REDESIGNATION REQUEST AND MAINTENANCE PLAN FOR THE CLEVELAND-AKRON-LORAIN, OH 8- HOUR OZONE NONATTAINMENT AREA

Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit Counties, Ohio

Prepared by:
Ohio Environmental Protection Agency
Division of Air Pollution Control

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REDESIGNATION REQUEST AND MAINTENANCE PLAN FOR THE CLEVELAND-AKRON-LORAIN, OH OZONE NONATTAINMENT AREA

Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit 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. On March 12, 2008, the United States Environmental Protection Agency (U.S. EPA) revised the air quality standard for ozone replacing the 1997 eight-hour standard of 0.08 parts per million (ppm) with a more stringent standard of 0.075 ppm.

On March 21, 2012 (77 FR 30088), U.S. EPA designated nonattainment areas for the 2008 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 Cleveland-Akron-Lorain, OH nonattainment area includes the following Counties: Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit.

As part of the 1997 eight-hour ozone standard designations, the following Counties within the Cleveland-Akron-Lorain, OH area were designated as moderate nonattainment pursuant to Subpart 2 of the CAA and, therefore, were subject to nonattainment area rulemakings: Ashtabula, Cuyahoga,

Geauga, Lake, Lorain, Medina, Portage, and Summit Counties. The Cleveland-Akron-Lorain, OH area was redesignated to attainment on September 15, 2009 (74 FR 47414) and a revision to the approved motor vehicle emissions budgets was approved on March 19, 2013 (78 FR 16785). A maintenance plan was approved at that time.

As a result of the 2012 ozone designations for the 2008 eight-hour ozone standard, U.S. EPA designated the Cleveland-Akron-Lorain, OH area marginal nonattainment, pursuant to Subpart 2 of the CAA, and the Ohio Environmental Protection Agency (Ohio EPA) was required to submit certain nonattainment plan elements by July 20, 2014. Ohio EPA submitted those elements on July 18, 2014 and U.S. EPA published a proposal and direct final action approving that submittal on March 10, 2016 (81 FR12626 and 81 FR 12591). The approval became effective May 9, 2016.

Ohio EPA requested a one-year extension request for the Cleveland-Akron-Lorain, OH area to attain the standard on February 20, 2015 and provided U.S. EPA with supplemental information on March 19, 2015. U.S. EPA published proposed rulemaking on granting the one-year attainment extension on August 27, 2015 (80 FR 51992). On May 4, 2016 (81 FR 26697) U.S. EPA published a final action approving the one-year extension request for the Cleveland-Akron-Lorain, OH nonattainment area with an effective date of June 3, 2016.

This document is intended to support Ohio's request that the Cleveland-Akron-Lorain, OH area be redesignated from nonattainment to attainment for the eight-hour ozone standard. The Cleveland-Akron-Lorain, OH area has recorded three (3) years of complete quality-assured ambient air quality monitoring data for the years 2013 through 2015 demonstrating attainment of the eight-hour ozone standard.

Geographical Description

The Cleveland-Akron-Lorain, OH eight-hour ozone nonattainment area is located in northeast Ohio and includes the following Counties of: Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit. This area is shown in Figure 1 under Chapter Three.

Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2013 through 2015, demonstrate that the air quality has met the NAAQS for ozone in this marginal nonattainment area. The NAAQS attainment, accompanied by decreases in emission levels discussed in Chapter Four, supports a redesignation to attainment for the Cleveland-Akron-Lorain, OH 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 Cleveland-Akron-Lorain, OH area.

i.) Attainment of the standard - CAA Section107 (d)(3)(E)(i)

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. Chapter Three discusses this requirement in more detail

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, Ohio EPA has incorporated photochemical modeling information in Chapter Seven to further support our request that Ohio's portion of the nonattainment area be redesignated to attainment.

ii.) SIP approval - CAA Section107 (d)(3)(E)(ii)

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 4, 1994 (59 FR 23799), March 23, 1995 (60 FR 15235) and May 7, 1996 (61 FR 20458) and includes the Cleveland-Akron-Lorain, OH area. In addition, on July 18, 2014, Ohio EPA submitted a SIP revision for this area and U.S. EPA published a proposal and direct final action approving that submittal on March 10, 2016 (81 FR 12626 and 81 FR 12591). The approval became effective May 9, 2016. Chapter Five discusses this requirement in more detail.

iii.) Permanent and enforceable improvement in air quality - CAA Section107 (d)(3)(E)(iii)

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.

On March 6, 2015, U.S. EPA finalized the "Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule" (herein referred to as "Implementation Rule"). (80 FR 12264) In the Implementation Rule, U.S. EPA states "Under CAA section 182(a), Marginal areas have up to 3 years from the effective date of designation to attain the NAAQS, and are not required to submit an attainment demonstration SIP." (80 FR 12268) Further, U.S. EPA identifies "An attainment demonstration consists of: (1) Technical analyses, such as base year and future year modeling of emissions which identifies sources and quantifies emissions from those sources that are contributing to nonattainment; (2) analyses of future year emissions reductions and air quality improvement resulting from existing (*i.e.,* already adopted or ''on the books'') national, regional and local programs, and potential new local measures needed for attainment, including RACM and RACT for the area; (3) a list of adopted measures (including RACT) with schedules for implementation and other means and techniques necessary and appropriate for demonstrating attainment as expeditiously as practicable but no later than the outside attainment date for the area's classification; and (4) a RACM analysis to determine whether any additional RACM measures could advance attainment by 1 year." (80 FR 12268) Therefore, these requirements, and specifically, the requirement to adopt specific state measures beyond federal measures, are not applicable to marginal areas, such as the Cleveland-Akron-Lorain, OH nonattainment area.

Regardless, Ohio has adopted and implemented control measures for these counties in the area beyond the federal measures in order to comply with the 1997 eight-hour ozone standard and Ohio also adopted the initial 1979/1981 statewide rules. Historically the Cleveland-Akron-Lorain, OH area was a moderate nonattainment area for the one-hour standard and the 1997 eight-hour standard. These measures and rules remain in effect and have assisted the Cleveland-Akron-Lorain, OH area in reaching attainment for the 2008 eight-hour ozone standard.

Below is a list of several previously adopted Ohio rules that have contributed to reducing ozone in this area:

- Portable Fuel Containers requirements
- Architectural and Industrial Maintenance (AIM) Coatings rules
- Consumer Products rules
- Clean Air Interstate Rule (CAIR)
- Cross State Air Pollution Rule (CSAPR)
- VOC RACT for all current U.S. EPA Control Technique Guidelines (CTG)
- NOx RACT
- E-Check
- NO_x Sip Call rules

Chapters Four and Five discuss this requirement in more detail.

iv.) Section 110 and Part D requirements - CAA Section107 (d)(3)(E)(v)
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.

i.) Section 110(a) requirements
Section 110(a) of Title I of the CAA contains the general requirements for a SIP. Section 110(a)(1) generally directs states to submit a SIP that provides for implementation, maintenance, and enforcement of the air quality standards to the U.S. EPA after reasonable notice and public hearing. Section 110(a)(2) provides that the infrastructure SIP 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[1], 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

[1] Other than nonattainment emission limitations and measures which are a part of nonattainment area plans and subject to the timing requirements of Section 172 of the CAA.

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 27, 2012 infrastructure SIP submission, Ohio verified that the State fulfills the requirements of Section 110(a)(2) of the CAA.

Subpart 1 of Part D, found in Sections 172-176 of the CAA, sets forth the basic nonattainment requirements applicable to all areas which are designated nonattainment based on a violation of the NAAQS. Subpart 2 of Part D, which includes Section 182 of the CAA, establishes more specific requirements depending on the area's ozone nonattainment classification.

The Cleveland-Akron-Lorain, OH area was designated under Subpart 2 of Part D as a marginal nonattainment area for ozone as part of U. S. EPA "Air Quality Designations for the 2008 Ozone NAAQS." (77 FR 30088) Therefore, the Cleveland-Akron-Lorain, OH area must meet the applicable requirements of both Subpart 1 and Subpart 2 of Part D. The applicable Subpart 1 requirements are contained in Section 172(c)(1)-(9) and in Section 176. The applicable Subpart 2 requirements are contained in Section 182(a) (marginal nonattainment area requirements).

ii.) Subpart 1 of Part D - <u>Section 172(c) requirements</u>

Section 172(c)(1) requires the plans for all nonattainment areas to provide for the implementation of all RACM as expeditiously as practicable and to provide for attainment for the national primary ambient air quality standards. As discussed above, U.S. EPA's Implementation Rule did not require marginal nonattainment areas to implement RACT/RACM. In addition, because attainment has been reached in the Cleveland-Akron-Lorain, OH area, no additional measures are needed to provide for attainment.

