

**REDESIGNATION REQUEST AND
MAINTENANCE PLAN FOR
THE CINCINNATI-HAMILTON, OH-KY-IN
8- HOUR OZONE
NONATTAINMENT AREA**

**Butler, Clermont, Clinton, Hamilton,
and Warren Counties, Ohio**

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REDESIGNATION REQUEST AND MAINTENANCE PLAN FOR THE CINCINNATI-HAMILTON, OHIO OZONE NONATTAINMENT AREA

Butler, Clermont, Clinton, Hamilton, and Warren Counties, Ohio

CHAPTER ONE

Introduction

The Clean Air Act (CAA) requires areas failing to meet the National Ambient Air Quality Standard (NAAQS) for ozone to develop State Implementation Plans (SIP's) to expeditiously attain and maintain the standard. In 1997, the United States Environmental Protection Agency (U.S. EPA) revised the air quality standard for ozone replacing the 1979 one-hour standard with an eight-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 of 2001.

On April 30, 2004, U.S. EPA designated 134 nonattainment areas for the eight-hour ozone standard. Section 107(d)(3)(E) of the CAA allows states to request nonattainment areas to be redesignated to attainment provided certain criteria are met. The following are the criteria that must be met in order for an area to be redesignated from nonattainment to attainment:

- i) A determination that the area has attained the eight-hour ozone standard.
- ii) An approved State Implementation Plan (SIP) for the area under Section 110(k).
- iii) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
- iv) A fully approved maintenance plan under Section 175(A).
- v) A determination that all Section 110 and Part D requirements have been met.

Background

The current Cincinnati-Hamilton nonattainment area includes the following Counties: Butler, Clermont, Clinton, Hamilton, and Warren in Ohio; Dearborn (partial nonattainment of Lawrenceburg Township only) in Indiana; and Boone, Campbell, and Kenton in Kentucky.

As part of the 1990 CAA Amendments re-evaluation, the following Counties within the Cincinnati-Hamilton area were designated as moderate

nonattainment for the one-hour ozone standard pursuant to the CAA and, therefore, were subject to nonattainment area rulemakings: Butler, Clermont, Hamilton, and Warren Counties in Ohio and Boone, Campbell and Kenton Counties in Kentucky. The Ohio portion of the Cincinnati-Hamilton area was redesignated to attainment on June 19, 2000 (65 FR 37879). Clinton County, Ohio was designated as a transitional nonattainment area. Clinton County was redesignated to attainment on March 21, 1996 (61 FR 11560). A maintenance plan was approved at those times.

As a result of the 2004 ozone designations, U.S. EPA designated the Cincinnati-Hamilton area basic nonattainment for the eight-hour standard, and Ohio EPA was required to develop a plan to reduce volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emissions to meet the federal eight-hour air quality standard for ozone by June 2009.

This document is intended to support Ohio's request that the Ohio portions of the Cincinnati-Hamilton area be redesignated from nonattainment to attainment for the eight-hour ozone standard. In addition, the States of Kentucky and Indiana also intend to submit requests for their respective portions of the Cincinnati-Hamilton area. The Cincinnati-Hamilton area has recorded three (3) years of complete quality-assured ambient air quality monitoring data for the years 2007 – 2009 demonstrating attainment of the eight-hour ozone standard.

Geographical Description

The Cincinnati-Hamilton eight-hour ozone nonattainment area is located in southwest Ohio and includes the following Counties of: Butler, Clermont, Clinton, Hamilton, and Warren in Ohio; Dearborn (partial nonattainment of Lawrenceburg Township only) in Indiana; and Boone, Campbell, and Kenton in Kentucky. This area is shown in Figure 1 under Chapter Three.

Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2007 through 2009, demonstrate that the air quality has met the NAAQS for ozone in this basic nonattainment area. The NAAQS attainment, accompanied by decreases in emission levels discussed in Chapter Four, supports a redesignation to attainment for the Cincinnati-Hamilton area based on the requirements in Section 107(d)(3)(E) of the CAA.

CHAPTER TWO

Requirements for Redesignation

U.S. EPA has published detailed guidance in a document entitled *Procedures for Processing Requests to Redesignate Areas to Attainment* (redesignation guidance), issued September 4, 1992, to Regional Air Directors. The redesignation request and maintenance plan are based on the redesignation guidance, supplemented with additional guidance received from staff of U.S. EPA Region V.

Below is a summary of each redesignation criterion as it applies to the Cincinnati-Hamilton area.

i.) Attainment of the standard

There are two components involved in making this demonstration. The first component relies on ambient air quality data. The data that are used to demonstrate attainment should be the product of ambient monitoring that is representative of the area of highest concentration. The data should be collected and quality-assured in accordance with 40 CFR 58 and recorded in the Air Quality System (AQS) in order for it to be available to the public for review.

The second component relies upon supplemental U.S. EPA-approved air quality modeling. The supplemental modeling is not required for ozone nonattainment areas seeking redesignation; however, in Appendix C and Appendix D the most recent modeling results showing future attainment and maintenance are provided. Chapter Three discusses this requirement in more detail and provides the attainment demonstration.

ii.) SIP approval

The SIP for the area must be fully approved under Section 110(k) and must satisfy all the requirements that apply to the area. Ohio's SIP was approved on May 9, 1994 (59FR23799) and March 23, 1995 (60FR15235) and includes the Cincinnati-Hamilton area. Chapter Five discusses this requirement in more detail.

iii.) Permanent and enforceable improvement in air quality

The state must be able to reasonably attribute the improvement in air quality to emission reductions which are permanent and enforceable. The state should estimate the percent reduction achieved from federal measures as well as control measures that have been adopted and implemented by the state.

The Ohio Counties portion of the Cincinnati-Hamilton area was designated moderate nonattainment for ozone as part of the 1990 CAA Amendments re-evaluation. As a result, Ohio has adopted and implemented control measures for these Counties in that area beyond the federal measures and the initial 1979/1981 Statewide rules. In addition, Ohio EPA has adopted several rules recently that will have an impact Statewide on ozone emissions in the future:

- Portable Fuel Containers requirements
- Architectural and Industrial Maintenance (AIM) Coatings rules
- Consumer Products rules
- Clean Air Interstate Rule (CAIR)
- NO_x Sip Call Rules

Chapters Four and Five discuss this requirement in more detail.

iv.) Section 110 and Part D requirements

For purposes of redesignation, a state must meet all requirements of Section 110 and Part D that were applicable prior to submittal of the complete redesignation request.

Part D consists of general requirements applicable to all areas which are designated nonattainment based on a violation of the NAAQS.

i.) Section 110(a) requirements

Section 110(a) of Title I of the CAA contains the general requirements for a SIP. Section 110(a)(2) provides that the implementation plan submitted by a state must have been adopted by the state after reasonable public notice and hearing, and that, among other things, it must include enforceable emission limitations and other control measures, means or techniques necessary to meet the requirements of the CAA; provide for establishment and operation of appropriate devices, methods, systems and procedures necessary to monitor ambient air quality; provide for implementation of a source permit program to regulate the modification and construction of any stationary source within the areas covered by the plan; include provisions for the implementation of Part C, prevention of significant deterioration (PSD) and Part D, NSR permit programs; include criteria for stationary source emission control

measures, monitoring, and reporting; include provisions for air quality modeling; and provides for public and local agency participation in planning and emission control rule development. In Ohio's December 5, 2007 and September 4, 2009 infrastructure SIP submissions, Ohio verified that the State fulfills the requirements of Section 110(a)(2) of the Act.

ii.) Section 172(c) requirements

This Section contains general requirements for nonattainment plans. The requirements for reasonable further progress, identification of certain emissions increases, and other measures needed for attainment will not apply for redesignations because they only have meaning for areas not attaining the standard. The requirements for an emission inventory will be satisfied by the inventory requirements of the maintenance plan. Chapters Four and Five discuss this requirement in more detail.

ii.) Conformity

The state must work with U.S. EPA to show that its SIP provisions are consistent with the Section 176(c)(4) conformity requirements. The redesignation request should include conformity procedures, if the state already has these procedures in place. If a state does not have conformity procedures in place at the time that it submits a redesignation request, the state must commit to follow U.S. EPA's conformity regulation upon issuance, as applicable.

v.) Maintenance plans

Section 107(d)(3)(E) stipulates that for an area to be redesignated, U.S. EPA must fully approve a maintenance plan that meets the requirements of Section 175(A). The maintenance plan must constitute a SIP revision and must provide for maintenance of the relevant NAAQS in the area for at least 10 years after redesignation. Section 175 (A) further states that the plan shall contain such additional measures, if any, as may be necessary to ensure such maintenance.

