



STATE OF OHIO NONATTAINMENT
AREA STATE IMPLEMENTATION PLAN
AND DEMONSTRATION OF ATTAINMENT
FOR 1-HOUR SO₂
NONATTAINMENT AREAS

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STATE OF OHIO NONATTAINMENT AREA STATE IMPLEMENTATION PLAN AND DEMONSTRATION OF ATTAINMENT FOR 1-HOUR SO₂ NONATTAINMENT AREAS

CHAPTER ONE: Introduction

History

The Clean Air Act (CAA), as amended, requires each state with areas failing to meet the 1-hour sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS) to develop State Implementation Plans (SIPs) to expeditiously attain and maintain the standard. The United States Environmental Protection Agency (U.S. EPA) promulgated the revised NAAQS for SO₂ on June 2, 2010. U.S. EPA replaced the 24-hour and annual standards with a new short-term 1-hour standard of 75 parts per billion (ppb). The new 1-hour SO₂ standard was published on June 22, 2010 (75 FR 35520) and became effective on August 23, 2010. The standard is based on the three-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

On August 15, 2013, U.S. EPA published (78 FR 47191) the initial SO₂ nonattainment area designations for the 1-hour SO₂ standard across the country (effective October 4, 2013). Unlike Subpart 2 of the CAA Amendments of 1990 which defined five ozone nonattainment classifications for the areas that exceed the NAAQS based on the severity of the ozone levels, SO₂ nonattainment designations are simply labeled “nonattainment.”

Requirements

Section 172 of the CAA addresses general requirements for areas designated as nonattainment for all NAAQS while Section 191 and 192 of the CAA address nonattainment area requirements specific to SO₂. Specifically, Section 191(a) requires states with SO₂ nonattainment areas to submit a plan within eighteen months of the effective date of the designations (April 4, 2015) detailing how the SO₂ standard will be attained, as expeditiously as practicable, but no later than October 4, 2018 (referred to as a “nonattainment area SIP” and “attainment demonstration”). However, areas that attain before the required date for submitting a plan may be exempt from certain otherwise applicable requirements, including submittal of a full nonattainment area SIP and attainment demonstration.

Section 172(c) of the CAA details the specific provisions required to be addressed in a nonattainment area SIP. These criteria are discussed in more detail under Chapter Two with a detailed analysis in subsequent chapters.

Nonattainment Areas

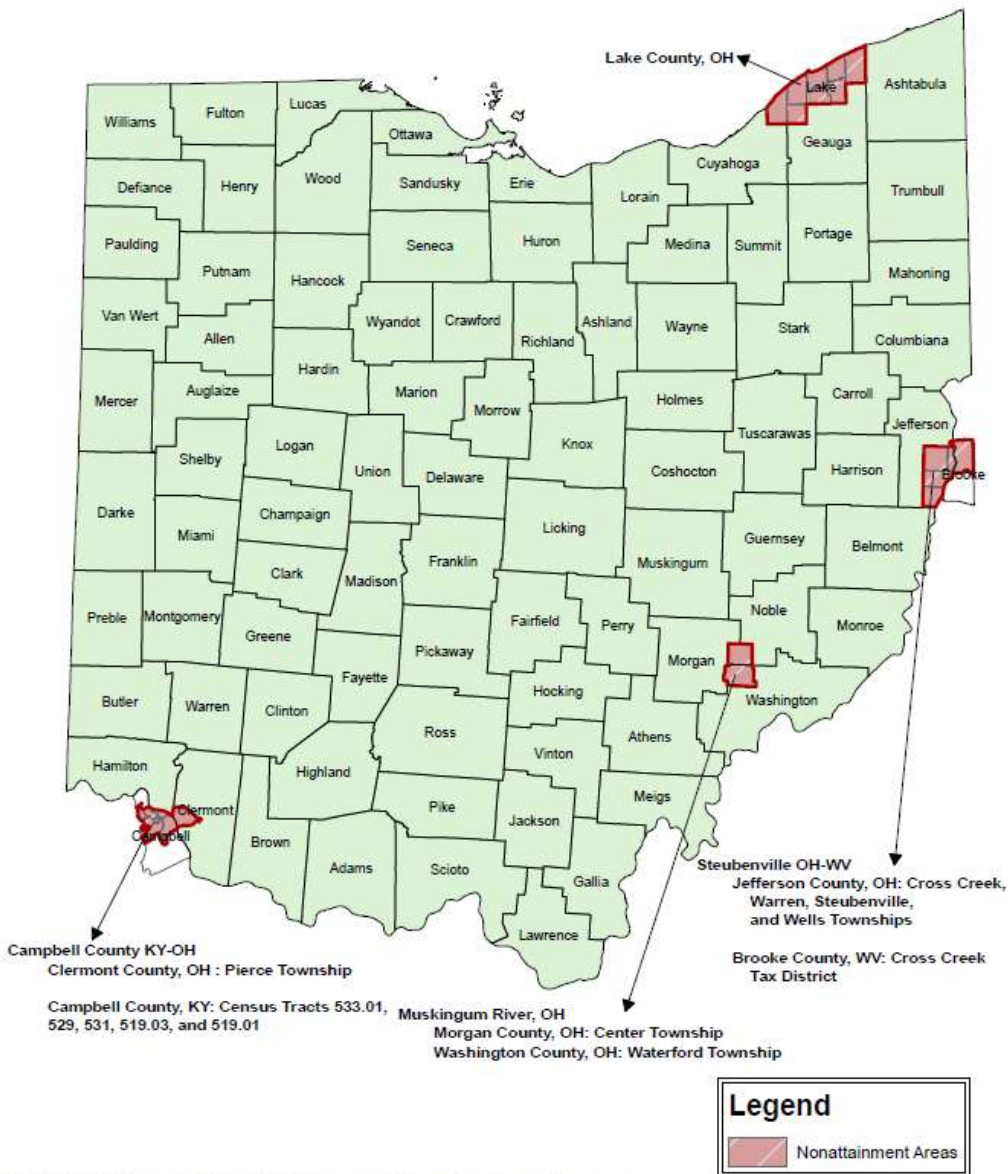
Four areas of the state were designated nonattainment in 2013 (see Figure 1):

1. Lake County, OH nonattainment area is located in northeastern Ohio and includes all of Lake County. Portions of Lake County were previously designated nonattainment from 1978 to 1999 under the 1971 SO₂ standard and include the cities of Eastlake, Lakeline, Mentor (north of US 20 and west of SR 306), Timberlake, and Willoughby (north of US 20) (43 FR 45993, 43 FR 8962). The area was redesignated to attainment effective September 29, 1999 (64 FR 47113).
2. Muskingum River, OH nonattainment area is located in southeastern Ohio and includes Center Township in Morgan County and Waterford Township in Washington County. This area was also designated nonattainment under the 1971 SO₂ standard from 1978 to 1993 (43 FR 45993, 43 FR 8962). The area was redesignated to attainment effective October 21, 1994 (59 FR 48403).
3. Steubenville OH-WV nonattainment area is located in eastern Ohio and includes Cross Creek Township, Steubenville Township, Warren Township, Wells Township, and Steubenville City in Jefferson County, Ohio and includes the Cross Creek Tax District in Brooke County, West Virginia. Portions of Jefferson County were previously designated nonattainment from 1978 to 1999 under the 1971 SO₂ standard and include the cities of Steubenville and Mingo Junction, and the townships of Steubenville, Island Creek, Cross Creek, Knox and Wells (43 FR 45993, 43 FR 8962). The area was redesignated to attainment effective September 29, 1999 (64 FR 47113).
4. Campbell-Clermont KY-OH nonattainment area is located in southwestern Ohio and includes Pierce Township in Clermont County, Ohio and the following area in Campbell County, Kentucky that lies south and west of the Ohio River: beginning at geographic coordinates 38.9735 North Latitude, 84.3017 West Longitude (NAD 1983) on the edge of the Ohio River running southwesterly to KY Highway 1566; thence continuing running southwesterly along KY Highway 1566 to KY Highway 9 (AA Highway); thence running north westerly along KY Highway 9 (AA Highway) from Hwy 1566 to Interstate 275; thence running northeasterly along Interstate 275 to Highway 2345 (John's Hill Road), Hwy 2345 to US-27, US-27 to I-275, I-275 to the Ohio River; thence running southeasterly along the Ohio River from Interstate 275 to geographic coordinates 38.9735 North Latitude, 84.3017 West Longitude (NAD 1983). This area was never designated as nonattainment under the 1971 SO₂ standard.

The Campbell-Clermont KY-OH nonattainment area is not addressed in this submittal any further. Air quality data from the 2012 to 2014 period

indicates this area is now attaining the standard. On March 12, 2015 Ohio EPA provided a draft redesignation request and maintenance plan to U.S. EPA and the public for comment. In addition, on March 31, 2015, the State of Kentucky submitted a clean data determination request to U.S. EPA. As noted above, areas that attain before the required date for submitting a plan may be exempt from certain otherwise applicable requirements, including submittal of a full nonattainment area SIP. Ohio EPA's redesignation request and maintenance plan addresses all elements that remain required under Section 172(c) for this area, such as the inventory requirements.