The reasonable further progress (RFP) requirement under section 172(c)(2) is defined as progress that must be made toward attainment. This requirement is not relevant for purposes of redesignation because the Cleveland-Akron-Lorain, OH area is monitoring attainment of the 2008 eight-hour ozone standard. In addition, because the Cleveland-Akron-Lorain, OH area has attained the ozone standard and is no longer subject

to an RFP requirement, the section 172(c)(9) contingency measures are not applicable for purposes of redesignation.

Section 172(c)(3) requires submission and approval of a comprehensive, accurate and current inventory of actual emissions. This requirement was superseded by the inventory requirement in Section 182(a)(1) discussed below.

Section 172(c)(4) requires the identification and quantification of allowable emissions for major new and modified stationary sources in an area, and Section 172(c)(5) requires source permits for the construction and operation of new and modified major stationary sources anywhere in the nonattainment area. Ohio has a fully approved new source review program which is discussed in more detail under Chapter Five.

Section 172(c)(6) requires the SIP to contain control measures necessary to provide for attainment of the standard. Because attainment has been reached, no additional measures are needed to provide for attainment.

Section 172(c)(7) requires the SIP to meet the applicable provisions of Section 110(a)(2). The Ohio SIP meets the requirements of Section 110(a)(2) for purposes of redesignation, as discussed above.

iii.) Subpart 1 of Part D - <u>Section 176(c) requirements</u>

Section 176(c) of the CAA requires states to establish criteria and procedures to ensure that Federally-supported or funded activities, including highway projects, conform to the air quality planning goals in the applicable SIPs. The requirement to determine conformity applies to transportation plans, programs and projects developed, funded or approved under Title 23 of the U.S. Code and the Federal Transit Act (transportation conformity) as well as to all other Federally-supported or funded projects (general conformity). State conformity revisions must be consistent with Federal conformity regulations relating to consultation, enforcement, and enforceability, which U.S. EPA promulgated pursuant to CAA requirements.

Ohio EPA established two SIPs for conformity. The rules

in Ohio Administrative Code (OAC) Chapter 3745-101 contained Ohio's SIP approved rules for transportation conformity, and OAC Chapter 3745-102 contained Ohio's SIP approved rules for general conformity.

Ohio EPA's transportation conformity rules in OAC Chapter 3745-101 were approved as a part of Ohio's SIP on July 31, 2000 (65 FR 34395) and April 27, 2007 (72 FR 20945). However, Ohio's transportation conformity rules in OAC Chapter 3745-101 were completely removed from Ohio's SIP on March 2, 2015 (80 FR 11134) when the rules were replaced by a series of memorandums of understanding (MOUs) between Ohio EPA, U.S.E PA, and the various state and local agencies involved in the transportation conformity process. The currently effective MOUs are available on Ohio EPA's website at:
http://epa.ohio.gov/dapc/sip/trans_conform.aspx.

Ohio EPA's general conformity rules in OAC Chapter 3745-102 were approved as part of Ohio's SIP on March 11, 1996 (61 FR 9644). In April, 2010, U.S. EPA promulgated changes to 40 CFR 51.851. The language in paragraph (a) of the section was changed from "must" to "may", thereby eliminating the requirement for states to maintain a general conformity SIP. For this reason, Ohio EPA requested, and U.S. EPA granted rescission of Ohio's general conformity SIP. The rules in OAC Chapter 3745-102 were removed from the state SIP on May 26, 2015 (80 FR 29968). The state SIP was replaced by the federal rules in 40 CFR Part 93, subpart B.

iv.) Subpart 2 of Part D - Section 182(a) requirements

Section 182(a)(1) requires the submission of a comprehensive emissions inventory. This requirement is addressed under Chapter Four.

Section 182(a)(2) requires the submission of certain corrections to VOC RACT rules, inspection and maintenance programs and permitting programs. These corrections were addressed for the Cleveland, OH area under the one-hour ozone standard and do not need to be addressed again under the 2008 eight-hour standard.

Section 182(a)(3)(B) requires the submission of an

emission statement SIP. This requirement is addressed under Chapter Five.

v.) Maintenance plans - CAA Section107 (d)(3)(E)(iv)

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 MONITORING

CAA Section107 (d)(3)(E)(i)

Requirement 1 of 4

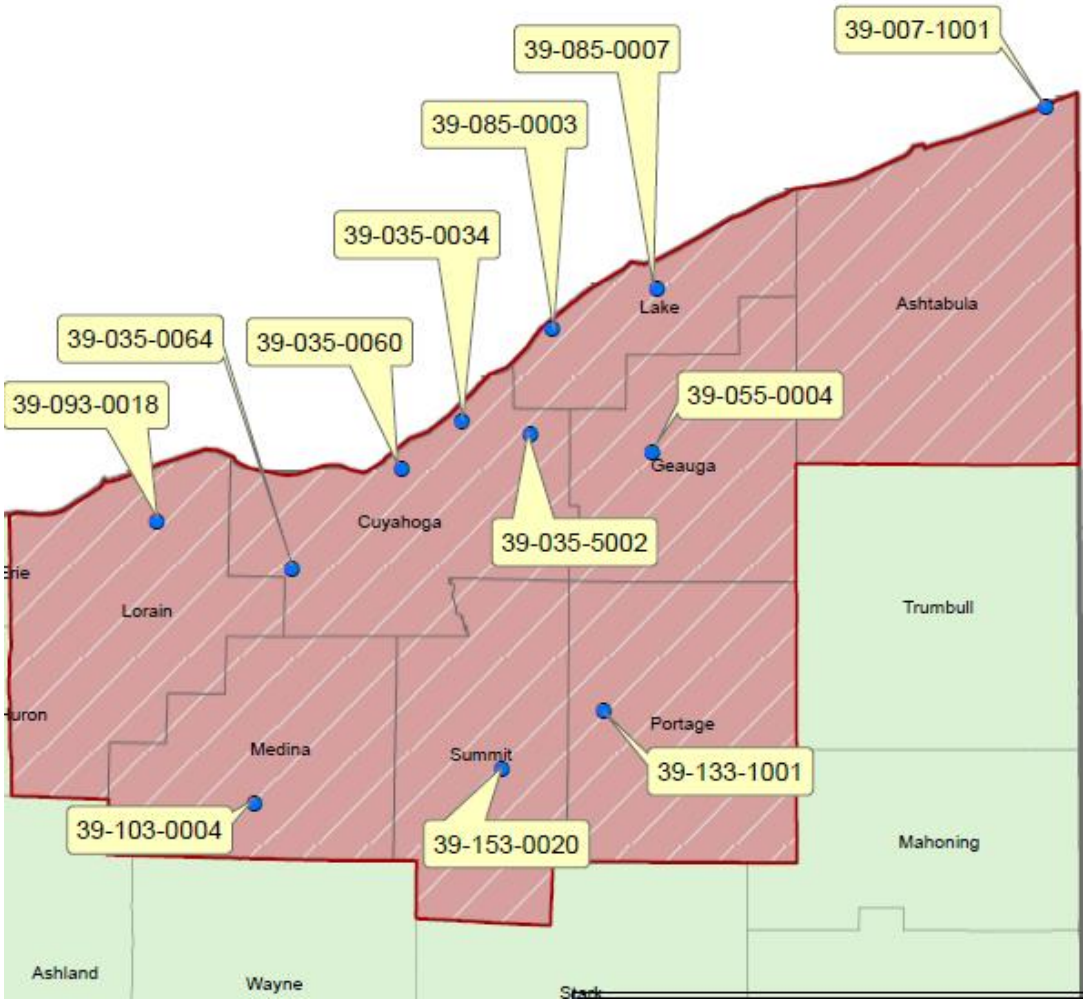
A demonstration that the NAAQS for ozone, as published in 40 CFR 50.15, has been attained.

Background

There are twelve monitors measuring ozone concentrations in this nonattainment area. The monitors are operated by Ohio EPA Division of Air Pollution Control, Northeast District Office, Department of Public Health Division of Air Quality, Lake County General Health District Air Pollution Control and Akron Regional Air Quality Management. 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 2013 through 2015 certified air quality data is shown in Table 1. The locations of the monitoring sites for this nonattainment area are shown on Figure 1.

Demonstration

Figure 1 - Map of the Cleveland-Akron-Lorain, 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 AQS database, and available for public view.

Demonstration

The Ohio EPA has quality assured all 2013 through 2015 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 75 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 Appendix P, "Interpretation of the Primary and Secondary NAAQS for O3" of 40 CFR Part 58.