In addition, the maintenance plan shall contain such contingency measures as the Administrator deems necessary to ensure prompt correction of any violation of the NAAQS. At a minimum, the contingency measures must include a

requirement that the state will implement all measures contained in the nonattainment SIP prior to redesignation.

States seeking redesignation of a nonattainment area should consider the following provisions:

- a.) attainment inventory;
- b.) maintenance demonstration;
- c.) monitoring network;
- d.) verification of continued attainment; and
- e.) contingency plan.

Chapter Six discusses this requirement in more detail.

CHAPTER THREE

OZONE MONITORING¹

CAA Section 107 (d)(3)(E)(i)

Requirement 1 of 4

A demonstration that the NAAQS for ozone, as published in 40 CFR 50.4, has been attained.

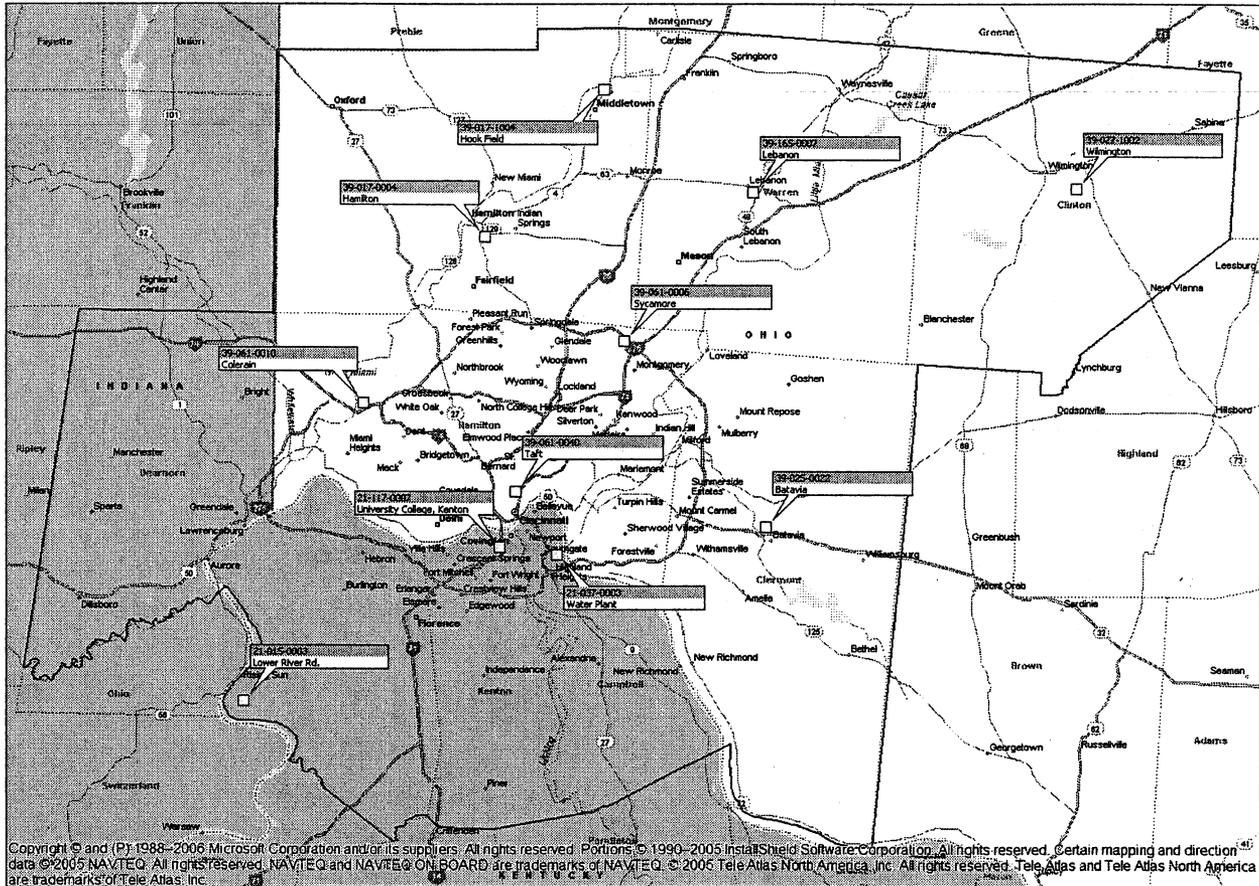
Background

There are eleven monitors measuring ozone concentrations in this nonattainment area. Eight of the eleven monitors, located in Ohio, are operated by Ohio EPA Division of Air Pollution Control, Southwest District Office and the Hamilton County Division of Environmental Services. A listing of the design values based on the three-year average of the annual fourth highest daily maximum eight-hour average ozone concentrations from 2007 through 2009 is shown in Table 1. The locations of the monitoring sites for this nonattainment area are shown on Figure 1.

¹ The draft version of this redesignation request primarily contains data through the end of August and has not been fully quality assured. However, all data will be incorporated and quality assured, as described in the text of this document, prior to official submittal to U.S. EPA. Ohio EPA does not believe the data as provided in this draft will change appreciably.

Demonstration

Figure 1 Map of the Cincinnati-Hamilton, OH nonattainment area and monitor locations



Requirement 2 of 4

Ambient monitoring data quality assured in accordance with 40 CFR 58.10, recorded in the U.S. EPA air quality system (AQS) database, and available for public view.

Demonstration

The Ohio Environmental Protection Agency (Ohio EPA) has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and the Ohio Quality Assurance Manual. Ohio EPA has recorded the data in the AQS database and, therefore, the data are available to the public.

Requirement 3 of 4

A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, are below 85 parts per billion (ppb). (This showing must rely on three complete, consecutive calendar years of quality assured data.)

Background

The following information is taken from U.S. EPA's "Guideline on Data Handling Conventions for the eight-hour ozone National Ambient Air Quality Standard (NAAQS)," U.S. EPA-454/R-98-017, December 1998.

Three complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The eight-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 eight-hour average ozone concentrations is less than or equal to 0.08 ppm. When this occurs, the site is said to be in attainment. Three significant digits must be carried in the computations. Because the third decimal digit, in ppm, is rounded, 0.084 ppm is the largest concentration that is less than or equal to 0.08 ppm. Therefore, for the purposes of this request, the eight-hour standard is considered to be 0.085 ppm. Values below 0.085 ppm meet the standard, values equal to or greater than 0.085 ppm exceed the standard. These data handling procedures are applied on an individual basis at each monitor in the area. An area is in compliance with the eight-hour ozone NAAQS 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 eight-hour average ozone concentrations is also called the site's design value.

Table 1 shows the monitoring data for 2007 – 2009 that were retrieved from the U.S. EPA AQS. The air quality design value for the area is the highest design value among all sites in the area. *Please note that the standard is measured in ppm while the commonly used unit is ppb. For the remainder of this document, ppb will be used.*

Demonstration

**Table 1 Monitoring Data for the Cincinnati-Hamilton, OH area
for 2007 – 2009**

Data source: U.S. EPA Air Quality System (AQS)
<http://www.epa.gov/ttn/airs/airsaqs/index.htm>