Figure 1: Ohio 2013 Nonattainment Area Designations



Ohio EPA DAPC Maps Available at: <http://www.epa.ohio.gov/dapc/general/naaqs.aspx>

Air Quality Trends

Nonattainment designations were first recommended by states based on 2008 to 2010 air quality data. By the time designations were finalized by U.S. EPA, 2009 to 2011 and 2010 to 2012 air quality data was also considered. Over that time period, SO₂ air quality improved in many areas. In the two years since final designations, additional improvements have occurred. Table 1 identifies 2008 through 2014 air quality trends at monitors located in Ohio's nonattainment areas. Appendix A includes the air quality data generated from U.S. EPA's Air Quality System (AQS).

Table 1 - Monitoring data for Ohio's SO2 Nonattainment Areas

Site	County	Year (ppb)							Design Value (ppb)				
		2008	2009	2010	2011	2012	2013	2014	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014
Lake County, OH Nonattainment Area													
39-085-0003	Lake, OH	42	37	31	32	38	32	33	37	33	34	34	34
39-085-0007[1]	Lake, OH	n/a	186	139	145	163	119	72	163	157	149	142	118
39-085-3002	Lake, OH	164	60	99	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a
Muskingum River, OH Nonattainment Area													
39-115-0004	Morgan, OH	220	198	167	175	142	124	148	195	180	161	147	138
Steubenville, OH-WV Nonattainment Area													
39-081-0017	Jefferson, OH	135	85	127	114	92	37	30	116	109	111	81	53
54-009-0005	Brooke, WV	168	82	131	143	71	49	33	127	119	115	88	51
54-009-0007	Brooke, WV	137	81	92	75	71	31	32	103	83	79	59	45
54-009-0011	Brooke, WV	159	143	143	235	117	62	48	148	174	165	138	76
Campbell-Clermont, KY-OH Nonattainment Area													
21-037-3002	Campbell, KY	52	60	99	109	85	71	61	70	89	98	88	72
	Less than 75% capture in at least one quarter												

[1] Monitor -3002 was replaced by monitor -0007 as part of a relocation approved under Ohio's Annual Monitoring Plan. Therefore, 2008 to 2010 data is combined.

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

This document is Ohio's nonattainment area SIP and attainment demonstration for nonattainment areas and addresses each of the applicable Section 172(c) requirements.

CHAPTER TWO: Overview of Attainment Demonstration Requirements

U.S. EPA has published detailed guidance for Section 172(c) nonattainment area requirements in a document entitled *Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions* (SO₂ nonattainment area SIP guidance), issued April 23, 2014, to Regional Air Division Directors. This nonattainment area SIP is based on this guidance.

Section 172(c) of the CAA details the specific provisions required to be addressed in a nonattainment area SIP. They include the following requirements:

1. General

Such plan provisions shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards. (CAA Section 172(c)(1))

This provision is discussed in detail in Chapter 6 and 7 of this document.

2. Reasonable Further Progress (RFP)

Such plan provisions shall require reasonable further progress. (CAA Section 172(c)(2))

This provision is discussed in detail in Chapter 9 of this document.

3. Inventory

Such plan provisions shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met. (CAA Section 172(c)(3))

This provision is discussed in detail in Chapter 4 of this document.

4. Identification and Quantification

Such plan provisions shall expressly identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in

accordance with section 173(a)(1)(B), from the construction and operation of major new or modified stationary sources in each such area. The plan shall demonstrate to the satisfaction of the Administrator that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard by the applicable attainment date. (CAA Section 172(c)(4))

This provision is discussed in detail in Chapter 4 of this document.

5. Permits for New and Modified Major Stationary Sources

Such plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with section 173. (CAA Section 172(c)(5))

This provision is discussed in detail in Chapter 5 of this document.

6. Other Measures

Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part. (CAA Section 172(c)(6))

This provision is discussed in detail in Chapter 7 of this document.

7. Compliance with Section 110(a)(2)

Such plan provisions shall also meet the applicable provisions of section 110(a)(2). (CAA Section 172(c)(7))

Section 110(a)(2) of the CAA directs air agencies to develop and maintain a comprehensive air quality management infrastructure program. Ohio EPA submitted its “Infrastructure SIP” to address these requirements on June 7, 2013. U.S. EPA publishes proposed rulemaking regarding this SIP on July 25, 2014 but has not finalized approval at the time of this submittal.

Ohio EPA has met the Section 110(a)(2) of the CAA requirements and continues to implement those requirements.

8. Equivalent Techniques

Upon application by any State, the Administrator may allow the use of equivalent modeling, emission inventory, and planning procedures, unless the Administrator determines that the proposed techniques are, in the aggregate, less effective than the methods specified by the Administrator. (CAA Section 172(c)(8))

There may be cases where Ohio EPA elected to use methods equivalent to those specified by U.S. EPA. Where this occurs, Ohio EPA has provided justification in this SIP submittal.

9. Contingency Measures

Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator. (CAA Section 172(c)(9))

This provision is discussed in detail in Chapter 9 of this document.

CHAPTER THREE: Conformity

CAA Sections 176(c)

As discussed in the SO₂ nonattainment area SIP guidance, CAA Section 176(c) requires that actions by federal agencies do not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS or interim reductions and milestones. General conformity applies to any federal action (e.g., funding, licensing, permitting or approving), other than certain highway and transportation projects, if the action takes place in a nonattainment for SO₂. U.S. EPA's General Conformity Rule establishes the criteria and procedures for determining if a federal action conforms to the SIP. Ohio EPA meets all of U.S. EPA's conformity procedures. Ohio EPA commits to following the general conformity requirements of 40 CFR 93.150 to 93.165. On August 20, 2014, Ohio EPA submitted signed Memorandums of Understanding (MOUs) to U.S. EPA establishing transportation conformity procedures for inclusion in Ohio's SIP. U.S. EPA issued a direct final rulemaking approving the MOUs on March 2, 2015 (80 FR 11133) with an effective date of May 1, 2015.

Also discussed in the SO₂ nonattainment area SIP guidance, CAA Section 176(c) addresses transportation conformity requirements that ensure that federally supported highway and transit project activities are consistent with the SIP. Transportation conformity applies to areas that are designated nonattainment for transportation-related criteria pollutants. However, in the SO₂ nonattainment area SIP guidance, U.S. EPA states that due to the relatively small, and decreasing, amounts of sulfur in gasoline and on-road diesel fuel, U.S. EPA's transportation conformity rules provide that they do not apply to SO₂ unless either the Regional Administrator or the director of a state air agency has found that transportation-related emissions of SO₂ as a precursor are a significant contributor to a PM_{2.5} nonattainment problem, or if the SIP has established an approved or adequate budget for such emissions as part of the RFP, attainment or maintenance strategy (40 CFR 93.102(b)(1), (2)(v)).

Lake County, OH nonattainment area

All of Lake County was designated nonattainment as part of the Cleveland-Akron-Lorain, OH area under the 1997 and 2006 PM_{2.5} standards. As discussed in Ohio's October 5, 2011 (1997 standard) and May 30, 2012 (2006 standard) redesignation request and maintenance plan submittals for Lake County and in Ohio's July 6, 2008 PM_{2.5} nonattainment area SIP, Ohio found that the regional highway emissions of SO₂ were insignificant contributors to the nonattainment problems. As discussed under Chapter 1 above, portions of the 2010 Lake County SO₂ nonattainment area was also designated as nonattainment under the 1971 SO₂ standard. However, no SO₂ budgets exist for Lake County under the older SO₂ standard or PM_{2.5} standards. Therefore, mobile source SO₂ emission budgets are not required for this area.

Muskingum River, OH nonattainment area

Morgan County was never designated nonattainment for PM_{2.5}. All of Washington County was designated nonattainment as part of the Parkersburg-Marietta WV-OH area under the 1997 PM_{2.5} standard. As discussed in Ohio's February 9, 2012 redesignation request and maintenance plan submittal for Washington County and in Ohio's July 6, 2008 PM_{2.5} nonattainment area SIP, Ohio found that the regional highway emissions of SO₂ were insignificant contributors to the nonattainment problems. As discussed under Chapter 1 above, the 2010 Muskingum River SO₂ nonattainment area was also designated as nonattainment under the 1971 SO₂ standard. However, no SO₂ budgets exist for either of these counties under the older SO₂ standard or PM_{2.5} standards. Therefore, mobile source SO₂ emission budgets are not required for this area.

Steubenville, OH-WV nonattainment area

All of Jefferson County, OH and Brooke County, WV was designated nonattainment as part of the Steubenville, OH-WV area under the 1997 and 2006 PM_{2.5} standards. As discussed in Ohio's April 16, 2011 (1997 standard) and May 25, 2012 (2006 standard) redesignation request and maintenance plan submittals for this area and in Ohio's July 6, 2008 PM_{2.5} nonattainment area SIP, Ohio found that the regional highway emissions of SO₂ were insignificant contributors to the nonattainment problems. As discussed under Chapter 1 above, portions of the 2010 Steubenville, OH-WV SO₂ nonattainment area was also designated as nonattainment under the 1971 SO₂ standard. However, no SO₂ budgets exist for this area under the older SO₂ standard or PM_{2.5} standards. Therefore, mobile source SO₂ emission budgets are not required for this area.

