



**Environmental  
Protection  
Agency**

# **Ohio's Regional Haze 5- Year Progress Report for the Second Planning Period**

The Ohio Environmental Protection Agency  
Division of Air Quality Control  
Air Quality Evaluation and Planning Section  
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## I. INTRODUCTION

In the 1977 amendments to the Clean Air Act (CAA), Congress established the goal of restoring many national parks and wilderness areas<sup>1</sup> to the natural visibility condition of atmospheric clarity that would prevail in the absence of human impacts. Section 169 of the CAA calls for the prevention of any future, and the remedying of any existing, humanmade visibility impairment in mandatory Class I areas. Over the following years modest steps were taken to address the visibility problems in Class I areas; however, these measures mainly addressed plume blight from specific sources and did little to address regional haze issues in the eastern United States.

When the CAA was amended in 1990, Section 169B (42 USC 7492) was incorporated. This section provided for further research and regular assessments of the progress made to date. In 1993, the National Academy of Sciences concluded that “current scientific knowledge is adequate and control technologies are available for taking regulatory action to improve and protect visibility” (Protecting Visibility in National Parks and Wilderness Areas; National Research Council, Washington, DC: 1993). In addition to authorizing creation of visibility transport commissions and setting forth their duties, Section 169B(f) of the CAA mandated creation of the Grand Canyon Visibility Transport Commission (Commission) to make recommendations to the U.S. EPA for the region affecting the visibility of the Grand Canyon National Park. After four years of research and policy development, the Commission submitted its report to U.S. EPA in June 1996. The Commission report, as well as the many research reports prepared by the Commission, contributed invaluable information to the U.S. EPA in its development of the federal Regional Haze Rule (RHR).

U.S. EPA’s RHR was adopted July 1, 1999 and went into effect on August 30, 1999 (64 FR 35714, July 1, 1999). The RHR aims at achieving natural visibility goals by 2064. This rulemaking addressed the combined visibility effects of various pollution sources over a wide geographic region. This wide-reaching effort means that many states, including those without Class I areas, must participate in haze reduction efforts. U.S. EPA designated five Regional Planning Organizations (RPOs) to assist with the coordination and cooperation needed to address the haze issue. Ohio participates in the Lake Michigan Air Directors Consortium (LADCO), which is comprised of the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.

In January 2017, U.S. EPA issued a final rule updating the regional haze program (82 FR 3078, January 10, 2017). The revised rule governs states’ obligations and U.S. EPA’s review of periodic State Implementation Plans (SIPs) developed for the second and subsequent implementation periods, among other requirements. Requirements for the second implementation period SIPs, due July 31, 2021, are contained in 40 CFR 51.308(f). On August 20, 2019, U.S. EPA issued a memorandum “Guidance on Regional Haze State Implementation Plans for the Second Implementation Period”. Ohio EPA submitted its second implementation period SIP on July 30,

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<sup>1</sup> Mandatory Class I Federal areas are composed of all international parks in the United States, all national wilderness areas and memorial parks larger than 5,000 acres, and all national parks larger than 6,000 acres in size that were in existence by 1977 (CAA Section 162, 42 USC 7472; 40 CFR 52.21(e)).

2021 which closely followed the key process steps outlined in this guidance. Subsequently, after further discussions with U.S. EPA, Ohio EPA submitted a supplemental analysis on August 6, 2024.

The U.S. EPA's RHR includes provisions for 5-year progress reports. The requirements for these reports are included for most states in 40 CFR 51.308 (g) and (h). The 5-year review is intended to provide a progress report on, and, if necessary, mid-course corrections to, the Regional Haze SIP. The progress report provides an opportunity for public input on the state's (and the U.S. EPA's) assessment of whether the approved Regional Haze SIP is being implemented appropriately and whether reasonable visibility progress is being achieved consistent with the projected visibility improvement in the SIP. The progress reports for this second planning period are due by January 31, 2025. To assist states in preparing their progress reports, U.S. EPA issued a memorandum in July 2024 "Overview of Elements for the Regional Haze Second Planning Period State Implementation Plan Progress Reports Due in 2025" (hereinafter referred to as "Progress Report Guidance (PRG)"). This document will closely follow the key process steps outlined in U.S. EPA's PRG.

The primary cause of regional haze in many parts of the country is light scattering resulting from fine particles (i.e., particulate matter less than 2.5 microns in diameter, referred to as  $PM_{2.5}$ ) in the atmosphere. These fine particles can contain a variety of chemical species including carbonaceous species (i.e., organics and elemental carbon), as well as ammonium nitrate, sulfates, and soil. Additionally, coarse particles between 2.5 and 10 microns in diameter can contribute to light extinction. Each of these components can be naturally occurring or the result of human activity. The natural levels of these species result in some level of visibility impairment in the absence of any human influences and will vary with season, daily meteorology, and geography.