SITE ID	COUNTY	ADDRESS	YEAR	%OBS	1 st	2 nd	3 rd	4 th	2007-2009
					8-HR	8-HR	8-HR	8-HR	AVERAGE
39-017-0004	Butler	Hamilton	2007	100	97	96	91	91	78
39-017-0004	Butler	Hamilton	2008	99	89	75	72	71	
39-017-0004	Butler	Hamilton	2009	98	79	78	74	73	
39-017-1004	Butler	Middletown	2007	100	104	97	95	91	82
39-017-1004	Butler	Middletown	2008	96	91	87	82	79	
39-017-1004	Butler	Middletown	2009	100	78	76	76	76	
39-025-0022	Clermont	Batavia	2007	98	93	92	90	86	75
39-025-0022	Clermont	Batavia	2008	97	72	71	71	71	
39-025-0022	Clermont	Batavia	2009	99	71	71	69	69	
39-027-1002	Clinton	Wilmington	2007	99	91	89	85	82	76
39-027-1002	Clinton	Wilmington	2008	96	87	80	77	76	
39-027-1002	Clinton	Wilmington	2009	96	73	72	71	70	
39-061-0006	Hamilton	Cincinnati	2007	96	100	92	91	89	82
39-061-0006	Hamilton	Cincinnati	2008	96	93	89	87	86	
39-061-0006	Hamilton	Cincinnati	2009	98	80	76	75	72	
39-061-0010	Hamilton	Cleves	2007	99	93	91	88	86	76
39-061-0010	Hamilton	Cleves	2008	96	85	79	78	77	
39-061-0010	Hamilton	Cleves	2009	80	69	66	65	65	
39-061-0040	Hamilton	Cincinnati	2007	99	97	93	88	86	80
39-061-0040	Hamilton	Cincinnati	2008	100	86	83	81	80	

SITE ID	COUNTY	ADDRESS	YEAR	%OBS	1 st	2 nd	3 rd	4 th	2007-2009 AVERAGE
					8-HR	8-HR	8-HR	8-HR	
39-061-0040	Hamilton	Cincinnati	2009	99	77	76	74	74	
39-165-0007	Warren	Lebanon	2007	100	103	89	88	88	82
39-165-0007	Warren	Lebanon	2008	95	92	87	84	82	
39-165-0007	Warren	Lebanon	2009	100	80	80	78	77	
21-015-0003	Boone	Not in City	2007	100	81	79	78	78	68
21-015-0003	Boone	Not in City	2008	98	65	64	64	64	
21-015-0003	Boone	Not in City	2009	98	69	67	65	64	
21-037-3002	Campbell	Highland Heights	2007	100	95	92	88	86	76
21-037-3002	Campbell	Highland Heights	2008	99	84	83	75	75	
21-037-3002	Campbell	Highland Heights	2009	100	75	72	70	68	
21-117-0007	Kenton	Covington	2007	100	93	89	85	85	77
21-117-0007	Kenton	Covington	2008	99	80	77	74	73	
21-117-0007	Kenton	Covington	2009	99	76	75	75	74	
Highest Average									82 ppb

The area's design values have trended downward as emissions have declined due to such factors as cleaner automobiles and fuels, and controls for EGUs, both regionally and locally.

Requirement 4 of 4

A commitment that once redesignated, the state will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

Demonstration

Ohio EPA commits to continue monitoring ozone levels at the Ohio sites indicated in Figure 1. Ohio EPA will consult with U.S. EPA Region V prior to making changes to the existing monitoring network, should changes become necessary in the future. Ohio EPA will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58 and all other federal requirements. Connection to a central station and

updates to the Ohio EPA web site² will provide real time availability of the data and knowledge of any exceedances. Ohio EPA will enter all data into AQS on a timely basis in accordance with federal guidelines.

² www.epa.state.oh.us/dapc/

CHAPTER FOUR

EMISSION INVENTORY

CAA Section 107 (d)(3)(E)(iii)

U.S. EPA's redesignation guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (VOC and NO_x) representative of the year when the area achieves attainment of the ozone air quality standard. Ohio also must demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emission inventory related requirements include a projection of the emission inventory to a year at least 10 years following redesignation; a demonstration that the projected level of emissions is sufficient to maintain the ozone standard; and a commitment to provide future updates of the inventory to enable tracking of emission levels during the 10-year maintenance period.

The emissions inventory development and emissions projection discussion below, with the exception of the mobile (on-road) emissions inventory and projections, identifies procedures used by Ohio EPA and the Lake Michigan Air Directors Consortium (LADCO) regarding emissions from Ohio's portion of the Counties in the Cincinnati-Hamilton area. Specific emissions data are provided for all Counties, including those in Ohio, Kentucky and Indiana. Indiana and Kentucky emissions data were obtained directly from Indiana and Kentucky, respectively. All of these inventories and emissions projections were prepared using similar methodologies. Ohio recognizes that revisions to the emissions data below may be necessary once Kentucky and Indiana prepare a redesignation request and maintenance plan for their portion of the nonattainment area. Mobile emissions inventories and projections for all Counties were prepared by the Ohio, Kentucky, Indiana Council of Governments (OKI).

Requirement 1 of 5

A comprehensive emission inventory of the precursors of ozone completed for the base year.

Background

The point source data are taken from Ohio's annual emissions reporting program. The 2005 periodic inventory has been identified as one of the preferred databases for SIP development and coincides with nonattainment air quality in the Cincinnati-Hamilton area.

Periodic inventories, which include emissions from all sectors - mobile, area, non-road, and point sources - are prepared every three years.

Demonstration

The 2005 inventory is used as the base year for the purpose of this submittal and was submitted to U.S. EPA on June 15, 2007 along with the attainment demonstration for this area. The detailed emission inventory information for the Ohio portion of the Cincinnati-Hamilton area is provided in Appendix B. Emissions of VOC and NO_x for 2005 are identified under Requirement Three of this Chapter.

Requirement 2 of 5

A projection of the emission inventory to a year at least 10 years following redesignation.

Background

Ohio EPA prepared a comprehensive inventory for the Ohio portion of the Cincinnati-Hamilton area including area, mobile, and point sources for precursors of ozone (VOCs and NO_x) for base year 2005. The 2005 inventory was submitted to U.S. EPA on June 15, 2007 as part of the attainment demonstration for this area. The information below describes the procedures Ohio EPA used to generate the 2005 base year inventory and to develop SIP-ready modeling inventories and future year projections (Pechan Report³). The report by Pechan generated future year estimates of annual emissions for each source sector using accepted growth surrogates. These inventories were provided to the LADCO and have been processed to develop summer-day emissions for use in the air quality analyses. These processed modeling inventories have been identified as the correct iteration of the inventory for use in the redesignation. In this document, references to LADCO include the Midwest Regional Planning Organization. Note, the on-road mobile source sector was addressed by specific modeling as discussed below.

- Area sources were taken from the Ohio 2005 periodic inventory submitted to U.S. EPA. These projections were made from the U.S. Department of Commerce Bureau of Economic Analysis (BEA) growth factors, with some updated local information.
- Mobile source emissions were calculated from MOBILE6.2-produced emission factors.

- Point source information was compiled from Ohio EPA's 2005 annual emissions inventory database and the 2005 U.S. EPA Air Markets acid rain database⁴.
- Biogenic emissions are not included in these summaries.
- Non-road emissions were generated using U.S. EPA's National Mobile Inventory Model (NMIM) 2002 application. To address concerns about the accuracy of some of the categories in U.S. EPA's non-road emissions model, LADCO contracted with two (2) companies to review the base data and make recommendations. One of the contractors also estimated emissions for three (3) non-road categories not included in U.S. EPA's non-road model. Emissions were estimated for aircraft, commercial marine vessels, and railroads. Recreational motorboat population and spatial surrogates (used to assign emissions to each county) were significantly updated. The populations for the construction equipment category were reviewed and updated based upon surveys completed in the midwest, and the temporal allocation for agricultural sources also was updated.

Demonstration

On-Road Emission Estimations

In coordination with the Ohio Department of Transportation (Ohio DOT), OKI utilizes a regional travel demand forecast model to simulate traffic in the area and to forecast traffic flows for given growth expectations. The model has been validated to observed traffic volumes for the model base year 2005. The model is primarily used as a long range planning tool to evaluate the transportation system including determination of locations where additional travel capacity may be needed and to determine the infrastructure requirements necessary to meet that need. It is also used as a tool for air quality purposes to estimate the total emissions of pollution caused by vehicles in the area. The travel demand forecasting model is used to predict the total daily vehicle miles traveled (VMT), and a U.S. EPA computer program called MOBILE6.2 is used to calculate emissions per mile. The product of these is the total amount of pollution emitted by the on-road vehicles for the area. Clinton County is outside the area covered by the regional travel demand model. The Ohio DOT uses traffic counts and local traffic growth rates for the VMT estimates.