CHAPTER FOUR: Emission Inventory

CAA Sections 172(c)(3) and 172(c)(4)

U.S. EPA's SO₂ nonattainment area SIP guidance suggests states should develop a comprehensive, accurate and current inventory of actual emissions from all sources of SO₂ emissions in each area.

U.S. EPA's SO₂ nonattainment area SIP guidance suggests states should also submit a projected attainment year inventory that includes estimated emissions for all emission sources of SO₂. This inventory should reflect projected emissions for the attainment year for all SO₂ sources in the nonattainment area, taking into account emission changes that are expected after the base year. Such emissions changes would include any expected emission reductions from existing control measures, from any new measures that may be adopted as part of the local area attainment plan, or from expected source shutdowns, so long as the existing and new control measures and source shutdowns are enforceable; and would include any expected emission increases due to new sources or growth by existing sources.

Ohio EPA is providing a summary below of its 2011 base year inventory and 2018 future year inventory for the three nonattainment areas included in this SIP. Appendix B provides more details on the inventory and its methodology. Chapter 7 of this SIP also provides additional emission, modeling, and enforceable emission limitation information on point sources that are a part of Ohio's attainment strategy.

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 SO₂ emission sectors every three years. The 2011 periodic inventory has been identified as one of the preferred databases for SIP development and coincides with nonattainment air quality in the three nonattainment areas included in this SIP. The 2011 inventory is used as the base year for the purpose of this submittal and is being submitted to U.S. EPA with this document to fulfill the base-year emissions inventory requirements under the 2010 SO₂ standard.

October 4, 2018 is the attainment date for the 2010 SO₂ standard; therefore, 2018 was selected as the future year and the projected inventory is being submitted to U.S. EPA with this document to fulfill the projected year emissions inventory requirements under the 2010 SO₂ standard. In summary, projections were developed for each sector as follows:

- The Emissions Modeling Clearinghouse (EMCH) provides emissions model input formatted inventories based on the latest versions of the NEI databases as well as the projection of these emissions. For Ohio's

inventory, 2011 and projected 2018 county level emissions data for area (non-point), on-road, marine/air/rail (MAR), and non-road sources were downloaded from the 2011NEI version 1-based Emissions Modeling Platform (2011v6) (<ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/>) on the EMCH website.

- For partial nonattainment areas (e.g., townships), county level emissions for area, MAR and non-road were adjusted using population ratios while county level emissions for on-road were adjusted using vehicle miles traveled (VMT) ratios.
- 2011 emissions for Electric Generating Unit (EGU) and non-EGU were retrieved by Ohio EPA from the Emissions Inventory System (EIS) (<http://www.epa.ohio.gov/dapc/aqmp/eiu/eis.aspx#126013925-download-eis-data-and-reports>). These data were reported by the sources annually in accordance with CERR. Adjustments for 2018 are explained in Appendix B and Chapter 7 of this SIP submittal.

Sectors included in the following tables are: Electrical Generating Unit (EGU Point); Non-Electrical Generating Unit (Non-EGU); Non-road (Non-road mobile); Area (non-point); MAR; and On-road Mobile (On-road). Reductions between 2011 and 2018 are discussed in Appendix B and elsewhere in this SIP submittal.

Table 2 – SO₂ Base Year and Future Year Emissions for the Lake County, OH Nonattainment Area

Lake County Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	48,303.10	1,659.53
Non-EGU	3,664.19	1,583.44
Non-road	4.23	2.38
MAR	104.94	13.09
Area	53.83	53.83
On-road	25.28	10.04
TOTAL	52,155.57	3,322.31

Table 3 – SO₂ Base Year and Future Year Emissions for the Muskingum River, OH Nonattainment Area

Center Township Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	0.00	0.00
Non-EGU	0.00	0.00
Non-road	0.01	0.00
MAR	0.00	0.00
Area	0.29	0.29
On-road	0.06	0.03
TOTAL	0.36	0.32
Waterford Township Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	104,113.16	0.00
Non-EGU	1,203.02	1,203.02
Non-road	0.05	0.02
MAR	0.10	0.01
Area	0.70	0.70
On-road	0.28	0.11
TOTAL	105,317.31	1,203.86
All Muskingum, OH Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	104,113.16	0.00
Non-EGU	1,203.02	1,203.02
Non-road	0.06	0.02
MAR	0.10	0.01
Area	0.99	0.99
On-road	0.34	0.14
TOTAL	105,317.67	1,204.18

Table 4 – SO₂ Base Year and Future Year Emissions for the Ohio Portion of the Steubenville, OH-WV Nonattainment Area

Warren Township Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	0.00	0.00
Non-EGU	0.20	0.20
Non-road	0.03	0.01
MAR	0.57	0.07
Area	5.86	5.86
On-road	0.65	0.25
TOTAL	7.31	6.39
Cross Creek Township Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	0.00	0.00
Non-EGU	0.00	0.00
Non-road	0.06	0.03
MAR	1.13	0.13
Area	11.58	11.58
On-road	0.93	0.36
TOTAL	13.70	12.10
City of Steubenville Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	0.00	0.00
Non-EGU	0.00	0.00
Non-road	0.14	0.06
MAR	2.54	0.30
Area	26.07	26.07
On-road	1.22	0.48
TOTAL	29.97	26.91

Wells Township Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	25,122.43	10,681.56
Non-EGU	0.00	0.00
Non-road	0.02	0.01
MAR	0.38	0.04
Area	3.92	3.92
On-road	0.56	0.23
TOTAL	25,127.31	10,685.76
Steubenville Township Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	0.00	0.00
Non-EGU	223.24	188.29
Non-road	0.03	0.01
MAR	0.58	0.07
Area	5.99	5.99
On-road	1.26	0.50
TOTAL	231.10	194.86
All Ohio Portion Steubenville, OH- WV Sector	2011 Base Year (tpy)	2018 Projected Year (tpy)
EGU Point	25,122.43	10,685.76
Non-EGU	223.44	188.49
Non-road	0.28	0.12
MAR	5.20	0.61
Area	53.42	53.42
On-road	4.62	1.82
TOTAL	25,409.39	10,930.22

CHAPTER FIVE: New Source Review

CAA Section 172(c)(5)

Part D of Title I of the CAA provides the requirements for new source review (NSR) in an area designated nonattainment for any criteria pollutant. Nonattainment NSR (NNSR) requirements are to be submitted to U.S. EPA as part of a nonattainment SIP. The SO₂ nonattainment area SIP guidance provides for states that already have a NNSR permitting program applicable to areas previously designated nonattainment for SO₂ may be able to use that existing program.

Ohio has a longstanding and fully implemented NSR program that meets all U.S. EPA Prevention of Significant Deterioration (PSD) and NNSR permitting requirements for the entire state of Ohio. This is addressed in OAC Chapter 3745-31¹. The Chapter includes provisions for the PSD permitting program in OAC rules 3745-31-01 to 3745-31-20 and the nonattainment new source review (NNSR) program in OAC rules 3745-31-21 to 3745-31-27. Ohio's PSD and NNSR program was conditionally approved on October 10, 2001 (66 FR 51570) and received final approval on January 22, 2003 (68 FR 2909) by U.S. EPA as part of the SIP. The latest revisions to OAC Chapter 3745-31 were approved into Ohio's SIP on February 20, 2013 (78 FR 11748).

Any facility that is not listed in the 2011 emission inventory², or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting all applicable NNSR requirements. Once the area is redesignated to attainment, Ohio EPA will implement NSR through the PSD program.

¹ http://www.epa.ohio.gov/dapc/regs/3745_31.aspx

² Ohio EPA's emissions inventory is identified in Appendix B. Although Ohio EPA has identified emissions at the emissions unit level to demonstrate reductions that occur at specific unit, it does not imply that lack of identification of all emissions units excludes them under this provision unless it is specifically identified in Appendix B that specific emissions units at a facility are permanently shutdown (unless Ohio EPA identifies some shutdown emissions are surplus).

CHAPTER SIX: RACM/RACT

CAA Section 172(c)(1)

Section 172(c)(1) requires states with nonattainment areas to submit a SIP providing for implementation of all RACMs as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of RACT).

The SO₂ nonattainment area SIP guidance also provides that to the extent that U.S. EPA has promulgated national and regional rules that will require significant SO₂ emission reductions in the period after areas are designated as nonattainment, “expeditious attainment” may in many cases mean that attainment will be possible earlier than the attainment date. The SO₂ nonattainment area SIP guidance references programs such as the Mercury and Air Toxics Standards (MATS) for EGUs and Maximum Achievable Control Technology (MACT) standards for industrial, commercial and institutional (ICI) boilers. U.S. EPA acknowledges that the control strategies sources may use to comply with these federal programs may also provide for significant SO₂ emission reductions and additional control measures may not be necessary to meet the requirements under the SO₂ standard.