## II. PROGRESS REPORT ELEMENTS

### A. Status of Control Strategies in the Regional Haze SIP of the Second Implementation Period

Sections 51.308(g)(1)

*A description of the status of implementation of all measures included in the implementation plan for achieving reasonable progress goals for mandatory Class I Federal areas both within and outside the State.*

It was concluded, in Ohio's Regional Haze SIP for the Second Implementation Period (hereinafter referred to as the "second Regional Haze SIP"), that "on-the-books" and "on-the-way" controls were sufficient to decrease the emissions of visibility-impairing pollutants and address Ohio's impact. It was determined that Ohio's fair share of emission reductions would be met by these on-the-books and on-the-way controls for each Class I area for which Ohio was determined to have emissions impacting visibility. Subsequently in Ohio's supplement to the second Regional Haze SIP (hereinafter referred to as the "Supplement"), Ohio incorporated emissions limits for General James M. Gavin Power Plant (facility ID 0627010056), Cardinal Power Plant (facility ID 0641050002), and Ohio Valley Electric Corp. (OVEC), Kyger Creek Station (facility ID 0627000003). These emissions limits were adopted to ensure the recent improvements are maintained and reasonable progress is made during the Regional Haze second implementation period. The current implementation of these control measures, and any updates since the submission of the previous progress report, is discussed below. As noted in the original SIP for the first implementation period, the majority of visibility-impairing point source emissions in Ohio come from electric generating units (EGUs), and as a result the projected emissions developed for 2018 in the original SIP showed dramatic reductions due to the Clean Air Interstate Rule (CAIR). As such this rule and its successor, the Cross-State Air Pollution Rule (CSAPR), the Good Neighbor Plan, and other regulations impacting the power sector are discussed in the following section at length, with other on-the-books controls listed with some brief updates.

#### Power Plants

- Clean Air Interstate Rule (CAIR) and the Cross State Air Pollution Rule (CSAPR)

On March 10, 2005, the U.S. EPA announced CAIR, a rule that addresses the interstate transport of air pollution to downwind states. On February 1, 2008, U.S. EPA approved Ohio's CAIR program. Revisions to the CAIR SIP were again submitted by Ohio EPA on July 15, 2009. The revised CAIR SIP was approved as a direct final action on September 25, 2009 (74 FR 48857). On July 11, 2008, the U.S. Court of Appeals for the D.C. Circuit vacated U.S. EPA's CAIR rule. However, on December 23, 2008, the U.S. Court of Appeals for D.C. Circuit issued a mandate deciding to remand CAIR back to U.S. EPA without vacatur. This decision allowed implementation of CAIR, and the benefit of CAIR emission reductions, while U.S. EPA worked

to address the Court's prior opinions contained in the original vacatur and promulgate a replacement to the CAIR program.

On July 6, 2010, U.S. EPA proposed a replacement to the Clean Air Interstate Rule (CAIR) program (75 FR 45210). On July 6, 2011, the Cross-State Air Pollution Rule (CSAPR) was finalized as this replacement to the CAIR program, requiring states to significantly improve air quality by reducing power plant emissions. On December 30, 2011, the U.S. Court of Appeals for the D.C. Circuit issued a decision staying CSAPR prior to its implementation. On August 21, 2012, the D.C. Circuit court decided to vacate CSAPR, but on April 29, 2014, the U.S. Supreme Court reversed this vacatur. Following this remand, U.S. EPA requested the CSAPR stay be lifted with the CSAPR compliance deadlines being extended by three years. This request was granted by the D.C. Circuit Court on October 23, 2014, with CSAPR Phase 1 implementation scheduled for 2015 and Phase 2 beginning in 2017. With CAIR remaining in effect throughout this process, Ohio acted in accordance with the CAIR program, as determined by the Ohio Regional Haze SIP to produce reasonable progress in emissions reductions. Now, with CSAPR being implemented, Ohio will benefit from even further reductions than those it would achieve under the CAIR program.

#### *Revised CSAPR Update*

On April 30, 2021, U.S. EPA finalized the Revised CSAPR Update in order to fully address states' outstanding interstate pollution transport obligations for the 2008 ozone standard (86 FR 23054). Starting in 2021, the proposed rule required additional reductions to 12 states', including Ohio, ozone season NO<sub>x</sub> allocations. In this update, the U.S. EPA proposed a budget for Ohio of 9,773 tons of NO<sub>x</sub> ozone season emissions budget for 2022 and onwards. This is about a 6,000 ton reduction from Ohio's 15,900 tons of NO<sub>x</sub> ozone season emissions for the 2021 baseline, according to U.S. EPA's estimates.<sup>2</sup>

- Good Neighbor Plan

In February 2022, U.S. EPA proposed significant steps to reduce ozone forming NO<sub>x</sub> emissions to ensure that 26 states specified in the proposal do not "significantly contribute" to problems attaining and maintaining the 2015 ozone standard in downwind states through a combination of requirements for power plants and certain other industrial sources (87 FR 20036). The final ruling of the Good Neighbor Plan was issued March 15, 2023 (88 FR 36654). The final rule defines ozone season NO<sub>x</sub> emissions performance obligations for EGU sources and fulfills those obligations by implementing an allowance-based ozone season trading program beginning in 2023. This rule also establishes emissions limitations beginning in 2026 for certain non-EGU stationary sources.