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 0.075 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 truncated, 0.075666* ppm is the largest concentration that is less than or equal to 0.075 ppm. Therefore, for the purposes of this request, values below 0.0757 ppm meet 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 2012 – 2014 and 2013-2015 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 - Certified Monitoring Data for the Cleveland-Akron-Lorain, OH area for 2012 – 2014 and 2013 – 2015

Data source: **U.S. EPA Air Quality System (AQS)**
http://www.epa.gov/aqs

SITE ID	COUNTY	YEAR	%OBS	1st 8-HR	2nd 8-HR	3rd 8-HR	4th 8-HR	2012-2014 AVER.	2013-2015 AVER.
39-007-1001	Ashtabula	2012	98	97	93	81	79	72	69
39-007-1001	Ashtabula	2013	100	73	73	70	70		
39-007-1001	Ashtabula	2014	100	76	73	70	69		
39-009-1001	Ashtabula	2015	98	83	73	71	70		
39-035-0034	Cuyahoga	2012	98	102	88	86	85	75	69
39-035-0034	Cuyahoga	2013	98	86	73	70	69		
39-035-0034	Cuyahoga	2014	99	75	74	72	71		
39-035-0034	Cuyahoga	2015	96	70	70	68	67		
39-035-0060	Cuyahoga	2012	98	84	81	74	73	65	62
39-035-0060	Cuyahoga	2013	95	66	60	58	57		
39-035-0060	Cuyahoga	2014	97	69	68	67	66		
39-035-0060	Cuyahoga	2015	94	67	63	63	63		
39-035-0064	Cuyahoga	2012	98	94	90	87	83	68	63
39-035-0064	Cuyahoga	2013	97	68	66	66	64		
39-035-0064	Cuyahoga	2014	97	66	62	61	59		
39-035-0064	Cuyahoga	2015	99	68	67	66	66		
39-035-5002	Cuyahoga	2012	99	98	94	89	87	71	66
39-035-5002	Cuyahoga	2013	99	80	70	65	65		
39-035-5002	Cuyahoga	2014	99	75	64	63	61		
39-035-5002	Cuyahoga	2015	99	74	73	72	72		
39-055-0004	Geauga	2012	100	103	99	83	82	70	67

SITE ID	COUNTY	YEAR	%OBS	1st 8-HR	2nd 8-HR	3rd 8-HR	4th 8-HR	2012-2014 AVER.	2013-2015 AVER.
39-055-0004	Geauga	2013	100	74	70	66	65		
39-055-0004	Geauga	2014	100	77	68	67	65		
39-055-0004	Geauga	2015	100	80	79	73	73		
39-085-0003	Lake	2012	100	108	93	92	89	78	73
39-851-0003	Lake	2013	100	85	74	72	70		
39-085-0003	Lake	2014	100	79	78	76	75		
39-085-0003	Lake	2015	98	77	75	74	74		
39-085-0007	Lake	2012	99	97	87	84	83	71	66
39-085-0007	Lake	2013	100	78	70	69	68		
39-085-0007	Lake	2014	100	73	66	64	62		
39-085-0007	Lake	2015	100	78	72	72	70		
39-093-0018	Lorain	2012	97	89	87	85	81	69	63
39-093-0018	Lorain	2013	100	66	63	63	60		
39-093-0018	Lorain	2014	99	68	68	67	67		
39-093-0018	Lorain	2015	99	68	65	64	62		
39-103-0004	Medina	2012	98	90	75	74	74	67	64
39-103-0004	Medina	2013	100	69	66	66	65		
39-103-0004	Medina	2014	100	72	65	65	64		
39-103-0004	Medina	2015	100	69	65	65	63		
39-133-1001	Portage	2012	95	91	75	75	74	64	61
39-133-1001	Portage	2013	98	67	61	59	58		
39-133-1001	Portage	2014	99	66	65	63	61		
39-133-1001	Portage	2015	100	68	65	65	64		

SITE ID	COUNTY	YEAR	%OBS	1st	2nd	3rd	4th	2012-2014	2013-2015
				8-HR	8-HR	8-HR	8-HR	AVER.	AVER.
39-153-0020	Summit	2012	100	86	71	70	70	62	61
39-153-0020	Summit	2013	100	70	64	61	60		
39-153-0020	Summit	2014	100	66	62	59	58		
39-153-0020	Summit	2015	100	68	68	65	65		

The area's design values have trended downward as emissions have declined due to such factors as cleaner automobiles and fuels, along with controls for electric generating units (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 site[2] 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] http://www.epa.gov/ttn/chief/emch/index.html

CHAPTER FOUR

EMISSION INVENTORY

CAA Section107 (d)(3)(E)(iii), & 107 (d)(3)(E)(v)

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 regarding emissions from the counties in the Cleveland-Akron-Lorain, OH area.

Area, non-road, on-road and point source emissions were compiled as follows:

- Area, non-road, and point source emissions (EGUs, non-EGUs and airport related emissions (AIR)) were collected from the data available on U.S. EPA's Emissions Modeling Clearinghouse website[3]. 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. Therefore, 2011 point emissions are actual reported emissions from the 2011 NEI.
- Because the 2014 NEI is not available at this time, Ohio EPA derived 2014 actual point emissions (for EGUs and non-EGUs) from state inventory databases (e.g., Ohio's EIS database which serves as the basis for the 2014 NEI).
- Because all emissions from the state inventory database, the NEI and the Ozone NAAQS Emissions Modeling platform (2011v6.1) are annual totals, tons per summer day were derived according to the U.S. EPA guidance document *Temporal Allocation of Annual Emissions Using EMCH Temporal Profiles*, dated April 29, 2002[4], using the temporal allocation references accompanying the 2011v6.1 modeling inventory files. These files provide SCC specific profiles that allow annual

[3] http://www.epa.gov/ttn/chief/emch/index.html
[4] https://www3.epa.gov/ttn/chief/emch/temporal/index.html

emission totals to be distributed across various temporal periods, as described in the guidance document referenced here.

- Using the above datasets:
    - 2014 emissions for area, non-road and AIR point were derived by interpolating between 2011 and 2018. Note that Ohio EPA does not require airport related emissions to be reported and therefore actual 2014 airport emissions will not be available until the 2014 NEI is available. If those emissions differ appreciably from the emissions projected using this methodology, Ohio EPA will commit to submitting a revised redesignation request and maintenance plan.
    - 2020 emissions for area, non-road and point (EGU, non-EGU and AIR) were derived by interpolating between 2018 and 2025.
    - 2030 emissions for area, non-road and point (EGU, non-EGU and AIR) were derived 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 for all years were developed in conjunction with the Ohio EPA, Ohio Department of Transportation (Ohio DOT), the Akron Metropolitan Area Transportation Study (AMATS) and the Northeast Ohio Areawide Coordinating Agency (NOACA) and were calculated from emission factors produced by U.S. EPA's 2010 Motor Vehicle Emission Simulator (MOVES) software program and data extracted from the region's travel-demand model. Appendix B contains detailed methodology and data for mobile source emissions for all years.
    - Biogenic emissions are not included in these summaries.

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.

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

Demonstration

The 2011 inventory is used as the nonattainment base year for the purpose of this submittal.[5] The 2014 inventory is used as the attainment year inventory for the purposes of comparison. These inventories represent a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutants in the Cleveland-Akron-Lorain, OH area. Emissions of VOC and NOx for 2011 and 2014 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

As discussed above, Ohio EPA prepared a projected emissions inventory for the Cleveland-Akron-Lorain, OH area including area, non-road, mobile, and point sources for precursors of ozone (VOCs and NO_x) for the nonattainment area.

Demonstration

In consultation with U.S. EPA and other stakeholders, Ohio EPA selected the year 2030 as the maintenance year for this redesignation request. The request also contains projected emission inventories for 2020.

On-Road Mobile Emission Estimations

Tables 2 through 10 contain the results of the emissions analysis for the appropriate years. All emissions estimations are expressed in tons per summer day (TSD).

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

	2011	2014	2020	2030
VOC (TSD)	2.88	2.09	1.38	1.06
NOx (TSD)	6.35	4.22	2.28	1.56
VMT (miles/day)	3,154,204	3,232,705	3,399,487	3,608,559

[5] On July 18, 2014, Ohio EPA submitted its 2008 base year inventory as required under CAA Section 182(a)(1). Ohio EPA is not requesting that inventory be replaced with the 2011 inventory in this submittal in Ohio's SIP.