⁴ <http://www.epa.gov/airmarkets/acidrain>

Overview

OKI incorporates a variety of sources of local data to both improve and confirm the accuracy of VMT, as well as other travel-related parameters. Free flow speeds used on the highway and transit networks are based on travel time studies performed locally. An OKI post-processing program uses the loaded highway network to generate VMT by hour, VMT by speed distribution, and VMT by facility type. These tables are then included as input into MOBILE6.2. The VMT by hour tables utilize hourly traffic distribution and directional split factors for different roadway types as developed by OKI. The main source of the data was the permanent traffic counting stations located throughout the OKI region. These data were supplemented with data collected at coverage count stations (locations with counts taken on only one-two days). The stations were classified by area type (urban and rural) and functional classification (freeway, arterial and collector). Speeds representing various "loaded" conditions (with traffic volumes) are estimated using techniques from the 1997 Highway Capacity Manual. This permits the estimation of speeds as conditions vary from hour to hour on the different facility types throughout the region. The post-processing program performs the appropriate summation by area and roadway type as well as regional totals. OKI has also developed seasonal conversion factors to adjust traffic volumes to summer conditions. The factors were derived from local data collected at permanent traffic counting stations utilizing the average daily traffic monthly conversion factors for June, July and August.

OKI's utilized U.S.EPA's emissions model MOBILE6.2 to develop emission factors for VOC's and NO_x. The MOBILE6.2 input file contains local parameters, developed through consultation with the Ohio DOT and Ohio EPA, for temperature, fuel programs and fuel characteristics. Low RVP (Reid Vapor Pressure) gasoline is the summer fuel program in OKI's Ohio counties. Low RVP fuel results in lower evaporative emissions and is a key component of the region's strategy for ozone attainment. The local parameters are combined with the VMT tables from the OKI Travel Demand Model to produce one set of emission factors measured in grams per mile for the appropriate calendar year (from 1952 to 2050). These emission factors are then multiplied by VMT. The methodologies incorporated into MOBILE6.2 for estimating emissions are based on methods and research conducted by U.S.EPA. OKI's development of MOBILE6.2 input values were guided by the

U.S.EPA's document "*Technical Guidance on the Use of MOBILE6 for Emission Inventory Preparation*", January 2002.

Some of the assumptions built into MOBILE6.2 include the following: older vehicles have much higher emission factors than newer vehicles, diesel vehicles have much higher NO_x emission factors and lower VOC emission factors than gasoline vehicles, and higher average speeds have lower emission factors except for diesel vehicles which have higher NO_x at higher speeds. MOBILE6.2 input and output files are provided in Appendix C.

Best Available Data

Most current vehicle age distribution data, temperature data, and fuel properties data provided by Ohio EPA were used by OKI and the Ohio DOT for generating emission factors. Likewise, the most current transportation planning data available from OKI and most current Ohio DOT count data were used by Ohio DOT for the emissions estimates. Details about each data set and how it was used is documented in OKI's "Mobile Source Emissions Inventory for the Cincinnati Ozone Nonattainment Area" document dated October, 2009 (revised). See Appendix C.

Analysis Years

Analysis years for this redesignation request include 2005, 2008 (attainment year), 2015 (interim year), and 2020 to meet the requirements specified by the CAA and U.S. EPA. The travel demand model presents the transportation system conditions for each of these years. Model runs for each future analysis year contain the road network OKI and Ohio DOT expect to exist in July of that year with corresponding socioeconomic forecasts for that year.

Local Road VMT

Most local roads such as subdivision streets are not explicitly modeled in a travel demand model. These local roads are represented as fictitious roadways called centroid connectors. Local road VMT is included in the OKI post process by including the traffic loaded on centroid connectors. In addition, some local road traffic is captured as intra-zonal trips which travel demand models usually do not assign to roadway segments. The OKI post process includes these trips as local road VMT.

On-Road Mobile Emission Estimations

Tables 2 through 13 contain the results of the emissions analysis for the appropriate years. All emissions estimations are expressed in tons per summer day (TSD).

Table 2 - Butler County, Ohio Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	9.94	7.87	4.87	4.50
NOx (TSD)	18.88	16.05	7.55	5.37
VMT (miles/day)	7,804,476	8,133,554	8,869,806	9,520,999

Table 3 - Clermont County, Ohio Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	6.86	5.42	3.29	3.04
NOx (TSD)	13.04	11.05	5.10	3.63
VMT (miles/day)	5,391,578	5,599,530	5,995,538	6,434,554

Table 4 - Clinton County, Ohio Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	3.02	2.33	1.47	1.22
NOx (TSD)	5.07	3.87	2.02	1.41
VMT (miles/day)	1,809,600	1,793,580	2,049,496	2,172,899

Table 5 - Hamilton County, Ohio Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	29.47	22.70	13.44	12.00
NOx (TSD)	56.51	46.80	21.11	14.44
VMT (miles/day)	23,170,766	23,481,421	24,516,538	25,407,972

Table 6 - Warren County, Ohio Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	7.97	6.26	4.02	3.88
NOx (TSD)	15.15	12.76	6.23	4.63
VMT (miles/day)	6,263,010	6,464,217	7,324,104	8,209,236

Table 7 – Dearborn County, Indiana Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	1.00	0.75	0.50	0.42
NOx (TSD)	1.44	1.14	0.60	0.42
VMT (miles/day)	599,761	613,027	673,632	715,923

Table 8 – Summary of Ohio and Indiana Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	58.26	45.33	27.59	25.06
NOx (TSD)	110.09	91.67	42.61	29.90
VMT (miles/day)	45,039,191	46,085,329	49,429,114	52,461,583

Table 9 - Boone County, Kentucky Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	4.33	4.00	3.17	2.96
NOx (TSD)	10.27	8.53	4.63	3.45
VMT (miles/day)	4,186,006	4,355,527	5,133,456	5,790,231

Table 10 - Campbell County, Kentucky Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	2.52	2.29	1.74	1.55
NOx (TSD)	5.98	4.88	2.54	1.81
VMT (miles/day)	2,437,698	2,495,174	2,809,926	3,039,274

Table 11 - Kenton County, Kentucky Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	4.32	3.85	2.85	2.56
NOx (TSD)	10.39	8.37	4.23	3.01
VMT (miles/day)	4,182,042	4,197,027	4,623,038	4,998,184

Table 12 – Summary of Kentucky Emission Estimations for On-Road Mobile Sources

	2005	2008	2015	2020
VOC (TSD)	11.17	10.14	7.76	7.07
NOx (TSD)	26.64	21.78	11.40	8.27
VMT (miles/day)	10,805,746	11,047,728	12,566,420	13,827,689

Table 13 - Emission Estimation Totals for On-Road Mobile Sources for the Cincinnati-Hamilton Area

	2005	2008	2015	2020
VOC (TSD)	69.43	55.47	35.35	32.14
NOx (TSD)	136.73	113.45	54.01	38.17
VMT (miles/day)	55,844,937	57,133,057	61,995,534	66,289,272

Motor Vehicle Emission Budget

Table 14 and Table 15 contain the motor vehicle emissions budgets for the Cincinnati-Hamilton area. For planning purposes, budgets are established for the combined Ohio and Indiana portions and for the separate Kentucky portion.

Table 14 - Mobile Vehicle Emissions Budget for Ohio and Indiana

	2015 Estimated Emissions	2015 Mobile Safety Margin Allocation*	2015 Total Mobile Budget	2020 Estimated Emissions	2020 Mobile Safety Margin Allocation*	2020 Total Mobile Budget
VOC (TSD)	27.59	4.14	31.73	25.06	3.76	28.82
NOx (TSD)	42.61	6.39	49.00	29.90	4.49	34.39
VMT (miles/day)	56,843,481	-	-	60,330,820	-	-

*The 15 percent margin of safety was calculated by taking 15 percent of the mobile source emission estimates.

Table 15 - Mobile Vehicle Emissions Budget for Kentucky

	2015 Estimated Emissions	2015 Mobile Safety Margin Allocation	2015 Total Mobile Budget	2020 Estimated Emissions	2020 Mobile Safety Margin Allocation	2020 Total Mobile Budget
VOC (TSD)	7.76	2.00	9.76	7.07	3.00	10.07
NOx (TSD)	11.40	3.00	14.40	8.27	5.00	13.27
VMT (miles/day)	14,451,383	-	-	15,901,842	-	-

The above budgets for the Ohio and Indiana portion of the area, agreed upon as part of the interagency consultation process, include the emission estimates calculated for 2015 and 2020 (from Table 8) with an additional 15 percent margin of safety allocated to those estimates.