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<sup>2</sup> These estimates are described more on U.S. EPA's website, <https://www.epa.gov/Cross-State-Air-Pollution/state-budgets-under-revised-cross-state-air-pollution-rule-update>

As a result of judicial orders limiting implementation of this rule, as of November 30, 2023, the Good Neighbor Plan's "Group 3" ozone-season NO<sub>x</sub> control program for power plants was to be implemented in the following states, all of which already were covered by CSAPR ozone season NO<sub>x</sub> trading programs: Illinois, Indiana, Maryland, Michigan, New Jersey, New York, Ohio, Pennsylvania, Virginia, and Wisconsin. Pursuant to court orders staying U.S. EPA action as to the following states, U.S. EPA was not implementing the Good Neighbor Plan "Group 3" ozone-season NO<sub>x</sub> control program for power plants in the following states: Alabama, Arkansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nevada, Oklahoma, Texas, Utah, and West Virginia.

However, on June 27, 2024, an opinion in *Ohio v. EPA* stayed implementation of the entire program. Therefore, at this time the Good Neighbor Plan is not being implemented.

- Acid Rain Program

Title IV of the CAA was promulgated in amendments to the CAA in 1990 (58 FR 3590). Title IV establishes the Acid Rain Program (ARP), targeting major emission reductions of SO<sub>2</sub> and NO<sub>x</sub>, primary precursors of acid rain, from the power sector. The program sets a permanent cap on the total amount of SO<sub>2</sub> that may be emitted by EGUs in the U.S. and applied NO<sub>x</sub> regulations to coal fired EGUs only. The initial goal of the program was to reduce annual SO<sub>2</sub> emissions by 10 million tons below 1980 levels and reduce NO<sub>x</sub> emissions by 2 million tons below 1980 levels by the year 2000.

The program was rolled out in 2 phases: Phase I beginning in 1995 and Phase II beginning in 2000. In Phase I, SO<sub>2</sub> regulations affected 263 units at 110 mostly coal burning power plants and NO<sub>x</sub> regulations covered only Group 1 coal-fired utility boilers. An additional 182 units were brought under the SO<sub>2</sub> regulations later on as substitution or compensating units, bringing the total number of SO<sub>2</sub> regulated units to 445 under Phase I. Phase II added more units to the program, encompassing over 2,000 total units subject to SO<sub>2</sub> regulations (62 FR 34148) and Group 2 boilers now being covered under NO<sub>x</sub> regulations (62 FR 3463). Units subject to the SO<sub>2</sub> reductions included smaller coal, oil, and gas fired units, and serve generators with an output capacity of greater than 25 megawatts (MW). All new utility units established after Phase II are subject to the SO<sub>2</sub> reductions.

This program and its emissions reductions have led to major decreases in acid rain nationwide with wet-sulfate deposition (a common indicator of acid rain) dropping by more than 70% between 1989-1991 and 2020-2022. Long-term monitoring showed an 81% improvement in the number of monitored streams and lakes that experience critical load exceedances, which indicates when acid deposition levels are causing harmful effects.

- NO<sub>x</sub> SIP Call

On October 27, 1998, U.S. EPA promulgated the NO<sub>x</sub> 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. NO<sub>x</sub> SIP Call requirements are incorporated into permits along with monitoring, recordkeeping, and reporting necessary to ensure ongoing compliance. Compliance is tracked through the Clean Air Markets data monitoring program. Beginning in 2004, this rule accounts for a reduction of approximately 31% of all NO<sub>x</sub> 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 NO<sub>x</sub> SIP Call with CAIR and then CSAPR. CSAPR continues to be implemented and amounts to even further reductions than that realized under the NO<sub>x</sub> SIP Call.

- Mercury and Air Toxic Standards (MATS)

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 estimated 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 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. On November 30, 2012, U.S. EPA published a proposed rule reconsidering certain new source standards and startup and shutdown provisions in MATS. On April 24, 2013, U.S. EPA took final action on the new source standards that were reconsidered and also the technical corrections contained in the November 30, 2012, proposed action. U.S. EPA did not take final action on the startup and shutdown provisions and, on June 25, 2013, added new information and analysis to the docket and reopened the public comment period for the proposed revisions. U.S. EPA took final action on the remaining topics open for reconsideration on November 19, 2014. The compliance date for existing sources was April 16, 2015, while the compliance date for new sources was April 16, 2012.

On November 25, 2014, the U.S. Supreme Court accepted several challenges to the rules brought by the utility industry and a coalition of nearly two dozen states. On June 29, 2015, the U.S. Supreme Court ruled that U.S. EPA did not properly account for compliance costs when crafting the MATS rule and remanded the decision to the D.C. Circuit Court for reconsideration. On May 22, 2020, U.S. EPA published in the Federal Register a reconsideration of the appropriate and necessary finding for the Mercury and Air Toxics Standards, correcting flaws in the 2016 supplemental cost finding while ensuring that power plants will emit no more mercury to the air than before. This action did not remove any coal- and oil-fired power plants from the list of affected source categories, so MATS remains in effect.

