2013)
** Represents one design value (2011 – 2013)

LADCO updated the modeling after U.S. EPA updated the projected year to 2017. Table 7.4 reflects the results of this update, which continues to show that all Cincinnati area monitors attain the NAAQS.

Table 7.4: LADCO's 2017 Modeling Results for the Cincinnati Area (Values in Parts Per Million)

Monitor ID	County	State	Monitored Average Design Value 2009-2013 Base Period	LADCO-Projected Average Design Value 2017 Base Case
39-017-0004	Butler	OH	0.0770	0.0715
39-017-0018	Butler	OH	0.0800*	0.0726
39-017-9991	Butler	OH	0.0770**	0.0693
39-025-0022	Clermont	OH	0.0787	0.0702
39-027-1002	Clinton	OH	0.0787	0.0697
39-061-0006	Hamilton	OH	0.0820	0.0745
39-061-0010	Hamilton	OH	0.0763	0.0712
39-061-0040	Hamilton	OH	0.0787	0.073
39-165-0007	Warren	OH	0.0777	0.0700
21-015-0003	Boone	KY	0.0680	0.0638
21-037-3002	Campbell	KY	0.0767	0.0712

7.4 Meteorological Analysis of High-Ozone Events

A meteorological analysis was performed to demonstrate that the reductions in monitored ozone were the result of permanent and enforceable reductions in precursor emissions and not the result of unusually favorable meteorology. Appendix G provides the details of a Classification and Regression Tree (CART) analysis performed by LADCO that clearly demonstrates that the improvement in air quality was not the result of favorable meteorology.

7.5 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling shows that national emission control measures will bring the Cincinnati area into attainment of the 2008 8-hour ozone NAAQS by 2018, if not earlier. Rulemakings to be implemented in the next several years will provide assurance that air quality will continue to meet the standard into the future. U.S. EPA's modeling support for the Interstate Transport "Good Neighbor" Provision show future year design values for the Cincinnati area will attain the ozone standard with 2018 projected average design values below the 2008 8-hour ozone NAAQS of 0.075 ppm. In addition, LADCO's modeling results continue to show 2018 projected average design values below the 8-hour ozone NAAQS. U.S. EPA and LADCO modeling demonstrates that the Cincinnati, OH-KY-IN, ozone nonattainment area will attain the 2008 8-hour ozone standard. Future national and local emission control strategies will ensure that the area's attainment will be maintained with an increasing margin of safety over time.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.6 above, Indiana commits to review its Maintenance Plan eight (8) years after redesignation, as required by Section 175A of the CAA. Thus, the horizon and maintenance-years will be extended by ten years to 2030 and 2040.

8.2 Commitment for Contingency Measures

Indiana commits to adopt and expeditiously implement necessary corrective actions in the following circumstances:

Warning Level Response

A Warning Level Response shall be prompted whenever an annual (1-year) 4th high monitored value of 0.079 ppm occurs in a single ozone season or a two-year average 4th high monitored value of 0.076 ppm or greater occurs within the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend, taking into consideration ease and timing for implementation, as well as economic and social considerations. Implementation of necessary controls in response to a Warning Level Response trigger will take place as expeditiously as possible, but in no event later than twelve months from the conclusion of the most recent ozone season (October 31, as of 2016).

Should it be determined through the Warning Level study that action is necessary to reverse the noted trend, procedures for control selection and implementation outlined under "Action Level Response" shall be followed.

Action Level Response

An Action Level Response shall be prompted whenever a violation of the standard (three-year average fourth high monitored value of 0.076 ppm or greater) occurs within the maintenance area. In the event that the Action Level is triggered and is not found to be due to an exceptional event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected and be in place within eighteen months from the close of the ozone season that prompted the Action Level.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal process. This process will include posting of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by the State of Indiana's Environmental Rules Board.

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, Indiana will submit to U.S. EPA an analysis to demonstrate that the proposed measure(s) 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 all 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 ozone precursor emissions. Because it is not possible at this time to determine what control measure(s) will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive. Indiana 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. Installation of a vehicle emissions testing program
2. Asphalt paving (lower VOC formulation)
3. Diesel exhaust retrofits
4. Traffic flow improvements
5. Idle reduction programs
6. Portable fuel container regulation (statewide)
7. Park and ride facilities
8. Rideshare/carpool program
9. VOC cap/trade program for major stationary sources
10. NO_x Reasonably Available Control Technology

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

In accordance with 40 CFR 51.102, public participation in this request was provided as follows:

Notice of availability of the complete document and a request for the opportunity for a public hearing was made available on IDEM's website on September 3, 2015 at http://www.in.gov/idem/6398.htm . It remained posted on the site until at least October 7, 2015.

During the public comment period, IDEM received requests from U.S. EPA seeking an "official submittal" of a base-year inventory and an emissions statement State Implementation Plan (SIP) for Dearborn County. IDEM is required to amend the SIP approved emission statement rule at 326 IAC 2-6 to add Dearborn County at a lower reporting threshold. No additional comments were received during the public comment period. There was not a request for a public hearing during the public comment period and the hearing was not required to be held.

A copy of the legal public notice and certification of publication can be found in Appendix I.

10.0 CONCLUSIONS

Lawrenceburg Township in Dearborn County, Indiana, along with the remaining portion of the Cincinnati-Hamilton, OH-KY-IN, nonattainment area, has attained the 2008 8-hour ozone standard. This petition demonstrates that Lawrenceburg Township in Dearborn County has complied with the applicable provisions of the CAA regarding redesignation of ozone nonattainment areas. IDEM has prepared a Redesignation Request and Maintenance Plan that meet the requirements 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. Additional significant regional NO_x and VOC emission reductions following implementation of Phase II NO_x SIP Call and CSAPR and/or its replacement rule or program will ensure continued compliance (maintenance) with the standard. Indiana has ensured that all CAA requirements necessary to support redesignation have been met.

In addition to the corrective actions (should they be necessary) outlined in this submittal, Indiana continues to participate in the regional air quality planning efforts sponsored by LADCO. The current goal of the planning process is to establish a regional control strategy that provides for attainment of the ozone and fine particle standards throughout the states of Illinois, Indiana, Michigan, Ohio, and Wisconsin. Along with the other LADCO states, Indiana is developing local and statewide emission control measures, where photochemical modeling and culpability analyses demonstrate a clear need. Cost effectiveness analyses justify the implementation of such measures. These actions will provide for an even greater margin of safety for the Cincinnati Area and ensure continued maintenance with the standard well into the future.

Based on this presentation, Indiana's portion of the Cincinnati-Hamilton, OH-KY-IN, nonattainment area (Lawrenceburg Township in Dearborn County) meets the requirements for redesignation under Section 107(d)(3) of the CAA and U.S. EPA guidance. Furthermore, because this area is subject to transport, additional regional NO_x and VOC reductions will ensure continued compliance (maintenance) with the 2008 8-hour ozone standard and provide an increased margin of safety.

Consistent with the authority granted to U.S. EPA under Section 107(d)(3) of the CAA, Indiana requests that Lawrenceburg Township in Dearborn County be redesignated from nonattainment to attainment for the 2008 8-hour ozone standard simultaneously with U.S. EPA approval of the Redesignation Request and Maintenance Plan provisions contained herein.