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

	2011	2014	2020	2030
VOC (TSD)	27.04	17.84	12.18	9.37
NOx (TSD)	50.73	31.72	17.65	12.01
VMT (miles/day)	28,384,168	28,467,810	28,392,560	28,736,592

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

	2011	2014	2020	2030
VOC (TSD)	4.76	2.03	1.45	1.11
NOx (TSD)	7.46	3.73	2.20	1.60
VMT (miles/day)	2,559,395	2,650,527	2,718,014	2,919,951

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

	2011	2014	2020	2030
VOC (TSD)	5.94	4.30	2.85	2.15
NOx (TSD)	11.97	8.05	4.71	3.25
VMT (miles/day)	5,789,656	5,918,927	6,031,050	6,419,270

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

	2011	2014	2020	2030
VOC (TSD)	7.80	5.69	3.79	2.86
NOx (TSD)	14.11	10.29	5.76	3.86
VMT (miles/day)	6,968,846	7,133,870	7,237,077	7,689,523

Table 7 – Medina County, Ohio Emission Estimations for On-Road Mobile Sources

	2011	2014	2020	2030
VOC (TSD)	5.41	3.95	2.78	2.22
NOx (TSD)	14.59	10.33	5.85	4.30
VMT (miles/day)	6,169,676	6,370,242	6,688,963	7,281,548

Table 8 – Portage County, Ohio Emission Estimations for On-Road Mobile Sources

	2011	2014	2020	2030
VOC (TSD)	4.48	3.38	2.39	2.00
NOx (TSD)	9.96	6.77	3.93	2.90
VMT (miles/day)	5,137,069	5,270,104	5,882,626	6,360,777

Table 9 – Summit County, Ohio Emission Estimations for On-Road Mobile Sources

	2011	2014	2020	2030
VOC (TSD)	13.61	10.07	6.96	6.01
NOx (TSD)	29.19	19.45	11.15	8.62
VMT (miles/day)	15,901,993	16,368,909	17,696,791	18,872,705

Table 10 - Emission Estimation Totals for On-Road Mobile Sources for the Cleveland-Akron-Lorain-OH Area

	2011	2014	2020	2030
VOC (TSD)	71.92	49.35	33.78	26.78
NOx (TSD)	144.36	94.56	53.53	38.10
VMT (miles/day)	74,065,007	75,413,094	78,046,568	81,888,925

Motor Vehicle Emission Budget

Table 11 contains the motor vehicle emissions budgets for the Cleveland-Akron-Lorain, OH area.

Table 11 - Mobile Vehicle Emissions Budget for the Cleveland-Akron-Lorain, OH Area

	2020 Estimated Emissions	2020 Mobile Safety Margin Allocation*	2020 Total Mobile Budget	2030 Estimated Emissions	2030 Mobile Safety Margin Allocation*	2030 Total Mobile Budget
VOC (TSD)	33.78	5.07	38.85	26.78	4.02	30.80
NOx (TSD)	53.53	8.03	61.56	38.10	5.72	43.82
VMT (miles/day)	78,046,568	-	-	81,888,925	-	-

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

The above budgets for the Cleveland-Akron-Lorain, OH area, agreed upon as part of the interagency consultation process, include the emission estimates calculated for 2020 and 2030 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 Cleveland-Akron-Lorain, OH nonattainment area.

The emission estimates are derived from the travel demand model and MOVES2010 as described above. 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 NOACA, AMATS, 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 Cleveland-Akron-Lorain, OH area well below the 2014 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 30.

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

-An allocation of 5.07TSD for VOC and 8.03TSD for NOx for 2020; and
-An allocation of 4.02TSD for VOC and 5.72TSD for NOx for 2030.

When compared to the overall safety margin, as defined in 40 CFR 93.101[6], discussed under “Requirement 3 of 5” below, it is evident this allocation is significantly below the total safety margin for this area (see Table 30).

[6] "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.

The current eight-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 new 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

Maintenance is demonstrated when the future-year (2030) projected emission totals are below the 2014 attainment year totals.

Sectors included in the following tables are: Electrical Generating Unit (EGU); Non-Electrical Generating Unit (Non-EGU); Non-road Mobile (Non-road); Airport (AIR); Other-Area (Area); and On-road Mobile (On-road).

Demonstration

NO_x

Table 12 -Ashtabula County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	4.21	1.26	0.30	0.71	
Non-EGU	0.74	0.74	0.73	0.71	
AIR	0.00	0.00	0.00	0.00	
Non-road	2.89	5.95	1.95	1.36	
Area	4.02	3.82	3.40	2.67	
On-road	6.35	4.22	2.28	1.56	
TOTAL	**18.21**	**15.99**	**8.66**	**7.01**	**8.98**

Table 13 – Cuyahoga County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	2.83	1.10	0.03	0.01	
Non-EGU	7.62	7.40	6.43	6.05	
AIR	1.67	1.80	2.10	2.68	
Non-road	18.83	21.03	11.00	7.66	
Area	13.78	13.60	13.10	12.03	
On-road	50.73	31.72	17.65	12.01	
TOTAL	**95.46**	**76.65**	**50.31**	**40.44**	**36.21**

Table 14 - Geauga County, Ohio NOx Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.00	0.00	
Non-EGU	0.02	0.02	0.03	0.03	
AIR	0.00	0.00	0.00	0.00	
Non-road	1.66	2.89	0.90	0.61	
Area	0.87	0.90	0.94	0.95	
On-road	7.46	3.73	2.20	1.59	
TOTAL	**10.01**	**7.54**	**4.07**	**3.18**	**4.36**

Table 15 – Lake County, Ohio NO_x Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	27.27	5.48	2.96	2.96	
Non-EGU	1.94	1.81	1.97	1.99	
AIR	0.01	0.01	0.01	0.01	
Non-road	4.83	6.66	3.20	2.36	
Area	4.25	4.12	3.82	3.24	
On-road	11.97	8.05	4.71	3.25	
TOTAL	**50.27**	**26.13**	**16.67**	**13.81**	**12.32**

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

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	12.73	10.48	0.04	0.04	
Non-EGU	1.84	1.66	1.91	1.92	
AIR	0.01	0.01	0.01	0.01	
Non-road	6.17	7.40	3.70	2.40	
Area	5.04	4.83	4.35	3.49	
On-road	14.11	10.29	5.76	3.86	
TOTAL	**39.90**	**34.67**	**15.77**	**11.72**	**22.95**

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

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.01	0.01	
Non-EGU	0.20	0.21	0.20	0.27	
AIR	0.02	0.02	0.02	0.02	
Non-road	2.95	3.07	1.50	0.79	
Area	1.98	1.93	1.82	1.58	
On-road	14.59	10.33	5.85	4.30	
TOTAL	**19.74**	**15.56**	**9.40**	**6.97**	**8.59**

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

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.00	0.00	
Non-EGU	0.28	0.32	0.29	0.29	
AIR	0.00	0.00	0.00	0.00	
Non-road	2.66	4.14	1.39	0.79	
Area	3.11	2.98	2.69	2.15	
On-road	9.96	6.77	3.93	2.90	
TOTAL	**16.01**	**14.21**	**8.30**	**6.13**	**8.08**

Table 19 - Summit County, Ohio NO_x Emission Inventory Total (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.01	0.01	
Non-EGU	1.59	1.33	0.74	0.76	
AIR	0.33	0.36	0.44	0.58	
Non-road	6.30	6.25	3.13	1.86	
Area	5.34	5.28	5.08	4.66	
On-road	29.19	19.45	11.15	8.62	
TOTAL	**42.75**	**32.67**	**20.55**	**16.49**	**16.18**

Table 20 – Cleveland-Akron-Lorain-OH Area NO_x Emission Inventory Totals (TSD)

NOx	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
Ashtabula	18.21	15.99	8.66	7.01	
Cuyahoga	95.46	76.65	50.31	40.44	
Geauga	10.01	7.54	4.07	3.18	
Lake	50.27	26.13	16.67	13.81	
Lorain	39.90	34.67	15.77	11.72	
Medina	19.74	15.56	9.40	6.97	
Portage	16.01	14.21	8.30	6.13	
Summit	42.75	32.67	20.55	16.49	
COMBINED NOx TOTAL	**292.35**	**223.42**	**133.73**	**105.75**	**117.67**

VOC

Table 21 - Ashtabula County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.06	0.01	0.03	0.11	
Non-EGU	7.04	6.68	7.04	7.04	
AIR	0.00	0.00	0.00	0.01	
Non-road	7.35	2.51	4.01	2.18	
Area	3.81	3.75	3.66	3.58	
On-road	2.88	2.09	1.38	1.06	
TOTAL	**21.14**	**15.04**	**16.12**	**13.98**	**1.06**

Table 22 - Cuyahoga County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.04	0.01	0.00	0.00	
Non-EGU	2.77	2.73	2.57	2.49	
AIR	0.41	0.43	0.49	0.60	
Non-road	24.86	15.42	16.66	14.86	
Area	33.36	32.55	31.56	30.93	
On-road	27.04	17.84	12.18	9.37	
TOTAL	**88.48**	**68.98**	**63.46**	**58.25**	**10.73**

Table 23 - Geauga County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.00	0.00	
Non-EGU	0.04	0.08	0.04	0.04	
AIR	0.00	0.00	0.00	0.00	
Non-road	3.34	1.32	2.37	2.13	
Area	4.14	4.05	3.94	3.87	
On-road	4.76	2.03	1.45	1.11	
TOTAL	**12.28**	**7.48**	**7.80**	**7.15**	**0.33**

Table 24 – Lake County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.32	0.26	0.02	0.02	
Non-EGU	0.73	0.80	0.64	0.63	
AIR	0.01	0.01	0.01	0.01	
Non-road	8.22	4.14	4.56	2.77	
Area	6.41	6.30	6.15	6.06	
On-road	5.94	4.30	2.85	2.15	
TOTAL	**21.63**	**15.81**	**14.23**	**11.64**	**4.17**