On May 7, 2024, the U.S. EPA published finalized amendments to the NESHAP for coal- and oil-fired steam EGUs source category (89 FR 38508). These changes revised the filterable PM limit for existing coal-fired EGUs, requiring the use of PM continuous emissions monitoring system (CEMS) for coal- and oil-fired EGUS to demonstrate compliance with the revised standard, and

revised the mercury (Hg) limit for lignite-fired EGUs of 1.2 lb/TBtu. The revisions to these standards being promulgated go in to effect on July 8, 2024. This action did not remove any coal- and oil-fired power plants from the list of affected source categories, so MATS remains in effect.

- Greenhouse Gas Emissions from Fossil Fuel-Fired EGUs

On May 9, 2024, the U.S. EPA finalized multiple actions under section 111 of the CAA addressing greenhouse gas (GHG) emissions from fossil fuel fired EGUs (89 FR 39798). First, U.S. EPA finalized the repeal of the Affordable Clean Energy (ACE) Rule. Second, U.S. EPA finalized emission guidelines for GHG emissions from existing fossil fuel-fired steam generating EGUs, including both coal-fired and oil/gas-fired steam generating EGUs. Third, U.S. EPA finalized revisions to the NSPS for GHG emissions from new and reconstructed fossil fuel-fired stationary combustion turbine EGUs. Fourth, U.S. EPA finalized revisions to the NSPS for GHG emissions from fossil fuel-fired steam generating units that undertake a large modification, based upon the 8-year review required by the CAA. U.S. EPA did not finalize emission guidelines for GHG emissions from existing fossil fuel-fired stationary combustion turbines at this time; instead, U.S. EPA intends to take further action on the proposed emission guidelines at a later date. These final rules became effective July 8, 2024.

The standards outlined in this ruling will be phased in over time. For existing steam EGUs, compliance deadlines range from 2030 to 2032 depending on the type of unit and the applicable standard. For new combustion turbines, efficiency based requirements apply as soon as the unit starts operating. New base load combustion turbines have until January 1, 2032, to meet an emission standard based on 90% capture of CO<sub>2</sub> emissions.

The power sector is the largest source of GHGs, emitting 25% of overall domestic GHGs emissions in 2022. These final rules will significantly reduce carbon pollution from the power sector, which contributes to major destructive changes in our climate that have serious and life-threatening impacts on public health and well-being. The U.S. EPA projects reductions of 1.38 billion metric tons of CO<sub>2</sub> systemwide through 2047, and net climate and health benefits of up to \$370 billion.

- Permanent Shutdown of Power Plant Sources

As noted in Ohio's Second Regional Haze SIP, several EGUs shut down during the second planning period, including EGUs at Conesville Power Plant, DP&L J.M. Stuart Generating Station, DP&L Killen Generating Station, and W.H. Sammis Plant (see Table 4 of Ohio's July 30, 2021 submittal).

Below are facilities that have permanently shut down additional EGUs since the submittal of Ohio's Second Regional Haze SIP:

- W. H. Sammis Plant (facility ID 0641160017)

W. H. Sammis was a coal-fired power plant located in Jefferson County with several coal-fired EGUs. Units B007, B008, and B009 all had design capacities of 1,822 MMBtu/hr and were shut down May 30, 2020. Unit B011 (design capacity of 3,000 MMBtu/hr), B012 (design capacity of 6,066 MMBtu/hr) and B013 (design capacity of 6,066 MMBtu/hr) were shut down May 31, 2023. There are no longer any EGUs operating at this facility.

- Avon Lake Power Plant (facility ID 0247030013)  
Avon Lake was a coal-fired power plant located in Lorain County. It had two coal-fired EGUs operating prior to the plant's shutdown on April 1, 2022. Unit B010 had a design capacity of 1,131 MMBtu and shutdown September 2019. Unit B012 had a design capacity of 6,040 MMBtu/hr and shutdown April 2022 with the facility. There are no longer any EGUs operating at this facility.
- W.H. Zimmer Plant (facility ID 1413090154)  
W. H. Zimmer was a coal-fired power plant in Clermont County that had one coal-fired EGU (1,426 MW), B006. B006 was shut down on December 31, 2022. There are no longer any EGUs operating at this facility.
- City of Hamilton Municipal Power Plant (facility ID 1409040243)  
The City of Hamilton Municipal Power Plant is located in Butler County with two EGUs. One unit was a coal and natural gas fired boiler (unit B009, design capacity of 729 MMBtu/hr) that shutdown May 17, 2021. The other unit (B004) is a natural gas fired turbine (design capacity of 250 MMBtu/hr) and is still operating at this facility.