In an effort to accommodate future variations in travel demand models and VMT forecast when no change to the network is planned, Ohio EPA consulted with U.S. EPA to determine a reasonable approach to address this variation. Based on this discussion, a 15 percent margin of safety allocation was agreed upon and has been added to the emissions estimates for the Ohio and Indiana portions of this nonattainment area.

The above budget for the Kentucky portion of the area was provided directly by Kentucky as part of the consultation process and also includes a margin of safety allocated to the emission estimates calculated for 2015 and 2020 (from Table 12).

The emission estimates are derived from the travel demand model and MOBILE6.2 as described above under the expected OKI 2030 Long Range Plan. All methodologies, the latest planning assumptions, and the safety margins allocations were determined through the interagency consultation process described in the Transportation Conformity Memorandum of Understanding (MOU) among OKI, Ohio DOT, and Ohio EPA.

A 15 percent margin of safety 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 15 percent allocation of safety margin to mobile sources while still continuing to maintain the total emissions in the Cincinnati-Hamilton area well below the 2006 attainment level of emissions.

The 15 percent margin of safety was calculated by taking 15 percent of the mobile source emission estimates. 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 15 percent of the total emission reduction from all sources as can be seen from Table 36.

In summary, for all three states combined, the mobile budget safety margin allocation translates into:

- An allocation of 6.14 TSD for VOC and 9.39 TSD for NOx for 2015; and
- An allocation of 6.76 TSD for VOC and 9.49 TSD for NOx for 2020.

When compared to the overall safety margin, as defined in 40 CFR 93.101⁵, discussed under "Requirement 3 of 5" below, it is evident this allocation is significantly below the total safety margin for this area (see Table 36).

The current one-hour budgets will no longer be applicable either after the effective date of the approved redesignation or after the effective date of any U.S. EPA action approving a finding that the eight-hour conformity budget included in this submittal is adequate for transportation conformity purposes, whichever date comes first.

Requirement 3 of 5

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

Background

In consultation with U.S. EPA, Ohio EPA selected the year 2020 as the maintenance year for this redesignation request. This document contains projected emissions inventories for 2015 and 2020.

⁵"safety margin" means the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance.

Emission projections for the Cincinnati-Hamilton area were performed using the following approaches:

- As performed by OKI, mobile source emission projections are based on the U.S. EPA MOBILE6.2 model. The analysis is described in more detail in Appendix C. All projections were made in accordance with "Procedures for Preparing Emissions Projections" U.S. EPA-45/4-91-019.
- Emissions inventories are required to be projected to future dates to assess the influence growth and future controls will have. LADCO has developed growth and control files for point, area, and non-road categories. These files were used to develop the future-year emissions estimates used in this document. This was done so the inventories used for redesignation are consistent with modeling performed in the future. Appendix D contains LADCO's technical support document detailing the analysis used to project emissions (Base M⁶).
- For the Ohio portion of the Cincinnati-Hamilton area, for the 2008 attainment year, emissions were grown from the 2005 LADCO modeling inventory, using LADCO's growth factors, for all sectors except point sources (electrical generating units and non-electrical generating units). Point source emissions for 2008 were compiled from Ohio EPA's 2008 annual emissions inventory database. The 2015 interim year emissions were estimated based on the 2009 and 2018 LADCO modeling inventory, using LADCO's growth factors, for all sectors. The 2020 maintenance year is based on emissions estimates from the 2018 LADCO modeling.

The detailed inventory information for the Ohio portion of the Cincinnati-Hamilton area for 2005 is in Appendix B. Emission trends are an important gauge for continued compliance with the ozone standard. Therefore, Ohio EPA performed an initial comparison of the inventories for the base year and maintenance years. Mobile source emission inventories are described in Section 5 of Appendix B.

⁶ <http://www.ladco.org/tech/emis/current/index.php>

Sectors included in the following tables are: Electrical Generating Unit (EGU-Point); Non-Electrical Generating Unit (Non-EGU); Non-road Mobile (Non-road); Other Area (Other); Marine; Aircraft; Rail (MAR); and On-road Mobile (On-road).

Maintenance is demonstrated when the future-year (2020) projected emission totals are below the 2008 attainment year totals.

The emissions data in the tables below are based on the following data sources:

Demonstration

NO_x

Table 16 - Butler County, Ohio NO_x Emission Inventory Totals (TSD)⁷

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	3.88	2.87	2.86	2.95	
Non-EGU	12.03	10.53	13.29	13.22	
Non-road	7.76	6.55	4.06	3.01	
Other	2.15	2.18	2.19	2.19	
MAR	2.49	2.34	1.85	1.63	
On-road	18.88	16.05	7.55	5.37	
TOTAL	47.19	40.52	31.80	28.37	12.15

⁷ Ohio EPA has revised the Butler County, Ohio NO_x Emissions Inventory to incorporate the total emissions reduction credits available and used to offset the allowed emissions of a major source modified within the maintenance area that will begin operating during the maintenance period. The total emissions included for this facility is 479.57 tons per year (assumed TSD = TPY/365). The emissions increase does not significantly impact the safety margin for this area or prevent the area from maintaining the standard in future years.

Table 17 - Clermont County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	42.96	22.61	50.07	51.49	
Non-EGU	0.15	0.18	0.16	0.16	
Non-road	4.07	3.48	2.21	1.67	
Other	1.65	1.67	1.67	1.67	
MAR	0.96	0.74	0.55	0.50	
On-road	13.04	11.05	5.10	3.63	
TOTAL	62.83	39.73	59.76	59.12	-19.39

Table 18 - Clinton County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	0.00	0.00	0.00	0.00	
Non-road	2.21	1.96	1.34	1.07	
Other	0.42	0.43	0.43	0.43	
MAR	0.05	0.05	0.05	0.06	
On-road	5.07	3.87	2.02	1.41	
TOTAL	7.75	6.31	3.84	2.97	3.34

Table 19 - Hamilton County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	15.23	12.92	28.32	29.13	
Non-EGU	6.72	6.17	7.39	7.56	
Non-road	16.08	13.28	8.04	5.89	
Other	5.19	5.27	5.30	5.30	
MAR	4.49	3.93	3.14	2.84	
On-road	56.51	46.80	21.11	14.44	
TOTAL	104.22	88.37	73.30	65.16	23.21

Table 20 - Warren County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	2.68	3.14	2.70	2.70	
Non-road	5.84	4.94	3.01	2.19	
Other	1.15	1.17	1.17	1.17	
MAR	0.26	0.25	0.21	0.19	
On-road	15.15	12.76	6.23	4.63	
TOTAL	25.08	22.26	13.32	10.88	11.38

Table 21 - Dearborn County, Indiana NO_x Emission Inventory (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	25.31	27.34	25.30	26.03	
Non-EGU	5.09	3.21	5.12	5.19	
Non-road *	1.26	1.14	0.78	0.65	
Other	0.26	0.26	0.27	0.27	
On-road	1.44	1.14	0.60	0.42	
TOTAL	33.36	33.09	32.07	32.56	0.41

*MAR emissions are included in the Non-road emissions

Table 22 - Boone County, Kentucky NO_x Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	23.80	23.15	24.97	26.35	
Non-EGU	0.14	0.12	0.11	0.12	
Non-road *	12.96	11.02	9.77	9.48	
Other	4.99	5.02	5.03	5.03	
On-road	10.27	8.53	4.63	3.45	
TOTAL	52.16	47.84	44.51	44.43	3.41

*MAR emissions are included in the Non-road emissions

Table 23 - Campbell County, Kentucky NO_x Emission Inventory Total (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	0.00	0.02	0.02	0.03	
Non-road*	6.33	5.34	4.57	4.34	
Other	1.41	1.32	1.30	1.30	
On-road	5.98	4.88	2.54	1.81	
TOTAL	13.72	11.56	8.43	7.48	4.08

*MAR emissions are included in the Non-road emissions

Table 24 - Kenton County, Kentucky NO_x Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	0.04	0.03	0.03	0.03	
Non-road*	8.43	7.33	6.15	5.75	
Other	4.17	4.06	4.02	4.02	
On-road	10.39	8.37	4.23	3.01	
TOTAL	23.03	19.79	14.43	12.81	6.98

*MAR emissions are included in the Non-road emissions

Table 25 - Cincinnati-Hamilton Area NO_x Emission Inventory Totals (TSD)