In 1979, 1987 and 1996, Ohio promulgated rules requiring reasonably available controls measures for SO₂ from stationary sources.

Statewide RACT rules have been applied to all new sources locating in Ohio since that time. RACT requirements are incorporated into permits along with monitoring, recordkeeping, and reporting necessary to ensure ongoing compliance. Ohio EPA also has an active enforcement program to address violations discovered by field office staff. The Ohio SIP approved RACT rules for SO₂ are found in OAC Chapter 3745-18³.

In addition, Ohio EPA promulgated and implemented CAIR (OAC Chapter 3745-109⁴) over the past six years. Emissions from EGUs make up a significant contribution to Ohio’s inventory. Beginning in 2009, Ohio implemented CAIR which provided for significant reductions in SO₂. Beginning in 2015, the more restrictive CSAPR will be implemented and more significant reductions in SO₂ will be realized.

Ohio EPA has analyzed RACM/RACT for all sources in nonattainment areas that emit at least 99% of the nonattainment area’s SO₂ emissions. Ohio EPA has determined that no additional RACM/RACT requirements are needed beyond those already established in OAC Chapter 3475-18; those that will be required under federal measures such as the MATS or MACT that provide for equivalent

3 http://www.epa.ohio.gov/dapc/regs/3745_18.aspx

4 http://www.epa.ohio.gov/dapc/regs/3745_109.aspx

or better control than RACM/RACT; or those reductions that will be required as a part of Ohio's attainment/control strategy discussed under Chapter 7 of this SIP and are equivalent to or more stringent than RACM/RACT. Below is a discussion relevant to each area supporting this finding and demonstrating RACM/RACT is met.

Lake County, OH nonattainment area

Only two major sources that impact nonattainment are located in the area; Painesville Municipal Power and Eastlake Power Plant. Carmeuse Lime was analyzed as part of the attainment/control strategy but was found to not be a contributor to nonattainment and did not necessitate control.

As noted in the attainment/control strategy portion of this SIP, portions of Eastlake Power Plant will be permanently shut down (2 units) while the company reports the other portions (3 units) will likely convert from coal burning to natural gas or they will also be permanently shut down. For the remaining three uncontrolled units, the attainment/control strategy necessitates a reduction in allowable emissions from 7473 lbs/hr to 1158.89 lbs/hr (modeled critical value). This is an 85% reduction in SO₂ emissions. Shutdown or conversion to natural gas will address all RACM/RACT requirements. Even if the company wished to resume coal burning operations, compliance with this level of reduction would necessitate major SO₂ pollution control, such as flue gas desulfurization (FGD), which would also constitute RACT/RACM

Painesville Municipal Power will also require significant reductions. As discussed in the attainment/control strategy portion of this SIP. Painesville Municipal Power operates three coal-fired boilers for electrical generation. These boilers, as currently operated, are subject to U.S. EPA's Boiler MACT standards. Painesville Municipal Power will be accepting a federally enforceable operating limit that reduces each unit's annual heat input capacity by 90% to meet the "Limited Use" definition under the applicable Boiler MACT rule (40 CFR 63.7575). As a result, future operations of these units will be intermittent to serve the City of Painesville during high demand periods and during service interruptions. Intermittent operations require frequent startups and shutdowns. Add-on emission control systems cannot be optimized during startup and shutdown because boiler conditions, including air flow velocities and temperature, are not at optimum levels for control efficiency. Frequent, short-duration operations are not the steady-state conditions for which control devices are designed. For these reasons, the Boiler MACT rule did not require that limited use units install additional control technology to satisfy MACT obligations. Similarly, add-on SO₂ control such as FGD should not be considered RACT for limited use units already curtailed to 10% of capacity. Compliance with the Boiler MACT that dramatically reduces the capacity of the operating units should be considered RACT/RACM.

Additional controls will not be cost effective for these units. The cost effectiveness of additional controls must be applied to a limited use unit already curtailed to 10% of capacity. When operating only 10% of capacity the additional emission reductions are insufficient to justify the full cost of an FGD. The cost per ton of additional emission reduction from the installation of an FGD is expected to be unreasonably high.

Painesville Municipal Power also considered the use of coal with low sulfur content. Powder River Basin (PRB) sub-bituminous coal has lower sulfur content but it is far more volatile and it contains more ash per MMBtu. The high volatility caused safety problems in storage and handling equipment at the R.H. Gorsuch facility, where it caught fire. This raises technical feasibility concerns because Painesville Municipal Power has storage piles and hoppers that could also catch fire where PRB gathers in the material handling system. The units at Painesville Municipal Power are old boilers that would require substantial modification to handle PRB both in fuel handling, combustion and air pollution control. It would not be cost effective to undergo these larger modifications for boilers that have limited use due to the Boiler MACT.

In addition, Painesville Municipal Power supplied information indicating the sulfur content in coal can only be reduced to a certain point before the lack of sulfur begins to have negative impacts on control device performance. Painesville Municipal Power uses an electrostatic precipitator (ESP) for particulate control. ESP experts warn against reducing the sulfur content of coal below 2.5% because it interferes with ESP performance. This is because low sulfur levels in coal can reduce the resistivity of the fly ash, which reduces the effectiveness of the ESP. (Appendix C). Reduced ESP effectiveness can lead to increases in particulate emissions.

Therefore, RACM for Painesville Municipal Power is a reduced emission limit that reflects an average fuel sulfur content of 2.5%, which equates to an SO₂ emission rate of 4.0 lbs/MMBtu using an average fuel heat content of 12,500 BTU/Lb. This is a significant reduction from the 5.7 lbs/MMBtu SO₂ limit in the current Ohio SIP applicable to Painesville Municipal Power. Coupled with the other measures and reductions incorporated in the attainment strategy in Chapter 7 of this SIP, Painesville Municipal Power will have reductions that are equivalent or better than RACM/RACT.

Muskingum River, OH nonattainment area

Only one major source that impacts nonattainment is located in the area; Muskingum River Power Plant. This facility will be permanently shutting down in June 2015; therefore RACT/RACM is not necessary.

Steubenville, OH-WV nonattainment area

Three sources are located in the Ohio portion of this area and only two sources required reductions for attainment of this area. These sources include AEP Cardinal Power Plant, the former Wheeling Pittsburgh Mingo Junction Steel Facility and the Mingo Junction Energy Center.

AEP Cardinal Power Plant is a well control (FGD) coal burning power plant already meeting current RACT/RACM requirements (FGD level control). Additional controls were not needed as a part of Ohio's attainment/control strategy portion of this SIP.

The former Wheeling Pittsburgh Mingo Junction Steel Facility is currently undergoing a purchase agreement in hopes of resuming operations of the remaining Electric Arc Furnace (EAF) that processes (melts) scrap steel. Current emission control equipment employed for the EAF consists of a baghouse for the control of PM emissions. Potential SO₂ emission controls include wet scrubbing, spray dryer absorption and dry sorbent injection. However, these emission control technologies are not technically feasible for EAF operations for various reasons. In addition, the RACT BACT Clearing House (RBLC) does not identify any EAF that employs add-on SO₂ emission controls.

To date, recommended reasonably available control technology (RACT) for controlling SO₂ emissions from the EAF is a scrap management program, which is currently a requirement of the facility's permit. In addition, 40 CFR, Subpart YYYYY (Electric Arc Steelmaking Facilities) requires a facility subject to this subpart to employ an approved scrap management program to aid in reducing overall emissions. Therefore, resumption of the EAF at the former Wheeling Pittsburgh Mingo Junction Steel Facility would meet current RACT/RACM requirements. It should also be noted that the EAF employs the CONSTEEL technology (Appendix D) which is considered one of the most environmentally friendly and energy efficient EAF processes.

In addition to the EAF, this facility also has a Ladle Metallurgical Furnace (LMF) to refine molten steel from the EAF and three reheat furnaces. The LMF is permitted at 14 lbs/hr SO₂ and additional controls were not needed as a part of Ohio's attainment/control strategy portion of this SIP. The three reheat furnaces were previously each permitted at 1213 lbs/hr SO₂ and as part of the attainment/control strategy they were reduced to 1 lb/hr each. Additional RACT/RACM is not necessary for these units.

The Mingo Junction Energy Center is comprised of four 180 MMBtu/hr boilers that can burn a combination of natural gas, blast furnace gas or coke oven gas (COG), and two of the units can also burn desulfurized coke oven gas. As

discussed in Ohio's attainment/control strategy portion of this SIP, the new ownership of the Mountain State Carbons (MSC) facility in West Virginia, AK Steel, has indicated no intent of providing coke oven gas or desulfurized coke oven gas to this facility in the future. Because the blast furnace at the former Wheeling Pittsburgh Mingo Junction Steel Facility was permanently shut down and dismantled, this gas will also not be supplied. Therefore, the only form of gas that may be burned in the future is natural gas.