#### Four-Factor Analyses Sources and Emissions Limits for General James M. Gavin Power Plant, Cardinal Power Plant and OVEC Kyger Creek Station

In Ohio's second Regional Haze SIP, four different point sources were discussed regarding unit emissions and possible controls to reduce their emissions. These sources included Avon Lake Power Plant, Carmeuse Lime Inc. - Maple Grove operations (facility ID 0374000010), Dover Municipal Light (facility ID 0679010146), and General James M. Gavin Power Plant. A four-factor analysis was originally performed for these sources in the second Regional Haze SIP. Two additional point sources, Cardinal Power Plant and OVEC Kyger Creek Station, were later analyzed in Ohio's Supplement and emissions limits were applied to both of them along with General James M. Gavin Power Plant.

- Avon Lake Power Plant  
Avon Lake Power Plant is a coal-fired electrical generating plant. SO<sub>2</sub> and NO<sub>x</sub> emissions from unit B012 (Unit 9), a 6,040 MMBtu/hour pulverized coal-fired boiler, is the major contributor to visibility impairment from this facility. This unit was installed on June 1, 1970, and was equipped with low-NO<sub>x</sub> cell burners and overfire air for NO<sub>x</sub> control, a dry

sorbent injection (DSI) system for hydrochloric acid (HCl) emission control under the MATS Rule, and an ESP for PM control.

To satisfy requirements under the Data Requirements Rule (DRR) for the SO<sub>2</sub> NAAQS designation process, Avon Lake accepted a federally enforceable SO<sub>2</sub> emissions limit from all SO<sub>2</sub>-emitting sources at the facility (i.e., emissions units B010, B012, B013, B015, and B016, combined) of 9,600 lbs/hr on a 1-hour average basis, effective January 13, 2017. In addition, SO<sub>2</sub> emissions from emissions units B010 and B012, combined, shall not exceed 1.59 lb/MMBtu as a rolling, 30-day average (Title V permit no. P0085253, effective April 18, 2017). In addition, the fuel was changed in 2016 to a Western Bituminous and Powder River Basin coal blend which resulted in reduced SO<sub>2</sub> emissions.

In Ohio's second Regional Haze SIP, the 4-factor analysis concluded that further SO<sub>2</sub> and NO<sub>x</sub> emission controls for unit B012 at Avon Lake were expensive and had negligible visibility improvement. The 4-factor analysis also showed that unit B012's annual emissions had reduced between 2006-2008 and 2017-2019 by 92% for SO<sub>2</sub> and 79% for NO<sub>x</sub>, and that the affected Class I area were running 10 to 20 years ahead of the RHR Re targets. Ohio found that potential additional controls were not cost-effective or affordable, had significant energy and non-air quality environmental impacts, and provided minimal estimated visibility benefit. Therefore, Ohio concluded that the on-the-books and on-the-way controls were more than sufficient to achieve reasonable progress goals, and no additional measures were necessary to make reasonable progress.

Avon Lake Power Plant permanently shut down on April 1, 2022.

- Carmeuse Lime, Inc – Maple Grove Operations  
Carmeuse Lime, Inc. - Maple Grove Operations is a lime manufacturing plant. SO<sub>2</sub> and NO<sub>x</sub> emissions from units P003 and P004 (SCC 30501604) are the major contributors to visibility impairment from this facility:
  - P003 - Rotary Kiln # 1 and cooler
  - P004 - Rotary Kiln # 2 and cooler

Both units have baghouses for control of particulates and a shared stack. Inherent control of SO<sub>2</sub> is achieved due to chemical absorption of the SO<sub>2</sub> by the calcium-rich lime kiln dust (LKD) in the flue gas and in the baghouses and NO<sub>x</sub> emissions are limited by good combustion practices, but there are no add-on controls for NO<sub>x</sub> or SO<sub>2</sub> emissions. These units burn coal, petroleum coke, and/or natural gas. Permitted limits on the maximum sulfur content are 5.50 percent for coal and 6.50 percent for coke, by weight. P003 and P004 are each subject to federally enforceable SO<sub>2</sub> limits of 1,102.00 lbs of SO<sub>2</sub>/hour and 4,826.80 tons SO<sub>2</sub> per rolling, 12-month period. Each unit is also subject to federally enforceable NO<sub>x</sub> limits of 1,234.90 pounds NO<sub>x</sub>/hour and 5,408.90

tons NO<sub>x</sub> per rolling, 12-month period (Title V permit no. P0128727, effective February 10, 2021).

These emission units were subject to best available control technology (BACT) analysis following restarting of lime manufacturing operations. The results of the BACT evaluation were established in the PSD permit issued in 2002, where it was determined that there are no cost-effective controls.

In Ohio's second Regional Haze SIP, the 4-factor analysis concluded that no reasonable and cost effective SO<sub>2</sub> and NO<sub>x</sub> control options were available for units P003 and P004. The inherent SO<sub>2</sub> and NO<sub>x</sub> controls that Carmeuse had in place were previously determined (before the 4-factor analysis) to be the best available control technology (BACT). Ohio found that potential additional controls were not cost-effective or affordable, had significant energy and non-air quality environmental impacts, and provided minimal estimated visibility benefit. Therefore, Ohio concluded that the on-the-books and on-the-way controls were more than sufficient to achieve reasonable progress goals, and no additional measures were necessary to make reasonable progress.