Table 25 - Lorain County, Ohio VOC Emission Inventory Totals (TSD)

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.09	0.08	0.00	0.00	
Non-EGU	2.51	1.97	2.50	2.50	
AIR	0.02	0.02	0.02	0.03	
Non-road	8.96	5.13	5.36	3.78	
Area	7.54	7.37	7.14	6.95	
On-road	7.80	5.69	3.79	2.86	
TOTAL	**26.92**	**20.26**	**18.81**	**16.12**	**4.14**

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

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.00	0.00	
Non-EGU	0.64	0.52	0.62	0.63	
AIR	0.04	0.04	0.04	0.04	
Non-road	3.60	2.33	2.45	2.11	
Area	5.23	5.14	5.03	4.97	
On-road	5.41	3.95	2.78	2.22	
TOTAL	**14.92**	**11.98**	**10.92**	**9.97**	**2.01**

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

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.00	0.00	
Non-EGU	0.91	1.12	0.91	0.89	
AIR	0.00	0.00	0.00	0.00	
Non-road	4.90	2.12	3.18	2.52	
Area	5.92	5.82	5.69	5.61	
On-road	4.48	3.38	2.39	2.00	
TOTAL	**16.21**	**12.44**	**12.17**	**11.02**	**1.42**

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

Sector	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
EGU	0.00	0.00	0.00	0.00	
Non-EGU	1.22	1.04	1.14	1.12	
AIR	0.09	0.10	0.11	0.13	
Non-road	7.33	4.90	5.09	4.80	
Area	14.44	14.19	13.87	13.62	
On-road	13.61	10.07	6.96	6.01	
TOTAL	**36.69**	**30.30**	**27.17**	**25.68**	**4.62**

Table 29 – Cleveland-Akron-Lorain-OH Area VOC Emission Inventory Totals (TSD)

VOC	2011 Base	2014 Attainment	2020 Interim	2030 Maintenance	Safety Margin
Ashtabula	21.14	15.04	16.12	13.98	
Cuyahoga	88.48	68.98	63.46	58.25	
Geauga	12.28	7.48	7.80	7.15	
Lake	21.63	15.81	14.23	11.64	
Lorain	26.92	20.26	18.81	16.12	
Medina	14.92	11.98	10.92	9.97	
Portage	16.21	12.44	12.17	11.02	
Summit	13.61	10.07	6.96	6.01	
COMBINED VOC TOTAL	**215.19**	**162.06**	**150.47**	**134.14**	**27.92**

VOC and NOx

Table 30 - Cleveland-Akron-Lorain, OH Area Comparison of 2014 attainment year and projected emission estimates (TSD)

	2014	2020	2020 Projected Decrease	2030	2030 Projected Decrease
VOC	162.06	150.47	11.59	134.14	27.92
NO_x	223.42	133.73	89.69	105.75	117.67

As shown in the table above, VOC emissions in the nonattainment area are projected to decrease by 11.59TSD in 2020 and 27.92TSD in 2030. In general, emissions for all sectors are projected to decline or remain stable. EGU sources in Ashtabula County) show a slight increase, but this is fractional compared to the overall reductions expected. Furthermore, Ashtabula, Cuyahoga, Lorain, and Summit Counties show a minor increase in regards to air emissions. Again this increase does not affect the overall reduction in VOC emissions for the area and are likely contributed to slight changes in population projections. Cleaner vehicles and fuels are expected to be in place in 2018 and will cause an overall drop in VOC emissions.

NO_x emissions in the nonattainment area are projected to decrease by 89.69TSD in 2020 and 117.67 TSD in 2030. Non-road and on-road emissions are all projected to decline. Area emissions are projected to decline in all counties expect Geauga, where a slight increase in emissions is projected. Air

emissions are projected to remain steady or slightly increase in Cuyahoga, and Summit Counties. EGU emissions are projected to decrease overall for the Cleveland-Akron-Lorain, OH area. Geauga, Lake, Lorain, Medina, and Portage are projected to have minor increases with non-EGU emissions. However, overall non-EGU NOx emissions are decreasing for the Cleveland-Akron-Lorain, OH area as a whole. Decreases from U.S. EPA rules covering EGUs (NOx SIP Call, CAIR and CSAPR), Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements[7], Highway Heavy-Duty Engine Rule[8], and the Non-Road Diesel Engine Rule[9] are factored into the changes.

As identified in Table 11 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 5.07TSD for VOC and 8.03TSD for NOx in the year 2020 and 4.02TSD for VOC and 5.72TSD for NOx in the year 2030. 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 2014 to 2030) to the mobile emissions budgets for future conformity.

- In 2020: 5.07TSD of the 11.59TSD safety margin for VOC and 8.03TSD of the 89.69TSD safety margin for NOx as a mobile emissions budget safety margin.

- In 2030: 4.02TSD of the 27.92TSD safety margin for VOC and 5.72TSD of the 117.67TSD safety margin for NOx as a mobile emissions budget safety margin.

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 2013 through 2015. U.S. EPA's Redesignation Guidance (p 9) states: "A state may generally demonstrate maintenance of the NAAQS by either

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

[8] http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm

[9] http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm

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 and non-road diesel engines while reductions in EGU emissions were due to implementation of CAIR/CSAPR.

With respect to EGUs, changes at several facilities have resulted in reductions in NOx emissions. Cleveland Electric Illuminating Co., Eastlake Plant in Lake County (OH) permanently shutdown in April of 2015. Prior to the shutdown, EGU NOx emissions had dropped from 27.27 TSD to 5.48 TSD (2011 to 2014). The First Energy Generation, LLC Lake Shore facility in Cuyahoga County (OH) permanently shutdown in April of 2015. Prior to the shutdown, EGU NOx emissions had dropped in Cuyahoga County from 2.83 TSD to 1.10 TSD (2011 to 2014). The First Energy Generation, LLC Ashtabula Plant in Ashtabula County (OH) shutdown coal fired boilers in April of 2015 and December of 2015. Prior to the shutdown, EGU NOx emissions in Ashtabula County had dropped from 4.21 TSD to 1.26 TSD (2011 to 2014). Even greater reductions than predicted will be achieved in these areas due to the shutdown of these facilities.

Reductions achieved are discussed in greater detail under Chapter Five.

Table 31 – Cleveland-Akron-Lorain, OH Area Combined Comparison of 2011 base year and 2014 attainment year EGU, non-road, and on-road reductions

	2011	2014
EGU NOx	47.04	18.32
Non-road NOx	46.29	57.39
Non-road VOC	68.56	37.87
On-road VOC	71.92	49.35
On-road NO_x	144.36	94.56

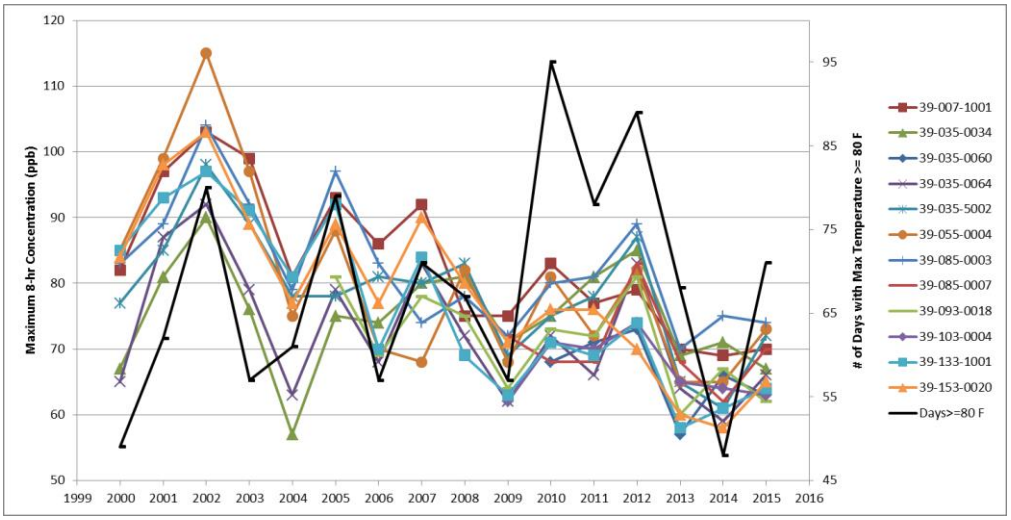
To further support Ohio's demonstration that the improvement in air quality between the year violations occurred and the year attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology, an analysis was performed by Ohio EPA in order to demonstrate the improvement in air quality is not based on unusually favorable meteorology.