Regardless, as part of BACT requirements, these four units were required to install a water injection system on the boilers by March 1, 2011 to control emissions. Their current permitted limits allow for 45.7 lbs/hr SO₂, as a 3-hour rolling average, when burning natural gas or natural gas/blast furnace gas blend; or 49.5 lbs/hr SO₂, as a 3-hour rolling average, when burning only COG, a blend of natural gas and COG, or a blend of natural gas, COG, and blast furnace gas. As part of the attainment/control strategy portion of this SIP, emissions from each of the four units will be limited to 0.5 lbs/hr SO₂ S critical value). Additional RACT/RACM to control SO₂ emissions is not necessary for these sources.

CHAPTER SEVEN: Attainment Demonstration/Control Strategy

CAA Sections 172(c)(1), 172(c)(6) and 172(c)(8)

Section 172(c) directs states with nonattainment areas to submit a SIP that contains an attainment demonstration showing that the affected area will attain the relevant standard as expeditiously as practicable, but no later than the applicable statutory attainment date, October 4, 2018. The SO₂ nonattainment area SIP guidance provides additional details on the expected elements of the attainment demonstration. An approvable attainment demonstration would include an air quality modeling analysis that demonstrates that the emission limits in the plan will suffice and the SO₂ nonattainment area SIP guidance also includes detailed modeling guidance in Appendix A.

The following summary identifies key expectations outlined in the guidance and for which Ohio EPA considered in preparation of this submittal. Following this summary is a detailed discussion on the control strategy and attainment demonstration for each nonattainment area evaluated under this SIP submittal.

- Ohio EPA reviewed emissions inventory and source emission rate data in order to: 1) estimate the degree to which different sources within a nonattainment area contribute to violations within the affected area; and 2) assess the expected improvement in air quality within the nonattainment area due to the adoption and implementation of control measures. This information is provided in this submittal.
- Ohio EPA has reviewed and included the best available information on current enforceable SO₂ emission rates ("allowable" or "permitted") for the SO₂ sources located in the nonattainment area that were determined to be significant enough to warrant analysis to determine if they are causing or contributing to the violations of the NAAQS.
- Ohio EPA is including, when appropriate, projected reduced emission rates that will become federally enforceable and lead to emission reductions in the nonattainment area prior to the attainment date.
- When Ohio EPA is incorporating longer term emissions limits for variable emissions sources, additional information developed in accordance with the SO₂ nonattainment area SIP guidance is provided.
- Ohio EPA will be including schedules and timetables for compliance and other criteria necessary for enforceability. Section 172(c)(6) requires that nonattainment area SIPs "include enforceable emission limitations, and such other control measures means or techniques as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the

applicable attainment date specified in this subpart." Therefore, U.S. EPA requires the limitations that air agencies establish to provide for timely attainment meet various criteria for enforceability. In general, U.S. EPA expects the approvable compliance dates for control measures in the attainment demonstration to be as expeditious as practicable. With respect to other standards, U.S. EPA has interpreted this to mean sources will comply with the requirements of the attainment strategy at least one calendar year before the attainment date. U.S. EPA goes on to further state they expect states to require sources to begin complying with the attainment strategy in the SIP no later than January 1, 2017 so plans would be able to provide at least one calendar year of air quality monitoring data (and at least 1 calendar year of compliance information) before the October 4, 2018 deadline. However, U.S. EPA acknowledges they will exercise judgment concerning the approval of SIPs with varying compliance dates.

- Ohio EPA is including air quality modeling that demonstrates future attainment in the entire area designated as nonattainment (*i.e.*, not just at the violating monitor) in accordance with Appendix A of the SO₂ nonattainment area SIP guidance and Appendix W to 40 CFR part 51. Ohio EPA is including with this SIP details of the modeling protocol used for each area that shows compliance with these requirements. (Appendix E)
- U.S. EPA states that for a short-term (*i.e.*, 1-hour) standard, they believe that dispersion modeling, using allowable emissions and addressing stationary sources in the affected area is technically appropriate, efficient and effective in demonstrating attainment in nonattainment areas because it takes into consideration combinations of meteorological and emission source operating conditions that can contribute to peak ground-level concentrations of SO₂. Ohio EPA has taken this into consideration and used allowable emissions as part of our analysis, when appropriate.

Lake County, OH nonattainment area

The Lake County, OH nonattainment area is comprised of the entirety of Lake County. Appendix F of this SIP provides details of the modeling analysis and results that have led to Ohio's attainment/control discussed in this section. The inventory is provided in Chapter 4 of this SIP and Appendix B.

There is one EGU, Eastlake Power Plant, and 13 non-EGU sources in this area. One non-EGU is also a power plant supplying electricity to the City of Painesville, Painesville Municipal Power. Eastlake Power Plant accounts for 93% of SO₂ emissions in this area while Painesville Municipal Power accounts

for 5%. In 2011, Eastlake Power Plant emitted 48,303.10 tons of SO₂ and Painesville Municipal Power emitted 2,745.29 tons. Combined they represent 98% of the area SO₂ emissions (52,155.57 tons). One additional source, Carmeuse Lime, emitted 890.60 tons of SO₂ in 2011, and inclusion of this source accounts for 99% of 2011 SO₂ emissions. Therefore, Ohio EPA's attainment/control strategy analysis includes these three sources.

As can be seen from Appendix F no additional control of Carmeuse Lime was necessitated as they had no impact on attainment of the area. Ohio EPA's modeling analysis indicated the following reductions were necessary from both Eastlake Power Plant and Painesville Municipal Power Plant.

Table 5 – Lake County Modeled Attainment Rates (Critical Values)

	Source ID	Chapter 18 SIP Limit	Capacity	Currently Permitted SO ₂ Rate	Final Attainment SO ₂ Rate
		(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(lb/hr)
Eastlake Power Plant	B001_EL	5.64	1,325	7,473	1,158.89
	B002_EL	5.64	1,325	7,473	1,158.89
	B003_EL	5.64	1,325	7,473	1,158.89
	B004_EL	5.64	2,253	12,707	0 (Shutdown)
	B005_EL	5.64	6,040	34,066	0 (Shutdown)
Painesville Municipal	B001_PV	5.7	593.0 ⁵	1,127	362.997 or
	B003_PV	5.7		1,127	430.499
	B004_PV	5.7		1,127	

First Energy has notified Ohio EPA that the five boilers at Eastlake Power Plant will be permanently shutdown effective April 16, 2015⁶. (Appendix G)

Painesville Municipal Power has requested longer term emission limits equivalent to their critical values. Ohio EPA has revised OAC Chapter 3745-18 to incorporate these new SIP limitations. Ohio EPA performed an analysis of

⁵ These three units are restricted by their Title V permit to a combined capacity of 593.0 MMBtu/hr. Permitted rates were derived by assuming equal distribution among the three units.

⁶ Only those emission reductions Ohio EPA modeled as necessary to show attainment in this area are a part of Ohio's strategy for attainment. The permanent shutdown notification for all units does not preclude consideration of emissions associated with the final attainment SO₂ rates (critical values) as surplus in this area with respect to the 2010 SO₂ standard.

30-day average emission limits in accordance with the SO₂ nonattainment area SIP guidance. The following strategy will be incorporated into the SIP:

- B001, B003 and B004 will be restricted to allow operation of only one unit at any time, except for coinciding periods of start-up and shutdown.
- An SO₂ emission rate of 4.0 lb/MMBtu for emissions units B001, B003, and B004 (RACM as discussed above).
- A 30-day average limit for B001 of 71.692 MMBtu/hr.
- A 30-day average limit for B003 or B004 of 85.024 MMBtu/hr.
- A combined 24-operating hour average limit of 249 MMBtu/hr for any calendar day for units B001, B003 and B004.
- A 10% “Limited Use” capacity restriction with compliance determined for each boiler in accordance with U.S. EPA’s Boiler MACT.

Appendix H provides an analysis of the 30-day averaging methods employed to assure the combination of the limited use restriction, the 24-hour average limitation and the 30-day average limitation is sufficient to conservatively provide assurance that the 1-hour SO₂ standard will be maintained in this area.

As part of Ohio’s rulemaking, a compliance schedule was incorporated that either provides for compliance no later than January 1, 2017 unless another compliance schedule is properly justified. This rulemaking is being submitted as a SIP revision request. (Appendix M)

Muskingum River, OH nonattainment area

The Muskingum River, OH nonattainment area is comprised of Center Township in Morgan County and Waterford Township in Washington County. The inventory is provided in Chapter 4 of this SIP and Appendix B. There is one EGU, Muskingum River Power Plant, and three non-EGU sources in this area. Muskingum River Power Plant accounts for 99% of SO₂ emissions in this area. In 2011, Muskingum River Power Plant emitted 104,113.16 tons of SO₂ while the entire 2011 inventory is comprised of 105,317.31 tons of SO₂. The four non-EGU sources emitted 1,203.02 tons of SO₂. AEP has notified Ohio EPA that Muskingum River Power Plant will be permanently shutdown by June 2015. (Appendix I)

Upon review of monitoring data for the area obtained from U.S. EPA’s AQS, it is apparent that violations of the standard are due to operation of Muskingum River Power Plant. Without any consideration of meteorological conditions, Ohio EPA plotted hourly monitor values from the violating monitor, ID 39-115-0004, along with hourly emissions from Muskingum River Power Plant obtained through CAMD. As can be seen in Figure 2, there is a distinct pattern of monitored highs and lows from 2011 to 2014 associated with emissions from Muskingum River Power Plant. Figure 3 shows more details for the same data for 2014 only.