On August 21, 2015, U.S. EPA finalized the Data Requirements Rule for the 2010 SO<sub>2</sub> standard (80 FR 51052). This rule established ongoing data review requirements including, for areas where modeling of actual SO<sub>2</sub> emissions served as the basis for an unclassifiable/attainment designation, an annual review of emissions data and submittal of a report recommending whether updated modeling is necessary due to emissions increases.

As part of Ohio's annual SO<sub>2</sub> emissions review for 2024, Ohio EPA reviewed updated dispersion modeling of the ambient SO<sub>2</sub> air quality around the Carmeuse Lime Maple Grove Facility that showed a modeled exceedance of the 2010 SO<sub>2</sub> standard. Ohio EPA subsequently reviewed updated dispersion modeling of the ambient SO<sub>2</sub> air quality around the Carmeuse Lime Maple Grove Facility to assess the critical emission rate from the combined lime kiln stack receiving the SO<sub>2</sub> emissions from the two rotary lime kilns at the Carmeuse Lime Maple Grove Facility that would allow the area around the Carmeuse Lime Maple Grove Facility to show modeled compliance with the 2010 SO<sub>2</sub> standard. The Director of Ohio EPA is establishing the critical emission rate identified via the updated dispersion modeling as the new SO<sub>2</sub> emissions limit through the issuance of Director's Final Findings and Orders (DFFOs).

- Dover Municipal Light  
Dover Municipal Light is a coal-fired electrical generating plant. SO<sub>2</sub> and NO<sub>x</sub> emissions from unit B004, a 247 MMBtu/hour coal-fired spreader stoker boiler (SCC 10100204), is the major contributor to visibility impairment from this facility.

This unit was installed on in 1962 and is controlled with a baghouse for particulate matter, activated carbon for mercury, and dry sorbent injection systems for hydrogen chloride; natural gas may be used as backup fuel. This unit is subject to a federally enforceable SO<sub>2</sub> emissions limit of 4.60 lbs/MMBtu (Title V permit no. P0130453, effective August 2, 2022).

In Ohio's second Regional Haze SIP, the 4-factor analysis concluded that the installation of additional controls would not be cost effective. As Dover Municipal Light is a non-profit governmental organization and the costs for the controls would not be associated with a capital improvement project, the costs to add the discussed controls would be passed on to the consumer, the cost/sales ratio ranging from 6.2% to 18.5%. Ohio found that potential additional controls were not cost-effective or affordable, had significant energy and non-air quality environmental impacts, and provided minimal estimated visibility benefit. Therefore, Ohio concluded that the on-the-books and on-the-way controls were more than sufficient to achieve reasonable progress goals, and no additional measures were necessary to make reasonable progress.

- General James M. Gavin Power Plant

General James M. Gavin Power Plant is a coal-fired electrical generating plant. SO<sub>2</sub> and NO<sub>x</sub> emissions from units B003 and B004, each 11,936 MMBtu/hour pulverized coal-fired, dry-bottom boilers (SCC 10100202), are the major contributors to visibility impairment from this facility. These units were installed on August 16, 1974, and are controlled with selective catalytic reduction system (SCR), electrostatic precipitator (ESP), wet FGD scrubber, and DSI for control of sulfur trioxide (SO<sub>3</sub>) emissions.

FGDs with 95% control efficiency were installed December 1, 1994, on B003 and March 1, 1995, on B004. The FGDs must be continuously operated in accordance with the requirements of the federal AEP Consent Decree<sup>3</sup>. While these requirements were originally established in the Consent Decree, they have since been incorporated into the Title V permit on April 15, 2020 (Title V permit no. P0089258) and are therefore federally enforceable and permanent (in that no modifications would be allowed unless it underwent review by U.S. EPA). The Title V permit defines "continuously operated" as when an SCR, FGD, DSI, ESP or other NO<sub>x</sub> pollution controls are used at an emissions unit, except during a malfunction, they shall be operated at all times such emissions unit is in operation, consistent with the technological limitations, manufacturers' specifications, and good engineering and maintenance practices for such equipment and the emissions unit so as to minimize emissions to the greatest extent practicable." B003 and B004 each have federally enforceable SO<sub>2</sub> emissions limits of 7.41 lb/MMBtu (Title V permit no. P0134437, effective December 5, 2023). As shown in table 17, recent SO<sub>2</sub> emissions rates are 0.39 lb/MMBtu or less. Further, these units are each subject to

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<sup>3</sup> <https://www.epa.gov/enforcement/consent-decree-and-modifications-american-electric-power-service-corporation>

CSAPR, which provides significant economic incentive to operate and optimize SO<sub>2</sub> and NO<sub>x</sub> emissions controls. This incentive will become stronger with additional reductions to NO<sub>x</sub> allocations with the Revised CSAPR Update and the Good Neighbor Plan.