Ohio EPA analyzed the maximum fourth-high eight-hour ozone value for May, June, July, August and September, years 2000 to 2015. The values were analyzed against average monthly temperatures, the number of days with a temperature exceeding 80° F, and the average relative humidity. While the formation of tropospheric ozone is dependent on a large number of atmospheric variables, ozone formation is strongly and positively correlated with elevated temperatures and humidity. The utilization of an extended period of record (2000-2015) should eliminate or dampen the influence of other meteorological variables affecting ozone formation, such as wind direction and wind speed.

Meteorological data for the Cleveland-Akron-Lorain, OH area was compiled from monthly local climatological data obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC). The data was recorded at the meteorological station located at the Cleveland-Hopkins International Airport, WBAN 14820. Ohio EPA has previously determined that data from this meteorological station is representative of meteorological conditions across the nonattainment area, and utilizes this same data for New Source Review and Prevention of Significant Deterioration air quality permit modeling applications. Monitor data was compiled from the U.S. EPA's AQS database for the same period.

The first analysis compared the maximum eight-hour ozone concentration at each monitor in the Cleveland-Akron-Lorain, OH area to the number of days where the maximum temperature was greater than or equal to 80° F. The results of this analysis are shown in Figure 2.

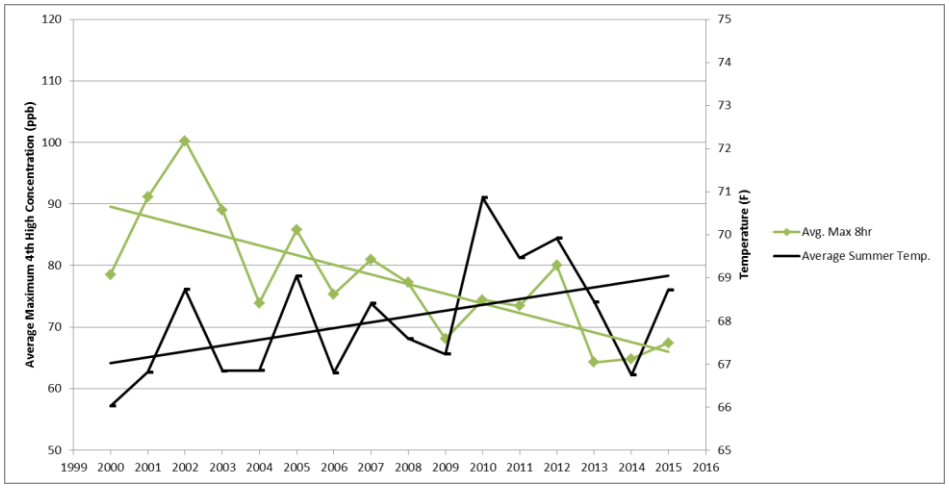
Figure 2 – Maximum eight-hour ozone concentrations versus number of days greater than or equal to 80° F for Cleveland Monitors



The data shown in Figure 2 indicates that while there is some correlation between the number of days in which temperatures were at or exceeded 80° F, this correlation is not 1 to 1. While there is clearly some degree of correlation when comparing one year to the next, the same is not observed when examining the monitor values and temperature data over the period of study. Secondly, a clear trend in decreasing ozone concentrations at all monitors is apparent, while no such trend is observed in the temperature data. Lastly, there is a clear similarity in the recorded ozone values, which is consistent with the regional nature of ground-level ozone formation.

To further examine the relationship between meteorological factors and ozone concentrations, Ohio EPA examined the relationship between average summer temperatures for each year of the 2000 to 2015 period and the 4th maximum eight-hour ozone concentration. Given the similarity of ozone concentrations observed at each monitor (see Figure 2) and the regional nature of ozone formation, Ohio EPA conducted this analysis using the average 4th maximum eight-hour ozone concentration from all monitors in the Cleveland-Akron-Lorain, OH area. The results of this analysis are shown in Figure 3.

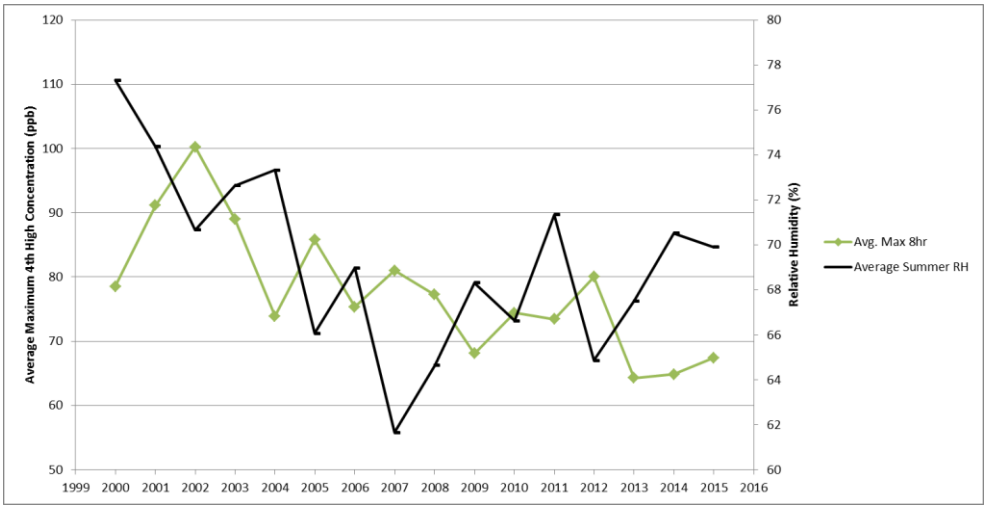
Figure 3 – Average maximum 4th high eight-hour ozone concentrations versus average summer temperatures



The data shown in Figure 3 indicates that while there is some correlation between average summer temperatures and ozone concentrations, this correlation does not exist over the study period. The linear regression lines for each data set demonstrate that average summer temperatures have increased over the 2000 to 2015 period, while average ozone concentrations have decreased. The correlation between temperature and ozone formation is well established; these data serve as strong evidence to suggest that reductions in precursors are responsible for the significant reductions in elevated ozone concentrations in the Cleveland-Akron-Lorain, OH area and not due to unusual or favorable summer temperatures.

Lastly, Ohio EPA analyzed the relationship between average summertime relative humidity and average 4th maximum eight-hour ozone concentrations in the Cleveland-Akron-Lorain, OH area. As with the data shown in Figure 3, Ohio EPA considered the overall trend in ozone monitors by analyzing the average of 4th maximum 8-hour concentrations across all monitors in the area. These data are shown in Figure 4.

Figure 4 – Average maximum 4th high eight-hour ozone concentrations versus average summer relative humidity



The data presented in Figure 4 do not indicate a correlation between relative humidity and ozone concentrations, and the period of study represents a significant spread of average summertime relative humidity.

The analyses of meteorological variables associated with ozone formation above further support Ohio's demonstration that the 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 unusually favorable meteorology. The extended study period should dampen the effects of minor variations in wind directions and wind speeds, and provides a sufficient basis to examine long-term trends in both the meteorological variables and the regional ozone concentrations in the Cleveland-Akron-Lorain, OH area.

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 2011 base year and the 2030 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 Section107 (d)(3)(E)(ii), 107(d)(3)(iv) & 107(d)(3)(E)(v)

Requirement 1 of 4

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). In addition, on July 18, 2014, Ohio EPA submitted a SIP revision for this area and U.S. EPA published a proposal and direct final action approving that submittal on March 10, 2016 (81 FR 12626 and 81 FR 12591). The approval was effective May 9, 2016. As discussed in Chapter Four (Requirement 4), Ohio EPA submits, and commits to submit, emission inventories (statements) every three years.

Requirement 2 of 4

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

Background

On October 27, 1998, U.S. EPA promulgated the NO_x SIP Call requiring 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 promulgated this rule in 2001. NOx 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.

As discussed in detail below, U.S. EPA subsequently replaced the NOx SIP Call with CAIR and CSAPR. CSAPR continues to

be implemented and amounts to even further reductions than that realized under the NOx SIP Call.

Section 182(b) contains additional provisions applicable to moderate nonattainment areas, for which the Cleveland-Akron-Lorain, OH area was under the one-hour standard and the 1997 eight-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, and Section 182(b)(2) requires RACT under Section 172(c)(1).

Demonstration

NOx SIP Call

Controls for EGUs under the NOx SIP Call 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 3745-14[10] 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 NOx emissions from EGUs and a 60 percent reduction of NO_x emissions from non-EGUs, compared to historical levels. This cap stayed in place through 2008, at which time the CAIR program superseded it as discussed above.