There are significant drops in monitor values during periods of non-operation at Muskingum River Power Plant.

Figure 2 – Hourly Monitoring Data and Muskingum River Power Plant Emissions From 2011 to 2014

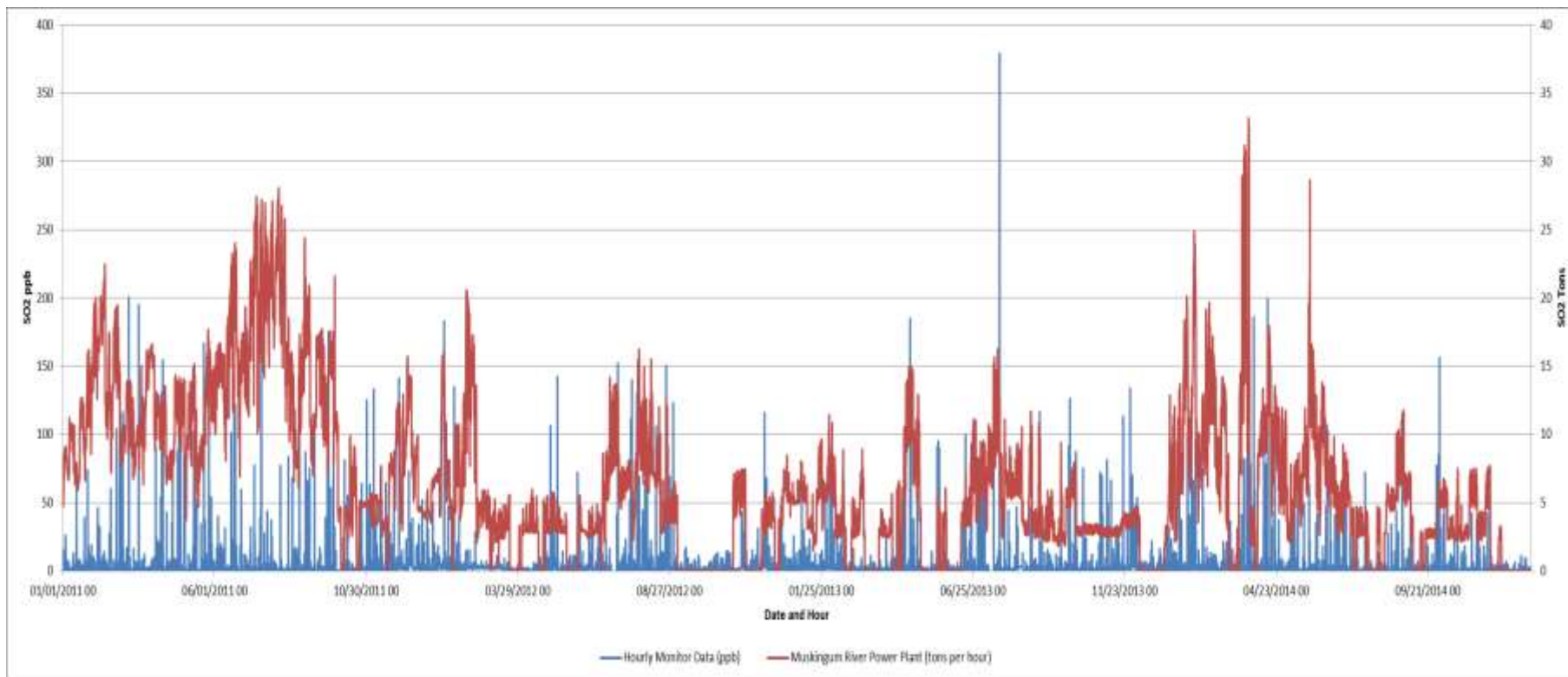
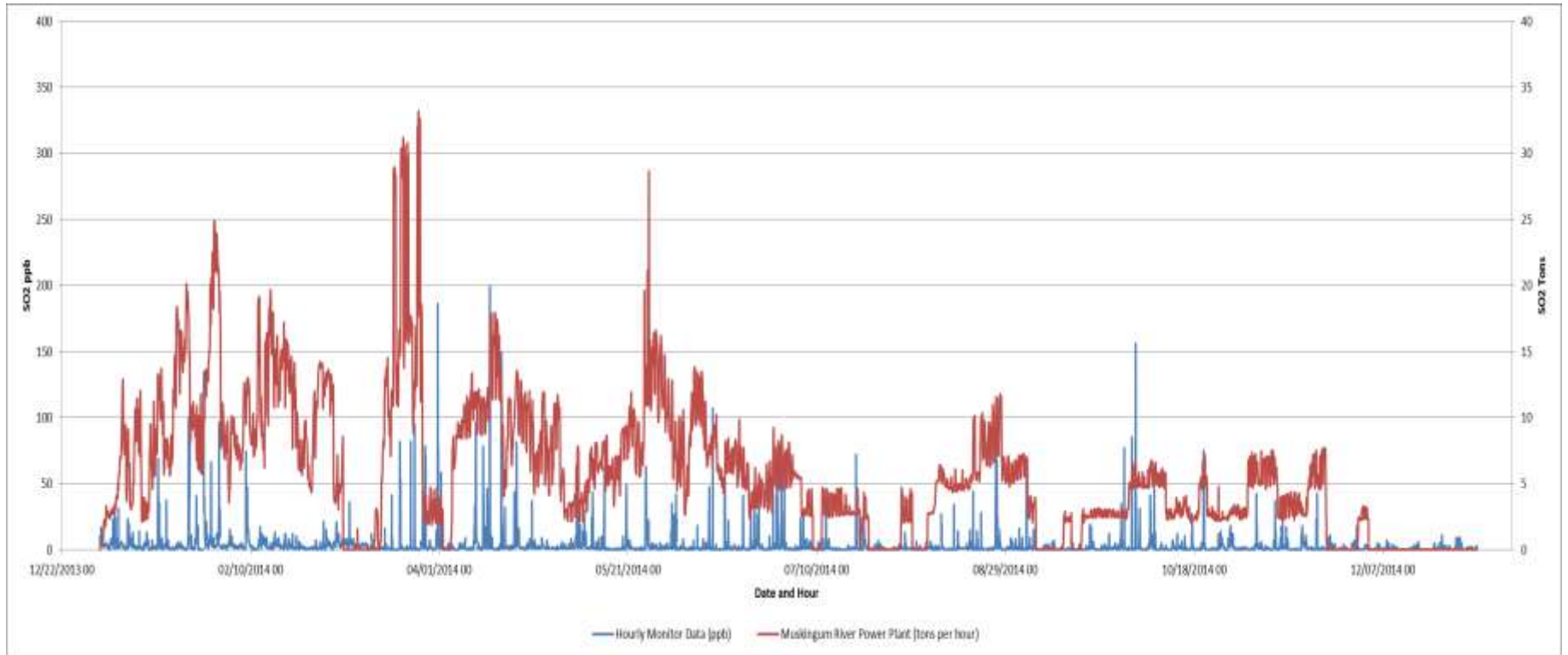


Figure 3 – Hourly Monitoring Data and Muskingum River Power Plant Emissions in 2014



Ohio EPA further analyzed data for these periods of non-operation of Muskingum River Power Plant to estimate a background concentration for the area. (Appendix J) Ohio EPA selected hourly monitoring data from the violating monitor for periods when Muskingum River Power Plant did not operate for 24 hours or longer. The results in Table 6 show that highest concentration achieved in any one hour is 24 ppb with an average during these periods of 13 ppb.

Table 6 – Highest 1% Monitored SO₂ Concentrations When Muskingum River Power Plant is not Operating more than 24 Hours

Year(s)	Total hours with no operation of Muskingum River Power Plant for continuous 24 hrs or longer	Rank of the highest monitor value corresponding to the highest 1% value	Highest 1% SO ₂ threshold concentration (ppb)
2011	116	1	24
2012	2387	24	11
2013	1916	19	10
2014	1625	16	8
2011- 2014	6044	60	10

In addition to the above analysis, Ohio EPA also reviewed 2015 hourly monitoring data from AQS from the violating monitor from the period of time when Muskingum River Power Plant permanently ceased operations (May 15, 2015) through July 31, 2015. The data shows that out of 1,883 recorded hours of data the highest hourly concentration is 6 ppb. The average concentration for that data set is <1 ppb. Of 368 non-zero recorded hours of data the average concentration is 1.9 ppb. Therefore, it is Ohio EPA's conclusion that the permanent shutdown of Muskingum River Power Plant will provide for attainment of the standard in this area and no further analysis, including modeling, is warranted. The background analysis shows future monitored values will be well below the standard.