Ohio determined in the second Regional Haze SIP that these units are effectively controlled for NO<sub>x</sub> and therefore did not request a four-factor analysis for NO<sub>x</sub>. With respect to SO<sub>2</sub>, in Ohio's second Regional Haze SIP, the 4-factor analysis concluded that the current SO<sub>2</sub> controls on units B003 and B004 were over 95% efficient at reducing SO<sub>2</sub> emissions, and that there were no additional, technically feasible control measures. Ohio found that potential additional controls were not cost-effective or affordable, had significant energy and non-air quality environmental impacts, and provided minimal estimated visibility benefit. Therefore, Ohio concluded that the on-the-books and on-the-way controls were more than sufficient to achieve reasonable progress goals, and no additional measures were necessary to make reasonable progress.

Subsequently, in the supplement, it was evaluated whether the facility could, at reasonable cost, achieve a consistently lower SO<sub>2</sub> emission rate through existing measures or potential low-cost upgrades. In conclusion, Ohio adopted a SO<sub>2</sub> emission limit of 0.75 lb/MMBtu on a rolling 30-operating day average for units B003 and B004. This is significantly lower than the previous enforceable limit of 7.41 lb/MMBtu.

- Cardinal Power Plant (Cardinal Operating Company)

Cardinal Power Plant (Facility ID 0641050002) is a coal-fired electrical generating plant. Units B001, B002, and B009, each 5,275 MMBtu/hour pulverized coal-fired, dry-bottom boilers (SCC 10100202), are the major contributors to SO<sub>2</sub> and NO<sub>x</sub> emissions from this facility.

Unit B001 was installed August 1, 1963, unit B002 was installed January 1, 1964, and unit B009 was installed September 1, 1977. All units are controlled with a SCR for NO<sub>x</sub>, an ESP for particulate control, and a wet FGD scrubber for SO<sub>2</sub> control. Units B001 and B002 each have a federally enforceable SO<sub>2</sub> emissions limits of 1.065 lbs/MMBtu on a rolling, 30-day average, and unit B009 has a federally enforceable SO<sub>2</sub> emissions limit of 0.66 lb/MMBtu on a rolling, 30-day average (Title V permit no. P0089700, effective January 28, 2021).

As a part of Ohio's Supplement, Ohio requested that Cardinal Power Plant's existing, federally enforceable SO<sub>2</sub> emission limit of 4,858.75 lb/hour as a rolling 30-day average for units B001, B002 and B009 be approved into the second Regional Haze SIP. This will help ensure the maintenance of existing measures and that reasonable progress is made during the second implementation period.

- OVEC Kyger Creek Station

OVEC Kyger Creek is a coal-fired electrical generating plant. Units B001, B002, B003, B004, and B005, each 1,850 MMBtu/hr pulverized coal-fired, dry-bottom boilers (SCC

10100202), are the major contributors to SO<sub>2</sub> and NO<sub>x</sub> emissions from this facility. All units were installed in 1955 and are controlled with a SCR for NO<sub>x</sub>, an ESP for particulate control, and a wet FGD scrubber. All five units each have a federally enforceable SO<sub>2</sub> emissions limits of 1.2 lbs/MMBtu (Title V permit no. 0089199, effective January 1, 2018).

As a part of Ohio's Supplement, Ohio requested that OVEC Kyger Creek's newly adopted NO<sub>x</sub> emission limits of 0.4 lb/MMBtu on a 720-operating rolling hourly average for each stack (B001 and B002 combined, B004 and B005 combined) be added to the second Regional Haze SIP. This is a significant reduction from the previous enforceable NO<sub>x</sub> emission limit of 0.84 lb/MMBtu. The proposed limit was developed by analyzing NO<sub>x</sub> emissions from the past 6-7 years and represents recent improvements and a rate the units can reliably achieve year round.

### Other Point Sources

- Reciprocating Internal Combustion Engines (RICE) NESHAPs

U.S. EPA has issued multiple regulations that cover different types of RICEs. U.S. EPA promulgated the NESHAP for existing, new, and reconstructed stationary RICE greater than 500 horsepower (HP) located at major sources on June 15, 2004 (69 FR 33474). U.S. EPA promulgated the NESHAP for new and reconstructed stationary RICE that are located at area sources of HAP emissions and for new and reconstructed stationary RICE that have a site rating of less than or equal to 500 HP that are located at major sources of HAP emissions on January 18, 2008 (73 FR 3568). On March 3, 2010, U.S EPA promulgated the NESHAP for existing stationary compression ignition (CI) RICE with a site rating of less than or equal to 500 HP located at major sources, existing nonemergency CI engines with a site rating greater than 500 HP at major sources, and existing stationary CI RICE of any site rating located at area sources (75 FR 9674). On August 20, 2010, U.S EPA promulgated the NESHAP for stationary spark ignition (SI) RICE that are located at area sources of HAP or have a site rating of less than or equal to 500 brake HP and are located at major sources of HAP (75 FR 51570).

On January 14, 2013, the rule was revised due to legal challenges and petitions for reconsideration. U.S. EPA estimated the revised rule would reduce PM by 2,800 TPY, NO<sub>x</sub> by 9,600 TPY and VOC by 36,000 TPY starting in 2013.