NO_x	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
Butler	47.19	40.52	31.80	28.37	
Clermont	62.83	39.73	59.76	59.12	
Clinton	7.75	6.31	3.84	2.97	
Hamilton	104.22	88.37	73.30	65.16	
Warren	25.08	22.26	13.32	10.88	
Dearborn	33.36	33.09	32.07	32.56	
Boone	52.16	47.84	44.51	44.43	
Campbell	13.72	11.56	8.43	7.48	
Kenton	23.03	19.79	14.43	12.81	
COMBINED NO_x TOTAL	369.34	309.47	281.46	263.78	45.69

VOC

Table 26 - Butler County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.03	0.03	0.02	0.02	
Non-EGU	3.64	2.77	4.25	4.56	
Non-road	6.73	5.54	4.85	4.71	
Other	11.96	10.31	9.76	9.76	
MAR	0.15	0.14	0.10	0.09	
On-road	9.94	7.87	4.87	4.50	
TOTAL	32.45	26.66	23.85	23.64	3.02

Table 27 - Clermont County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.49	0.27	0.52	0.53	
Non-EGU	0.24	0.09	0.26	0.27	
Non-road	4.31	3.66	3.11	2.95	
Other	6.98	6.05	5.74	5.74	
MAR	0.02	0.02	0.02	0.01	
On-road	6.86	5.42	3.29	3.04	
TOTAL	18.90	15.51	12.94	12.54	2.97

Table 28 - Clinton County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	0.00	0.00	0.00	0.00	
Non-road	1.73	1.60	1.20	1.02	
Other	3.24	2.85	2.72	2.72	
MAR	0.04	0.05	0.06	0.06	
On-road	3.02	2.33	1.47	1.22	
TOTAL	8.03	6.83	5.45	5.02	1.81

Table 29 - Hamilton County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.28	0.24	0.31	0.31	
Non-EGU	2.66	2.85	2.97	3.12	
Non-road	17.25	14.47	12.55	12.06	
Other	33.04	28.80	27.38	27.38	
MAR	0.20	0.19	0.15	0.13	
On-road	29.47	22.70	13.44	12.00	
TOTAL	82.90	69.25	56.80	55.00	14.25

Table 30 - Warren County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	0.53	0.82	0.57	0.57	
Non-road	4.78	4.09	3.38	3.14	
Other	8.40	7.30	6.94	6.94	
MAR	0.01	0.01	0.01	0.01	
On-road	7.97	6.26	4.02	3.88	
TOTAL	21.69	18.48	14.92	14.54	3.94

Table 31 - Dearborn County, Indiana VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.33	0.35	0.44	0.46	
Non-EGU	2.91	3.23	3.51	3.69	
Non-road	0.82	0.74	0.62	0.60	
Other	2.07	2.42	1.79	1.79	
On-road	1.00	0.75	0.50	0.42	
TOTAL	7.13	7.49	6.86	6.96	0.53

*MAR emissions are included in the Non-road emissions

Table 32 - Boone County, Kentucky VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.17	0.17	0.18	0.19	
Non-EGU	2.40	2.64	2.86	3.01	
Non-road*	1.71	5.07	4.55	4.36	
Other	8.13	8.41	8.50	8.50	
On-road	4.33	4.00	3.17	2.96	
TOTAL	16.74	20.29	19.26	19.02	1.27

*MAR emissions are included in the Non-road emissions

Table 33 - Campbell County, Kentucky VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	0.25	0.28	0.30	0.31	
Non-road*	1.76	1.51	1.29	1.22	
Other	4.77	4.34	4.20	4.20	
On-road	2.52	2.29	1.74	1.55	
TOTAL	9.30	8.42	7.53	7.28	1.14

*MAR emissions are included in the Non-road emissions

Table 34 - Kenton County, Kentucky VOC Emission Inventory Totals (TSD)

Sector	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
EGU Point	0.00	0.00	0.00	0.00	
Non-EGU	1.20	1.17	1.31	1.42	
Non-road*	2.33	1.95	1.76	1.73	
Other	8.53	7.88	7.66	7.66	
On-road	4.32	3.85	2.85	2.56	
TOTAL	16.38	14.85	13.58	13.37	1.48

*MAR emissions are included in the Non-road emissions

Table 35 - Cincinnati-Hamilton Area VOC Emission Inventory Totals (TSD)

VOC	2005 Base	2008 Attainment	2015 Interim	2020 Maintenance	Safety Margin
Butler	32.45	26.66	23.85	23.64	
Clermont	18.90	15.51	12.94	12.54	
Clinton	8.03	6.83	5.45	5.02	
Hamilton	82.90	69.25	56.80	55.00	
Warren	21.69	18.48	14.92	14.54	
Dearborn	7.13	7.49	6.86	6.96	
Boone	16.74	20.29	19.26	19.02	
Campbell	9.30	8.42	7.53	7.28	
Kenton	16.38	14.85	13.58	13.37	
COMBINED VOC TOTAL	213.52	187.78	161.19	157.37	30.41

VOC and NO_x

Table 36 - Cincinnati-Hamilton Area Comparison of 2008 attainment year and projected emission estimates (TSD)

	2008	2015	2015 Projected Decrease	2020	2020 Projected Decrease
VOC	187.78	161.19	26.59	157.37	30.41
NO_x	309.47	281.46	28.01	263.78	45.69

As shown in the table above, VOC emissions in the nonattainment area are projected to decrease by 26.59 TSD in 2015 and 30.41 TSD in 2020. Point sources in the Kentucky area show a slight increase due to expectations that the population will grow in this area; however, cleaner vehicles and fuels are expected to be in place in 2009 and 2018, and they cause an overall drop in VOC emissions.

NO_x emissions in the nonattainment area are projected to decrease by 28.01 TSD in 2015 and 45.69 TSD in 2020. Again, area source emissions and, to a lesser extent, point sources show a slight increase due to expectations that the population will grow in this area. Decreases from U.S. EPA rules covering Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur

Control Requirements⁸, Highway Heavy-Duty Engine Rule⁹, and the Non-Road Diesel Engine Rule¹⁰ are factored into the changes.

All projections do not take into account reductions expected from the Clean Air Interstate Rule¹¹. In many cases, Ohio utilities subject to CAIR have already, or will be installing controls and reducing NOx emissions beyond those projected for EGU's above.

As can be seen from the projected decreases above, even in the absence of consideration of reductions resulting from CAIR, the area will be able to maintain the standard.

As identified in Table 14 and Table 15 above, an additional mobile budget margin of safety allocation is being requested for mobile emissions. The mobile budget margin of safety allocation translates into an additional 6.14 TSD for VOC and 9.39 TSD for NOx in the year 2015 and 6.76 TSD for VOC and 9.49 TSD for NOx in the year 2020. U.S. EPA's conformity regulations allow for allocation, through a revision to the SIP, of all or some portion of the overall area's safety margin (emission reductions from 2008 to 2020) to the mobile emissions budgets for future conformity. As identified in Table 14 and Table 15 above, the mobile budget margin of safety allocation and the total budget is distributed separately between Kentucky (alone) and Ohio/Indiana (combined). For the entire area, Ohio, Indiana and Kentucky chose to allocate:

- In 2015: 6.14 TSD of the 26.59 TSD safety margin for VOC and 9.39 TSD of the 28.01 TSD safety margin for NOx as a mobile emissions budget safety margin.
- In 2020: 6.76 TSD of the 30.41 TSD safety margin for VOC and 9.49 TSD of the 45.69 TSD safety margin for NOx as a mobile emissions budget safety margin.

⁸ <http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm>

⁹ <http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm>

¹⁰ <http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm>

¹¹ <http://www.epa.gov/fedrgstr/EPA-AIR/2005/May/Day-12/a5723a.pdf>

Requirement 4 of 5

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

Background

Ambient air quality data from all monitoring sites indicate that air quality met the NAAQS for ozone in 2007-2009. U.S. EPA's redesignation guidance (p 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."

Demonstration

Permanent and enforceable reductions of VOC and NOx emissions have contributed to the attainment of the eight-hour ozone standard. Some of these reductions were due to the application of tighter federal standards on new vehicles. Reductions achieved are discussed in greater detail under Chapter Five.