Steubenville, OH-WV nonattainment area

The Steubenville OH-WV nonattainment area is comprised of Cross Creek Township, Steubenville Township, Warren Township, Wells Township, and Steubenville City in Jefferson County, Ohio and includes the Cross Creek Tax District in Brooke County, West Virginia. Appendix K of this SIP provides details of the modeling analysis and results that have led to Ohio's attainment/control

discussed in this section. Ohio's inventory is provided in Chapter 4 of this SIP and Appendix B.

In the Ohio portion of this area, there is one EGU, Cardinal Power Plant, and four non-EGU sources. In the West Virginia portion of this area, there are no EGUs and eight non-EGUs.⁷

Cardinal Power Plant's 2011 emissions were 25,122.43 tons; however, it should be noted that in 2012 Cardinal began operating an FGD on their last remaining uncontrolled boiler thereby reducing future emissions significantly. Those 2011 emissions from Cardinal accounted for 95% of SO₂ emissions in this area. Non-EGU emissions from both Ohio and West Virginia were 953.05 tons with the most significant source being Mountain State Carbon with 696.79 tons. Ultimately, Cardinal Power Plant, Mountain State Carbon, the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center were selected for analysis. They're combined 2011 emissions account for 99% of the SO₂ emissions in this area. Therefore, Ohio EPA's attainment/control strategy analysis includes these four sources.

As can be seen from Appendix K no additional control of Cardinal Power Plant was necessitated. Ohio EPA is using a weight-of-evidence approach in addition to our modeling analysis that demonstrates further reductions from Cardinal Power Plant are not necessary to bring the area into attainment and ensure attainment in the future. Cardinal Power Plant operates three boilers all of which are well controlled by FGD. U.S. EPA's most recent draft of the document "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM_{2.5}, and Regional Haze" (December 3, 2014) continues to support the ability to use a weight-of-evidence approach as part of attainment demonstrations.

Unique to this area is the substantial number of air quality monitors currently in operation. In addition to the four U.S. EPA AQS monitors located in the northern portion of the nonattainment area (where Mountain State Carbon, the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center are located), Cardinal operates four monitors in the southern portion of the nonattainment area. These monitors began operation in 2011 and were sited at points of maximum impact from Cardinal Power Plant. As such, there is a substantial amount of monitoring data indicative of the impacts of Cardinal on ambient SO₂ concentrations. The Cardinal Power Plant monitoring network is the only one of its type currently operating in Ohio, whereby a substantial number of monitors have been specifically sited to capture the maximum impacts of a facility.

⁷ In preparation of this submittal, West Virginia DEP supplied inventory information for their portion of this area and it is being summarized here and included in Appendix L. It may differ from the final inventory incorporated in West Virginia DEP's final SIP submittal.

The Cardinal Power Plant monitors were not considered during the nonattainment designation process because the monitors had not operated for a long enough time period, and it was violations at the monitors in the northern portion that led to this area being designated nonattainment. Since designations there are now four full years of Cardinal Power Plant monitoring data available and that data is being used to inform Ohio EPA's weight-of-evidence approach. The four years of data clearly show the southern portion of the nonattainment area has and continues to attain the standard.

Cardinal Power Plant has performed an extensive amount of data analysis on these four years of data and Ohio EPA has reviewed their analyses. The analyses are discussed in more detail in Appendix K. In summary, it is apparent that there are very few hours of high readings at any of the monitors. The bulk of these elevated readings were recorded in 2011, likely due to the operation of Unit 3 without the FGD system installed. The 99th percentile daily maximum value at all monitors, for all years 2011 to 2014, are well below the standard of 75 ppb. Further, no three-year design value is close to a value that would exceed the standard and lead to a nonattainment designation. The highest three-year design values are well below the standard; 48 ppb for 2011-2013 and 42 ppb for 2012-2014.

As noted above, at the time of designations a full three years of monitor data from the Cardinal network was not available and any limited data that was available towards the end of the designation process was not considered. Based on the full four years of monitor data collected at the Cardinal Power Plant network, Ohio EPA contends that the southern portion of the original nonattainment area was and is attaining the standard.

In addition to a review of monitoring data, Ohio EPA's weight-of-evidence approach relies on a series of modeling evaluations to show Ohio's strategy ensures attainment of this area.

Ohio EPA performed a base-case analysis using actual emissions from a 2013 to 2014 period⁸ and on site meteorological data specific to both the northern and southern portions of the area. The base case provides a means to assess model performance and source-specific impacts at the monitor locations. This area, due to complex terrain, has a varied and area-specific meteorology that is not adequately reflected by meteorological stations located outside of the valley or one single meteorological on-site set. In addition, this area contains complex emission sources that require special consideration. As a result, special model considerations have been applied in past SIPs and also in this SIP.

⁸ Emissions from the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center were not included in the base case analysis because these sources were not in operation during this period.

Ohio EPA found model performance to be predominantly and systematically over-predictive in the southern portion of the area. Ohio EPA explored other alternative modeling protocols but found given the unique meteorological circumstances of this area and the importance of obtaining good model performance in the northern (violating) portion of this area, this was the best performing approach. Recall, it is the northern portion of the nonattainment area designated by U.S. EPA that contains monitors that led to the designations. It was U.S. EPA's belief during the designation process that the lower portion of this area, the portion containing Cardinal, should be included because "The wind is more likely from the south than the north, so the much larger Cardinal Power Plant to the south of the monitors is more likely to affect air quality at the violating monitors⁹." In fact, this was the only reason U.S. EPA cited for inclusion of Cardinal in this area in the nonattainment designation process.

There are enough inaccuracies and inconsistencies evident in the base case (using actual emissions) modeling results for the southern portion of this nonattainment area and these inaccuracies are significant enough that deference must be given to the now extensive amount of actual monitoring data in demonstrating attainment in the southern portion of the nonattainment area.

In addition, the base case analysis demonstrated Cardinal Power Plant's emissions do not meaningfully impact the northern monitors when compared to the impact of emissions from Mountain State Carbon. In fact, Cardinal only contributed on average 13% of the 1st through 15th highest modeled design values at monitor 54-009-0011 which is the design value monitor that has always recorded the highest monitoring values and is the only monitor currently showing nonattainment at 76 ppb (2012 to 2014).

As a next step, Ohio EPA has also modeled attainment scenarios considering allowable emissions from Mountain State Carbon, the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center. Cardinal Power Plant was not initially included in this analysis because the base case analysis demonstrated Cardinal Power Plant's emissions have minimal impact on the northern monitors. The results of this analysis helped inform critical emission levels that would be necessary from the three northern facilities in order to demonstrate attainment with their combined emissions, using the 2013 to 2014 meteorological data set. This modeling analysis showed significant reductions would be necessary from the three sources in the northern portion of this area.

As a next step necessary to provide additional weight-of-evidence that emissions from Cardinal Power Plant would not interfere with attainment of this area, Ohio EPA modeled the addition of a conservative high base load (at 8,760 hours)

⁹ See U.S. EPA's "Technical Support Document Ohio Area Designations for the 2010 SO₂ Primary National Ambient Air Quality Standard."

level of emissions from Cardinal Power Plant with the above modeled attainment demonstration, using the 2013 to 2014 meteorological set (both southern and northern data sets). This analysis showed that out of 8,951 receptors analyzed, the addition of this unrealistic, conservative level of Cardinal Power Plant emissions results in one single receptor with an exceedance of 75.11 ppb; 0.11 ppb over the standard. Considering the unrealistic-ness of operation of all three Cardinal Power Plant boilers at such high base loads during every hour of the year, combined with the unrealistic-ness that one receptor would show an exceedance of 0.11 ppb over an entire year, it is Ohio EPA's technical conclusion that Cardinal Power Plant emissions will not contribute to nonattainment in this area with the control/attainment strategy developed by Ohio EPA.

Ohio EPA performed one last analysis before finalizing the control strategy for the northern area sources. Ohio EPA was concerned that the significant reductions that would be necessary from the three sources may have been over predicted by using the 2013 to 2014 meteorological data set. The use of a single year of meteorological data could potentially bias the design value through the impacts of unusual weather events or rare meteorological conditions that would otherwise be averaged out over three or more years of meteorological data typically used in attainment demonstration modeling analyses. The original reason the single year (2013 to 2014) of meteorological data was selected was because it was the only period of time that a full year of data was available for both the meteorologically distinct northern and southern portions of the nonattainment area (Mountains State Carbon on-site data and Cardinal Power Plant on-site data) and also encompassed a time period Cardinal Power Plant was fully controlled by FGD.

Since Ohio EPA has determined that Cardinal Power Plant does not need to be a part of the attainment strategy for this area, we are now able to consider larger, earlier meteorological data sets from the Mountain State Carbon sites (that represents the northern portion of this area).