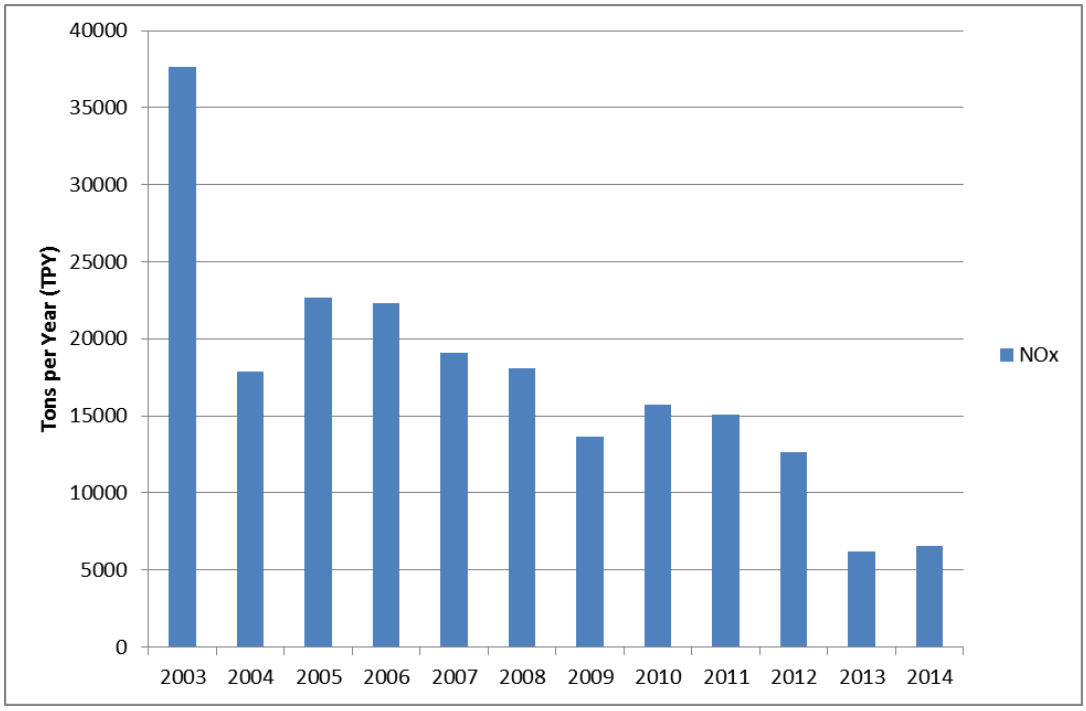
On April 21, 2004, U.S. EPA published Phase II of the NO_x SIP Call that establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. Ohio EPA's OAC rule 3745-14-12 addresses stationary internal combustion engines, all used in natural gas pipeline transmissions. 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.

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

As discussed further below, starting January 1, 2009, CAIR commenced and emissions covered by this program have continued trending downward. 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 implementation of CAIR. CAIR's cap and trade program stayed in place through 2014, at which time the CSAPR program superseded it.

The following graph depicts the trend in NOx emissions from EGUs for the entire nonattainment area:

Figure 5 - NO_x Emissions from EGUs – Entire Nonattainment Area Electric Generating Units, 2003-2014



VOC RACT

The Cleveland-Akron-Lorain, OH area was required to adopt RACT for the following source categories under Section 182(b)(2) for the one-hour standard and the 1997 eight-hour ozone standard: (a) all VOC sources covered by Control Technique Guidelines (CTGs) issued between November 15, 1990 and the date the Cleveland area attained the one-hour ozone standard; (b) all VOC sources covered by a CTG issued prior to November 15, 1990; and (c) all other major non-CTG stationary sources in the Cleveland area.

U.S. EPA approved Ohio EPA's VOC RACT rules on September 7, 1994 (59 FR 46182), October 23, 1995 (60 FR 54308), April 25, 1996 (61 FR 18255), and July 28, 2009 (74 FR 37171).

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 3745-21[11].

Gasoline Vapor Recovery Systems

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. However, some areas, including Ohio, retained Stage II requirements to provide a control method to comply with rate-of-progress emission reduction targets. Congress recognized that onboard refueling vapor recovery and Stage II would eventually become redundant, and actually increase emissions, and provided the U.S. EPA authority to allow states to remove Stage II from their SIPs after U.S. EPA finds that onboard refueling vapor recovery is in widespread use. On May 16, 2012, the U.S. EPA determined that onboard refueling vapor recovery technology is in widespread use throughout the motor vehicle fleet for purposes of controlling motor vehicle refueling emissions. This action (77 FR 28772) also provided notice of an upcoming guidance document for states to use to prepare a SIP revision to remove or phase-out Stage II controls. U.S. EPA published this

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

guidance on August 7, 2012 (EPA-457/B-12-001). The guidance noted that since Section 182(b)(3) requirements no longer applied, the only requirements for Stage II controls are state SIPs (which includes Ohio, as noted above), Section 184(b)(2) for areas in the ozone transport region (does not apply to Ohio), and section 193 for any area that adopted Stage II controls prior to November 15, 1990 (does not apply to Ohio). In order to remove Stage II control requirements from the SIP, CAA Section 110(ℓ) is required to be addressed. Ohio EPA conducted this demonstration and submitted the SIP revision request to U.S. EPA on July 15, 2015. This demonstration included a new requirement for the use of low permeation hoses which will provide even greater VOC emissions reductions in the future.

Motor Vehicle Inspection and Maintenance Program

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 under Section 182(b)(4). 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 continues to be being implemented in this area.

In addition to the above, there are several measures beyond the CAA requirements that have been implemented in this area.

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 were phased in between 2004 and 2009. U.S. EPA has estimated that NO_x emission reductions were 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 were 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.

Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards

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 NOx. Compared to Tier II, the Tier III tailpipe standards for light-duty vehicles are expected to reduce NOx 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.

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 was phased in from 2004 through 2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule resulted 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 cut emissions from non-road diesel engines by more than 90 percent. Non-road diesel equipment, as described in this rule, accounted for 47 percent of diesel particulate matter (PM) and 25 percent of NO_x from mobile sources nationwide. Sulfur levels were reduced in non-road diesel fuel by 99 percent from previous levels, from approximately 3,000 parts per million (ppm) to 15 ppm in 2009. New engine standards took effect, based on engine horsepower, starting in 2008.

Non-road Spark-Ignition Engines and Recreational Engine Standards

Effective in January 2003, this standard regulates NOx, 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 NOx, 72% reduction in VOC, and 56% reduction in CO emissions are expected by 2020.

Reciprocating Internal Combustion Engine Standards

This new standard, effective in May 2010, 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 June 12, 2006; and (3) used at major sources of air toxics for nonemergency 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.

The 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 (PM2.5), and CO, respectively.

Category 3 Marine Diesel Engine Standards

This new standard, effective in June 2010, 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 NOx 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 NOx and PM2.5 emissions in the U.S. will be reduced by approximately 1.2 million tpy and 143,000 tpy, respectively.

Clean Air Interstate Rule (CAIR)/Cross State Air Pollution Rule (CSAPR)

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 NOx SIP Call; Final Rule.” This rule established the requirement for states to adopt rules limiting the emissions of NOx and SO2 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 PM2.5, SO2, and ozone precursors (NOx).

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 NOx and SO2 in two phases, with Phase I caps for NOx and SO2 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. SO2 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. NOx 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, 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). Ohio's rule included annual and seasonal NOx trading programs, and an annual SO2 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 has 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 the U.S. EPA's motion. CSAPR became effective on January 1, 2015, for SO2 and annual NOx, and May 1, 2015 for ozone season NOx. Combined with other final state and U.S. EPA actions, CSAPR will reduce power plant SO2 emissions by 73% and NOx emissions by 54% from 2005 levels in the CSAPR region, which includes the states of Indiana, Kentucky, and Ohio.

Oil and Natural Gas Industry Standards

This new standard, issued on April 17, 2012, 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. When these standards are fully implemented in 2015, U.S. EPA estimates that VOC and air toxic emissions in the U.S. will be reduced by approximately 190,000 to 290,000 tpy and 12,000 to 20,000 tpy, respectively.

Mercury and Air Toxic Standards

This new standard, effective in April 2012, 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.

EGUs

As discussed above, several federally enforceable changes at EGUs have resulted in reductions in NOx emissions and will result in further reductions than projected. Cleveland Electric Illuminating Co., Eastlake Plant in Lake County (OH) permanently shutdown in April of 2015; First Energy Generation, LLC Lake Shore facility in Cuyahoga County (OH) permanently shutdown in April of 2015; and First Energy Generation, LLC Ashtabula Plant in Ashtabula County (OH) shutdown coal fired boilers in April of 2015 and December of 2015.

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

Requirement 3 of 4

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 3745-31[12]. 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 2008[13] emission inventory, or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or

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

[13] On July 18, 2014, Ohio EPA submitted its 2008 base year inventory as required under CAA Section 182(a)(1).

reconstruct without meeting all applicable NSR requirements. Once the area is redesignated, Ohio EPA will implement NSR through the PSD program.

Requirement 4 of 4

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 Cleveland-Akron-Lorain, OH area, will be submitted to U.S. EPA for approval as a SIP revision.

Ohio, through Ohio EPA's Legal section and the Ohio Attorney General's Office, 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 Cleveland-Akron-Lorain, OH area.