Table 37 - Cincinnati-Hamilton Area Combined Comparison of 2005 base year and 2008 attainment year on-road reductions

	2005	2008
On-road VOC	69.43	55.47
On-road NO _x	136.73	113.45

Requirement 5 of 5

Provisions for future annual updates of the inventory to enable tracking of the emission levels, including an annual emission statement from major sources.

Demonstration

In Ohio, major point sources in all counties are required to submit air emissions information annually, in accordance with U.S. EPA's Consolidated Emissions Reporting Rule (CERR). Ohio EPA prepares a new periodic inventory for all ozone precursor emission sectors every three years. These ozone precursor inventories will be prepared for future years as

necessary to comply with the inventory reporting requirements established in the CFR. Emissions information will be compared to the 2005 base year and the 2020 projected maintenance year inventories to assess emission trends, as necessary, and to assure continued compliance with the ozone standard.

CHAPTER FIVE

CONTROL MEASURES AND REGULATIONS

CAA Section 107(d)(3)(E)(ii), 107(d)(3)(iv) & 107(d)(3)(E)(v)

Requirement 1 of 5

Section 182(a) of the 1990 Clean Air Act Amendments requires states with marginal nonattainment areas to implement RACT under Section 172(b).

Background

Section 182(b) of the 1990 Clean Air Act Amendments requires states with moderate nonattainment areas to submit a SIP to correct, or add, RACT requirements under Section 172(b) (as in effect immediately before the enactment of the Clean Air Act Amendments of 1990).

Demonstration

As required under the 1-hour ozone standard, Ohio EPA submitted VOC RACT rules which U.S. EPA approved on April 25, 1996 (61 FR 18255) and September 7, 1994 (59 FR 46182).

Statewide RACT rules have been applied to all new sources locating in Ohio since that time. RACT requirements are incorporated into permits along with monitoring, recordkeeping, and reporting necessary to ensure ongoing compliance. Ohio EPA also has an active enforcement program to address violations discovered by field office staff. The Ohio RACT rules are found in OAC Chapter 3745-21¹².

Requirement 2 of 5

Section 182(a)(3)(B) requires states to submit emissions statements.

Background

Section 182(a)(3)(B) requires states to submit emissions statements within two years of the enactment of the Clean Air Act Amendments and then every three years thereafter.

Demonstration

Ohio EPA submitted its emissions statement SIP on March 18, 1994 which was approved by U.S. EPA on October 13, 1995 (59 FR 51863). As discussed in Chapter 4 (Requirement 4), Ohio EPA submits, and commits to submit, emission inventories (statements) every three years.

¹² http://www.epa.state.oh.us/dapc/regs/3745-21/3745_21.html

Requirement 3 of 5

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

Background

In addition to the historic RACT requirements and those mentioned above, the U.S. EPA NO_x SIP Call required 22 states to pass rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Ohio passed this rule in 2001. NO_x SIP Call requirements are incorporated into permits along with monitoring, recordkeeping, and reporting necessary to ensure ongoing compliance. Ohio EPA also has an active enforcement program to address violations discovered by field office staff. Compliance is tracked through the Clean Air Markets data monitoring program. Beginning in 2004, this rule accounts for a reduction of approximately 31 percent of all NO_x emissions statewide compared to previous uncontrolled years. The other 21 states also have adopted these rules.

On March 10, 2004, the U.S. EPA promulgated the CAIR. Beginning in 2009, U.S. EPA's CAIR rule requires EGUs in 28 eastern states and the District of Columbia to significantly reduce emissions of NO_x. CAIR replaced the NO_x SIP Call for EGUs. National NO_x emissions will be cut from 4.5 million tons in 2004, to a cap of 1.5 million tons by 2009, and 1.3 million tons in 2018 in 28 states. States were required to submit a CAIR SIP as part of this effort. Ohio submitted a CAIR SIP which was approved by U.S. EPA on February 1, 2007. Revisions to the CAIR SIP were again submitted on July 15, 2009. The revised CAIR SIP was approved as a direct final action on September 25, 2009 (74 FR 48857). As a result of CAIR, U.S. EPA projects that in 2009 emissions of NO_x will decrease from a baseline of 264,000 tons per year to 91,000 tons per year within Ohio¹³.

On December 23, 2008, U.S. EPA's CAIR program was remanded without vacatur by the D.C. Circuit Court. As mentioned above, Ohio EPA has not incorporated these expected CAIR reductions into this redesignation request. It should also be noted that Ohio's SIP-approved NO_x SIP Call program and regulations are still in place. Ohio EPA is currently in the process of revising these regulations to provide a "back

¹³ <http://www.epa.gov/cair/pdfs/0053-2228.pdf>

stop” for the reinstatement of the NO_x SIP Call program in the event the CAIR program, or an equivalent, is no longer implemented by U.S. EPA.

Section 182(b) contains additional provisions applicable to moderate nonattainment areas, for which the Cincinnati-Hamilton area was under the one-hour standard. Section 182(b)(3) requires gasoline vapor recovery systems for gasoline dispensing stations in the area and section 182(b)(4) requires motor vehicle inspection and maintenance programs.

Demonstration

U.S. EPA and Ohio EPA performed modeling that indicated this area would attain the eight-hour ozone standard with the implementation of the NO_x SIP Call. Controls for EGUs formally commenced May 31, 2004. Emissions covered by this program have been generally trending downward since 1998 with larger reductions occurring in 2002 and 2003. Data taken from the U.S. EPA Clean Air Markets web site, quantify the gradual NO_x reductions that have occurred in Ohio as a result of Title IV of the 1990 CAA Amendments and the beginning of the NO_x SIP Call Rule. Ohio developed the NO_x Budget Trading Program rules in OAC Chapter 3745-14¹⁴ in response to the SIP Call. OAC Chapter 3745-14 regulates EGUs and certain non-EGUs under a cap and trade program based on an 85 percent reduction of NO_x emissions from EGUs and a 60 percent reduction of NO_x emissions from non-EGUs, compared to historical levels. This cap will stay in place through 2008, at which time the CAIR program will supersede it as discussed above.

On April 21, 2004, U.S. EPA published Phase II of the NO_x SIP Call that establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. Ohio EPA's OAC rule 3745-14-12 addresses stationary internal combustion engines, all used in natural gas pipeline transmissions. U.S. EPA approved this revision to the SIP on April 4, 2008. An 82 percent NO_x reduction from 1995 levels is anticipated. Completion of the compliance plan occurred by May 1, 2006, and the compliance demonstration began May 1, 2007. The 2007 controlled NO_x emissions are 599 tons statewide for the ozone season.

¹⁴ http://www.epa.state.oh.us/dapc/regs/3745-14/3745_14.html

Section 182(b)(3) requires states to submit Stage II vapor recovery rules no later than November 15, 1992. The U.S. EPA partially approved and partially disapproved Ohio's SIP revision for implementation of Stage II on October, 20, 1994 (59 FR 52911). As stated in that rulemaking action, with the exception of paragraph 3745-21-09 (DDD)(5), U.S. EPA considers Ohio's Stage II program to fully satisfy the criteria set forth in the September 17, 1993, U.S. EPA guidance document for such programs entitled "Enforcement Guidance for Stage II Vehicle Refueling Control Programs." Furthermore, the September 17, 1993, guidance memorandum states that once onboard vapor recovery regulations are promulgated, the Stage II regulations are no longer applicable for moderate ozone nonattainment areas. The U.S. EPA promulgated onboard vapor recovery rules in February 1994. Therefore, pursuant to Section 202(a)(6) of the CAA, Stage II would no longer be required. Stage I and Stage II requirements are still being implemented in the original one-hour attainment area (excludes Clinton County).