As such, Ohio EPA explored the use of an extended 2007 to 2009 meteorological data set collected at the Mountain State Carbon facility. Ohio EPA believes the results indicate the use of a single year of meteorological data was in fact leading to unnecessary over control of the three northern sources; and to a significant degree both the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center. Therefore, Ohio EPA's final attainment/control strategy for this area relies on the critical values established using the extended 2007 to 2009 meteorological dataset along with the weight-of-evidence analysis summarized above. Details on the analysis and the full weight-of-evidence are included in Appendix K.

Ohio EPA's modeling analysis indicated the following reductions were necessary

from Mountain State Carbon, the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center.

Table 7 – Steubenville, OH-WV Modeled Attainment Rates (Critical Values)

	Source ID	Chapter 18 SIP Limit	Currently Permitted SO2 Rate	Final Attainment SO2 Rate (2007 to 2009 Modeling)	Final Attainment SO2 Rate (2007 to 2009 Modeling Ohio Sources and 2013 to 2014 Modeling West Virginia Source)
			(lb/hr)	(lb/hr)	(lb/hr)
Mingo Junction Energy Center	Unit 1	See currently permitted SO2 rates (OAC 3745-18-47(C))	45.7, 49.5	20.34	n/a
	Unit 2		45.7, 49.5	20.34	n/a
	Unit 3		45.7, 49.5	20.34	n/a
	Unit 4		45.7, 49.5	20.34	n/a
Wheeling Pittsburgh Steel Plant	Reheat Furnace 2	See currently permitted SO2 rates (OAC 3745-18-06(E)(2))	1213	1	n/a
	Reheat Furnace 3		1213	1	n/a
	Reheat Furnace 4		1213	1	n/a
	LMF		14.0	14.0	n/a
	EAF		105.0	105.0	n/a
Mountain State Carbon	Battery 1 Fugitives	See WV DEP's SIP Submittal for rule applicability and permit rates		1.897	1.897
	Battery 2 Fugitives			1.897	1.897
	Battery 3 Fugitives			2.04	2.04
	Battery 8 Fugitives			1.98	1.98
	Battery 1-2-3 Pushing			10.48	6.528
	Battery 8 Pushing Scrubber			15.72	15.72
	Acid Stack			8.04	1.46
	Boiler 10			15.5	13.275
	Boiler 6			15.34	20.63
	Boiler 7			15.34	20.63
	Boiler 9			15.5	13.288
	COG Flare			39.8	39.8
	Battery 1 Stack			22	22
	Battery 2 Stack			22	22
Battery 3 Stack		24.75	24.75		
Battery 8 Stack		117.41	103.08		

Ultimately, WV DEP will establish requirements based on the critical values identified above for Mountain State Carbon. Critical values modeled by Ohio EPA are included in the summary table above for informational purposes. As demonstrated in Appendix K, Ohio EPA's analysis shows attainment will be achieved in the area with the emission reductions identified in the 2007 to 2009 modeling for Mingo Junction Energy Center and the former Wheeling Pittsburgh

Steel Plant regardless of whether WV DEP's requires reductions from Mountain State Carbon based on the 2007 to 2009 modeling or 2013 to 2014 modeling. The critical values identified above for the sixteen units at Mountain State Carbon are just one possible scenario for eliminating Mountain State Carbon's emissions to a level that assures attainment. The ultimate strategy used by WV DEP may differ from that strategy above. Ohio EPA understands, via consultation with WV DEP and Mountain State Carbon that the critical attainment values ultimately included in WV DEP's attainment strategy will be consistent with the principles behind the analysis performed by Ohio EPA.

With respect to Ohio's sources, it should be noted that in recent years neither of these facilities have been operating. However, the owners of both facilities wish to continue to be included in the inventory in the event operations can resume in the future.

Historically Mountain State Carbon supplied coke oven gas (COG) (and sometimes desulfurized coke oven gas) to both the former Wheeling Pittsburgh Steel Plant and Mingo Junction Energy Center. The COG was burned at either the boiler(s) at Mingo Junction Energy Center or in the reheat furnaces at the former Wheeling Pittsburgh Steel Plant. In addition, the both facilities historically had the option to burn blast furnace gas from the former Wheeling Pittsburgh Steel Plant. The blast furnace was permanently shut down and dismantled recently. Therefore, blast furnace gas will no longer be burned at either facility.

COG will no longer be burned by the former Wheeling Pittsburgh Steel Plant or at the Mingo Junction Energy Center. The new ownership of the Mountain State Carbons facility in West Virginia, AK Steel, has indicated no intent of providing coke oven gas or desulfurized coke oven gas to these facilities in the future. Therefore, the only form of gas that may be burned in the future is natural gas. Although the Mingo Junction Energy Center's modeled attainment SO₂ rate is 20.34 lb/hr (see Table 7), as a result of public comments received and because the only form of gas that may be burned in the future is natural gas, Ohio EPA is applying a limitation of 0.5 lb/hr as part of Ohio's SIP (included in OAC Chapter 3745-18). Therefore, the results seen in the Steubenville, OH-WV nonattainment area modeling analysis in Appendix K are considered conservative.

Ohio EPA has revised OAC Chapter 3745-18 to incorporate these new SIP limitations. This rulemaking is being submitted as a SIP revision request. (Appendix M)

CHAPTER EIGHT: Reasonable Further Progress

CAA Sections 172(c)(2)

Section 171(1) defines RFP as “such annual incremental reductions in emissions of the relevant air pollutant as are required by this part (part D) or may reasonable be required by the EPA for the purposes of ensuring attainment of the applicable NAAQS by the applicable attainment date.” The SO₂ nonattainment area SIP guidance explains that this definition is most appropriate for pollutants emitted by numerous and diverse sources where inventory-wide reductions are often needed to attain a standard. Furthermore, the definition is generally less pertinent to pollutants like SO₂ that usually have a limited number of sources affecting areas and where emissions controls for such sources result in swift and dramatic improvement in air quality. Therefore, U.S. EPA explained that RFP is best construed as “adherence to an ambitious compliance schedule.” Ohio EPA’s compliance schedules and, therefore, RFP, are included in Chapter 7 above.

CHAPTER NINE: Contingency Measures

CAA Sections 172(c)(9)

Section 172(c)(9) defines contingency measures as such measures in a SIP that are to be implemented in the event that an area fails to make RFP, or fails to attain the NAAQS, by the applicable attainment date. Contingency measures are to consist of other measures that are not included in the control strategy.

However, U.S. EPA has also explained that SO₂ presents special considerations.

“First, for some of the other criteria pollutants, the analytical tools for quantifying the relationship between reductions in precursor emissions and resulting air quality improvements remains subject to significant uncertainties, in contrast with procedures for directly-emitted pollutants such as SO₂. Second, emission estimates and attainment analyses for other criteria pollutants can be strongly influenced by overly optimistic assumptions about control efficiency and rates of compliance for many small sources. In contrast, the control efficiencies for SO₂ control measures are well understood and are far less prone to uncertainty. Since SO₂ control measures are by definition based on what is directly and quantifiably necessary to attain the SO₂ NAAQS, it would be unlikely for an area to implement the necessary emission controls yet fail to attain the NAAQS.” (SO₂ nonattainment area SIP guidance. Page 41).

The SO₂ nonattainment area SIP guidance explains that "contingency measures" can mean that the air agency has a comprehensive program to identify sources of violations of the SO₂ NAAQS and to undertake an "aggressive" follow-up for compliance and enforcement, including expedited procedures for establishing enforcement consent agreements pending the adoption of the revised SIP.

Ohio EPA has an active enforcement program to address violations and Ohio EPA will continue to operate a comprehensive program to identify sources of violations of the SO₂ NAAQS and to undertake an aggressive follow-up for compliance and enforcement, including expedited procedures for establishing enforceable consent agreements pending the adoption of revised SIPs.

CHAPTER TEN: Public Participation

Ohio published notification for a public hearing and solicitation for public comment concerning the draft nonattainment area SIP in widely distributed county publications on May 22 and June 4, 2015 and public comments were accepted through July 9, 2015.

Public hearings to receive comments on the nonattainment area SIP were held as follows:

- June 29, 2015, at the Pomeroy Public Library, 216 West Main Street, Pomeroy, Ohio.
- June 20, 2015, at the Steubenville Public Library, Schiappa Branch Conference Room, 4141 Mall Drive, Steubenville, Ohio.
- July 9, 2015, at the Morley Library, 184 Phelps St., Painesville, Ohio.

In addition to requesting comments and conducting hearings on this draft nonattainment area SIP analysis, comments were also specifically requested on the revisions to OAC Chapter 3745-18. As part of rulemaking activities in Ohio, more extensive comment opportunities and public hearing opportunities are afforded. The following additional comment opportunities and hearings were provided specifically on the rulemaking:

- Ohio published notification for a public hearing and solicitation for public comment concerning the second draft revisions to OAC Chapter 3745-18 in widely distributed county publications on August 7, 2015. Public comments were accepted through September 16, 2015 and a public hearing was held the same day at the Ohio EPA Central Office, Columbus, Ohio.

Appendix M includes a copy of the public notices, the transcript from the public hearings, and when applicable, a response to comments document(s).

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