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 79 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 76 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) Tighten VOC RACT on existing sources covered by U.S. EPA Control Technique Guidelines issued after the 1990 CAA.

2) Apply VOC RACT to smaller existing sources.

3) One or more transportation control measures sufficient to achieve at least half a percent reduction in actual area wide 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, area wide 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.

4) Alternative fuel and diesel retrofit programs for fleet vehicle operations.

5) Require VOC or NO_x emission offsets for new and modified major sources.

6) Increase the ratio of emission offsets required for new sources.

7) Require VOC or NO_x controls on new minor sources (less than 100 tons).

8) Adopt additional NOx 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
- other sources less than 100 tons per year

VOC RACT

- architectural and industrial maintenance coatings
- automobile refinishing shops
- cold cleaner degreasers
- synthetic organic compound manufacturing
- organic compound batch processes
- wood manufacturing
- industrial wastewater
- aerospace industry
- 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

MODELING ANALYSIS

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 Cleveland-Akron-Lorain, OH area to determine the effect of national emission control strategies on ozone levels. This area includes Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit Counties in Ohio. These modeling analyses determined that this area was significantly impacted by ozone and ozone precursor transport and regional NOx reductions will help the area attain the 2008 eight-hour ozone standard of 75 ppb in this area.

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 eight-hour ozone standard. 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) and 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 Nonroad Spark-Ignition Engines and Recreational Engine Standards.

This modeling was conducted to identify monitoring sites that may have difficulty attaining the 2008 eight-hour ozone standard 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 32 shows the results of U.S. EPA's "Good Neighbor" Provision modeling for ozone impacts at the ozone monitors in the Cleveland-Akron-Lorain, OH area. The monitor identification number, county, and the 2009 – 2013 eight-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.

Table 32- Comparison of Cleveland-Akron-Lorain, OH Area Average Design Values with U.S. EPA "Good Neighbor" Provision Modeling Results (ppm)

Monitor ID	County	Monitored Average Design Value 2009-2013	U.S. EPA Projected Average Design Value 2018
39-007-1001	Ashtabula	0.0773	0.0668
39-035-0034	Cuyahoga	0.0777	0.0639
39-035-0060	Cuyahoga	0.0685	0.0560
39-035-0064	Cuyahoga	0.0700	0.0602
39-035-5002	Cuyahoga	0.0767	0.0630
39-055-0004	Geauga	0.0747	0.0653
39-085-0003	Lake	0.0800	0.0649
39-085-0007	Lake	0.0717	0.0584
39-093-0018	Lorain	0.0717	0.0586
39-103-0004	Medina	0.0690	0.0607
39-133-1001	Portage	0.0683	0.0604
39-153-0020	Summit	0.0720	0.0642

Due to the differences in the base period 2009 – 2013 average design values and more current average design values for all of the Cleveland-Akron-Lorain, OH area ozone monitors, a comparison of these values, as well as the 2018 projected average design values taken from the "Good Neighbor" Provision was made, and are presented in Table 33. The current average design values were calculated by averaging the three 3-year design values from 2010 – 2012, 2011 – 2013, and 2012 – 2014, and 2013 - 2015.

Comparison of the 2009 – 2013 average design values with current 3-year average design values for all ozone monitors in the Cleveland-Akron-Lorain, OH area show that current average design values are below the average eight-hour ozone design values for 2009 – 2013.

Based on the 2009 – 2013 average design values, the 2018 projected average design values modeled well below the 2008 eight-hour ozone standard of 75 ppb. With the exception of the Cuyahoga monitor (39-035-0064) and Lake County monitors (39-085-0003 and 39-085-0007), if the modeling was conducted with the 2010 – 2014 average design values, the 2018 projected average design values would be lower than the current results, further re-enforcing maintenance of the standard. Modeling conducted using the 2011-2015 average design values would result in 2018 projected design values at all monitors well below the current results, again further reinforcing maintenance of the standard. For the highest monitor in the area (Lake County monitor 39-

085-0003), the 2018 projected average design value is 0.0649 ppm, well below the level of the 2008 eight-hour ozone standard that demonstrates attainment (0.0757 ppm).

Table 33- Comparison of Cleveland-Akron-Lorain, OH Area Current Design Values with U.S. EPA "Good Neighbor" Design Values (ppm)

Monitor ID	County	Monitored Average Design Value 2009-2013	Monitored Average Design Value 2010-2014	Monitored Average Design Value 2011-2015	U.S. EPA Projected Average Design Value 2018
39-007-1001	Ashtabula	0.0773	0.0753	0.0720	0.0668
39-035-0034	Cuyahoga	0.0777	0.0777	0.0740	0.0639
39-035-0060	Cuyahoga	0.0685	0.0673	0.0647	0.0560
39-035-0064	Cuyahoga	0.0700	0.0707	0.0673	0.0602
39-035-5002	Cuyahoga	0.0767	0.0757	0.0710	0.0630
39-055-0004	Geauga	0.0747	0.0737	0.0700	0.0653
39-085-0003	Lake	0.0800	0.0803	0.0770	0.0649
39-085-0007	Lake	0.0717	0.0723	0.0700	0.0584
39-093-0018	Lorain	0.0717	0.0717	0.0677	0.0586
39-103-0004	Medina	0.0690	0.0690	0.0667	0.0607
39-133-1001	Portage	0.0683	0.0673	0.0640	0.0604
39-153-0020	Summit	0.0720	0.0680	0.0637	0.0642

LADCO Modeling for Eight-Hour Ozone Standard

The LADCO performed photochemical modeling for ozone, which used the most recent emissions inventories and model updates. This modeling was performed to support attainment demonstrations for the five-state LADCO region. The photochemical model used by LADCO and Indiana for the eight-hour ozone standard analysis is CAMx version 6.11, 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 34 shows that modeled ozone concentrations in the Cleveland-Akron-Lorain, OH area for 2018 will be below the eight-hour ozone standard of 75 ppb. As shown in Table 32 above, the current 2011 – 2015 average design values decreased from the 2009 – 2013 average design values, thus the projected average design values would be lower than the LADCO modeling results using the latest average design values. For Lake County monitor 39-085-0003, the projected average design value was well below the 2008 eight-hour ozone standard at 0.0644 ppm. If the LADCO modeling was performed using the lower 2011 – 2015 average design value, it is expected that the 2018 projected average design value would be further below the standard for the Lake County monitor, as well as all other monitors in the area.

Table 34- LADCO's Modeling Results for the Cleveland-Akron-Lorain, OH Area (ppm)

Monitor ID	County	Monitored Average Design Value 2009-2013	Monitored Average Design Value 2010-2014	Monitored Average Design Value 2011-2015	LADCO Projected Average Design Value 2018
39-007-1001	Ashtabula	0.0773	0.0753	0.0720	0.0663
39-035-0034	Cuyahoga	0.0777	0.0777	0.0740	0.0625
39-035-0060	Cuyahoga	0.0685	0.0673	0.0647	0.0547
39-035-0064	Cuyahoga	0.0700	0.0707	0.0673	0.0612
39-035-5002	Cuyahoga	0.0767	0.0757	0.0710	0.0659
39-055-0004	Geauga	0.0747	0.0737	0.0700	0.0672
39-085-0003	Lake	0.0800	0.0803	0.0770	0.0644
39-085-0007	Lake	0.0717	0.0723	0.0700	0.0586
39-093-0018	Lorain	0.0717	0.0717	0.0677	0.0579
39-103-0004	Medina	0.0690	0.0690	0.0667	0.0632
39-133-1001	Portage	0.0683	0.0673	0.0640	0.0623
39-153-0020	Summit	0.0720	0.0680	0.0637	0.0660

Summary of Existing Modeling Results

U.S. EPA and LADCO modeling shows that national emission control measures will bring the Cleveland-Akron-Lorain, OH area into attainment of the 2008 eight-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 Cleveland-Akron-Lorain, OH area will attain the ozone standard with 2018 projected average design values below the 2008 eight-hour ozone standard of 75 ppb. In addition, LADCO's modeling results continue to show 2018 projected average design values below the eight-hour ozone standard.

U.S. EPA and LADCO modeling demonstrates that the Cleveland-Akron-Lorain, OH ozone nonattainment area will attain the 2008 eight-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.

CHAPTER EIGHT

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.

The public hearing to receive comments on the redesignation request was held on June 27, 2016 at 2110 East Aurora Road, Twinsburg, Ohio 44087. The public comment period closed on June 27, 2016. _____ testimony was provided at the public hearing and _____ comments were received during the public comment period. Appendix C includes a copy of the public notice and transcript from the public hearing and comment period.

CHAPTER NINE

CONCLUSIONS

The Cleveland-Akron-Lorain, OH ozone nonattainment area has attained the 2008 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 Cleveland-Akron-Lorain, OH 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 Cleveland-Akron-Lorain, OH 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 eight-hour ozone standard.

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