The U.S. EPA's final I/M regulations in 40 CFR Part 85 require the states to submit a fully adopted I/M program by November 15, 1993. U.S. EPA approved Ohio's enhanced I/M program (E-Check), on April 4, 1995 (60 FR 16989) and January 6, 1997 (62 FR 646). The E-check program is no longer being implemented in this area. On November 3, 2005, Ohio EPA submitted a request for replacement of the E-Check program in this area. In order to transfer the E-Check program from the active maintenance plan to a contingency plan, alternative emission reduction programs were adopted to replace the benefits associated with the E-Check program in the one-hour maintenance plan approved at that time. The following programs were implemented in place of the E-Check program and are still being implemented today in the original one-hour attainment area (excludes Clinton County):

- OAC rule 3745-21-09(O)(2)(e) - Vapor pressure limit for cold cleaning degreasing operations. Approved July 28, 2009 (74 FR 37171)
- OAC rule 3745-21-18 - Mobile equipment refinishing emission reduction via high transfer efficiency spray guns. Approved July 28, 2009 (74 FR 37171)
- OAC Chapter 3745-72 - Low Reid Vapor Pressure Fuels. Approved May 25, 2007 (72 FR 29269)
- OAC rule 3745-21-17 - Portable Fuel Containers. Approved October 14, 2009 (74 FR 52691)

Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light trucks, including sport utility vehicles (SUVs). Under this proposal, automakers will be required to sell cleaner cars, and refineries will be required to make cleaner, lower sulfur gasoline. This rule will apply nationwide. The federal rules will phase in between 2004 and 2009. U.S. EPA has estimated that NO_x emission reductions will be approximately 77 percent for passenger cars, 86 percent for smaller SUVs, light trucks, and minivans, and 65 to 95 percent reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions will be approximately 12 percent for passenger cars, 18 percent for smaller SUVs, light trucks, and minivans, and 15 percent for larger SUVs, vans, and heavier trucks.

Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy Duty Engines, a program which includes low-sulfur diesel fuel standards, which will be phased in from 2004 through 2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule will result in a 40 percent reduction in NO_x from diesel trucks and buses, a large sector of the mobile sources NO_x inventory.

Clean Air Non-road Diesel Rule

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 new standards will cut emissions from non-road diesel engines by more than 90 percent. Non-road diesel equipment, as described in this rule, currently accounts for 47 percent of diesel particulate matter (PM) and 25 percent of NO_x from mobile sources nationwide. Sulfur levels will be reduced in non-road diesel fuel by 99 percent from current levels, from approximately 3,000 parts per million (ppm) now to 15 ppm in 2009. New engine standards take effect, based on engine horsepower, starting in 2008.

Together, these rules will substantially reduce local and regional sources of ozone precursors.

Requirement 4 of 5

Acceptable provisions to provide for new source review.

Background

Ohio has a longstanding and fully implemented New Source Review (NSR) program. This is addressed in OAC Chapter 3745-31¹⁵. The Chapter includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in OAC rules 3745-31-01 to 3745-31-20. Ohio's PSD program was conditionally approved on October 10, 2001 (66 FR 51570) and received final approval on January 22, 2003 (68FR 2909) by U.S. EPA as part of the SIP.

Demonstration

Any facility that is not listed in the 2005 emission inventory, or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting all applicable NSR requirements. Once the area is redesignated, Ohio EPA will implement NSR through the PSD program.

Requirement 5 of 5

Assure that all existing control measures will remain in effect after redesignation unless the State demonstrates through photochemical modeling that the standard can be maintained without one (1) or more control measures.

Demonstration

Ohio commits to maintaining the aforementioned control measures after redesignation. Ohio hereby commits that any changes to its rules or emission limits applicable to VOC and/or NO_x sources, as required for maintenance of the ozone standard in the Cincinnati-Hamilton area, will be submitted to U.S. EPA for approval as a SIP revision.

Ohio, through Ohio EPA's Legal section, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of ozone precursors in the Cincinnati-Hamilton area.

¹⁵http://www.epa.state.oh.us/dapc/regs/3745-31/3745_31.html

CHAPTER SIX

CONTINGENCY MEASURES

CAA Section 107(d)(3)(E)(v)

Requirement 1 of 4

A commitment to submit a revised plan eight (8) years after redesignation.

Demonstration

Ohio hereby commits to review its maintenance plan eight (8) years after redesignation, as required by Section 175(A) of the CAA.

Requirement 2 of 4

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

Demonstration

Ohio hereby 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) fourth high monitored value of 88 ppb occurs in a single ozone season 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 12 months from the conclusion of the most recent ozone season (October 31).

Should it be determined through the warning level study that action is necessary to reverse the noted trend, the 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 two-year average fourth high monitored value of 85 parts per billion (ppb) or greater occurs within the maintenance area. A violation of the standard (three-year average fourth high value of 85 ppb or greater) shall also prompt an action level response.

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, Ohio EPA in conjunction with the metropolitan planning organization or regional council of governments, will determine additional control measures needed to assure future attainment of the NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected in order to be in place within 18 months from the close of the ozone season that prompted the action level. Ohio EPA will also consider the timing of an action level trigger and determine if additional, significant new regulations not currently included as part of the maintenance provisions will be implemented in a timely manner and will constitute our response.

Control Measure Selection and Implementation

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

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

Requirement 3 of 4

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

Demonstration

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. The selection of measures will be based on cost-effectiveness, emission

reduction potential, economic and social considerations or other factors that Ohio EPA deems appropriate. Ohio EPA will solicit input from all interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. Because it is not possible at this time to determine what control measures will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not exhaustive.

- 1) Implementation of an enhanced I/M program (E-Check) in Butler, Clermont, Hamilton and Warren Counties.
- 2) Tighten or adopt VOC RACT on existing sources covered by U.S. EPA Control Technique Guidelines issued after the 1990 CAA.
- 3) Apply VOC RACT to smaller existing sources.
- 4) One or more transportation control measures sufficient to achieve at least half a percent reduction in actual areawide VOC emissions. Transportation measures will be selected from the following, based upon the factors listed above after consultation with affected local governments:
 - a) trip reduction programs, including, but not limited to, employer-based transportation management plans, areawide rideshare programs, work schedule changes, and telecommuting;
 - b) traffic flow and transit improvements; and
 - c) other new or innovative transportation measures not yet in widespread use that affected local governments deem appropriate.
- 5) Alternative fuel and diesel retrofit programs for fleet vehicle operations.
- 6) Require VOC or NO_x emission offsets for new and modified major sources.
- 7) Increase the ratio of emission offsets required for new sources.

- 8) Require VOC or NO_x controls on new minor sources (less than 100 tons).
- 9) Adopt NO_x RACT for existing combustion sources.

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.

Requirement 4 of 4

A list of VOC and NO_x sources potentially subject to future additional control requirements.

Demonstration

The following is a list of VOC and NO_x sources potentially subject to future controls.

NO_x RACT

- EGUs
- asphalt batching plants
- industrial/commercial and institutional boilers
- process heaters
- internal combustion engines
- combustion turbines
- other sources greater than 100 tons per year

VOC RACT

- synthetic organic compound manufacturing
- organic compound batch processes
- wood manufacturing
- industrial wastewater
- aerospace industry
- bakeries
- plastic parts coating
- volatile organic liquid storage
- industrial solvent cleaning
- offset lithography
- industrial surface coating
- other sources greater than 50 tons per year

CHAPTER SEVEN

PUBLIC PARTICIPATION

Ohio published notification for a public hearing and solicitation for public comment concerning the draft redesignation petition and maintenance plan in the widely distributed county publications on November 4, 2009.

The public hearing to receive comments on the redesignation request was held on December 9, 2009, at the Hamilton County Department of Environmental Services, Cincinnati, Ohio. The public comment period closed on December 11, 2009. No testimony was provided at the public hearing and no comments were received during the public comment period. Appendix E includes a copy of the public notice from the public hearing and comment period.

CHAPTER EIGHT

CONCLUSIONS

The Cincinnati-Hamilton ozone nonattainment area has attained the 1997 NAAQS for ozone and complied with the applicable provisions of the 1990 Amendments to the CAA regarding redesignations of ozone nonattainment areas. Documentation to that effect is contained herein. Ohio EPA has prepared a redesignation request and maintenance plan that meet the requirements of Section 110 (a)(1) of the 1990 CAA.

Based on this presentation, the Cincinnati-Hamilton ozone nonattainment area meets the requirements for redesignation under the CAA and U.S. EPA guidance. Ohio has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. Furthermore, because this area is subject to significant transport of pollutants, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standard with an increasing margin of safety.

The State of Ohio hereby requests that the Cincinnati-Hamilton ozone nonattainment area be redesignated to attainment simultaneously with U.S. EPA approval of the maintenance plan provisions contained herein. In addition, the State of Ohio requests that this maintenance plan satisfy the requirements of CAA Section 175A (b), for subsequent plan revisions required for areas redesignated for the one-hour ozone standard.

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