On June 26, 2023, it was proposed to revise the rule to provide information on the provisions specifying the emergency engines can operate up to 50 hours per year to mitigate local transmission and/or distribution limitations to avert potential interruption of the power supply in a local area or region (88 FR 41361).

- Area Source Boilers, Major Sources Boilers and Commercial/Industrial Solid Waste Incinerators (CISWI) NESHAPs

On January 31, 2013, February 1, 2013, and February 7, 2013, U.S. EPA finalized revisions to the March 2011 CAA emissions standards for large boilers (commonly referred to as the Boiler MACT), small boilers and incinerators, respectively (78 FR 7138, 78 FR 7488, 78 FR 9112). These standards cover more than 200,000 boilers and incinerators that emit harmful air pollution, including mercury, cadmium, and particle pollution.

Boilers at large sources of air toxics emissions are known as major source boilers. They are located at large sources of air pollutants, including refineries, chemical plants, and other industrial facilities. Boilers located at small sources of air toxics emissions are known as area source boilers. These are located at universities, hospitals, hotels, and commercial buildings. A CISWI unit is a device that is used to burn solid waste at a commercial or industrial facility. This includes units designed to discard solid waste; energy recovery units designed to recover heat that combust solid waste; and waste burning kilns that combust solid waste in the manufacturing of a product.

In a separate but related action, U.S. EPA revised the non-hazardous secondary materials rule (NHSM). This rule defines which materials are, or are not, “solid waste” when burned in combustion units. The NHSM rule helps determine which standards, either boiler or CISWI, a unit that burns these materials will be required to meet. These combined rules will lead to additional NO<sub>x</sub> and VOC reductions. The compliance deadlines for area boilers, major boilers and CISWI units were 2014, 2016 and 2018, respectively.

In September 2023, U.S. EPA proposed that sources reclassifying from major source status to area source status under the NESHAP program must satisfy the following criteria: any permit limitations taken to reclassify from a major source to an area source of HAP must be federally enforceable, any such permit limitations must contain safeguards to prevent emissions increases after reclassification beyond the applicable major source requirements, and reclassification will only become effective once a permit with enforceable conditions reflecting the previously stated requirements has been issued and submitted to the U.S. EPA (88 FR 66336).

- VOC 2-, 4-, 7-, and 10-year MACT standards

U.S. EPA has promulgated and revised numerous Maximum Achievable Control Technology (MACT) standards that reduce VOC emissions and continue to be implemented.<sup>4</sup>

- Combustion turbine MACT

On March 5, 2004, U.S. EPA issued requirements to reduce VOC emissions from stationary combustion turbines. These requirements apply to turbines used at facilities such as power plants, chemical and manufacturing plants, and pipeline compressor stations. This rule limits

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<sup>4</sup> <http://www3.epa.gov/ttn/atw/eparules.html>

the amount of air pollution that may be released from exhaust stacks of any new stationary combustion turbine (built after January 14, 2003).

On April 7, 2004 (68 FR 18338), U.S. EPA proposed a rule to amend the list of categories of sources that was developed pursuant to CAA section 112(c)(1) (69 FR 18327). U.S. EPA proposed to delete four subcategories from the Stationary Combustion Turbines source category. The subcategories proposed for delisting, as defined in 40 CFR 63.6175, are: (1) lean premix gas-fired stationary combustion turbines (also referred to herein as “lean premix gas-fired turbines”), (2) diffusion flame gas-fired stationary combustion turbines (also referred to herein as “diffusion flame gas-fired turbines”), (3) emergency stationary combustion turbines, and (4) stationary combustion turbines located on the North Slope of Alaska.

Effective August 18, 2004 (80 FR 51184), U.S. EPA stayed the effectiveness of two subcategories of stationary combustion turbines: lean premix gas-fired turbines and diffusion flame gas-fired turbines. Pending the outcome of U.S. EPA’s proposal to delete these subcategories from the source category list, U.S. EPA stayed the effectiveness of the emissions and operating limitations in the stationary combustion turbines NESHAP for new sources in the lean premix gas-fired turbines and diffusion flame gas-fired turbines subcategories. This action was necessary to avoid wasteful and unwarranted expenditures on installation of emission controls which will not be required if the subcategories are delisted. Without a stay, all turbines in the lean premix gas-fired turbine and the diffusion flame gas-fired turbine subcategories which were constructed or reconstructed after January 14, 2003, would have been required to comply immediately with the emission standards for new sources.

On March 9, 2020, the U.S. EPA addressed requirements during periods of startup, shutdown, and malfunction of sources, and added electronic reporting requirements (85 FR 13539).

On November 19, 2020, under the “Reclassification of Major sources as Area Sources under Section 112 of the Clean Air Act” (85 FR 73854), the U.S. EPA also finalized amendments to clarify compliance dates, notification, and recordkeeping requirements that apply to sources choosing to reclassify to area source status and to sources that revert back to major source status, including requirement of electronic notification. This became effective January 19, 2021.

Most recently on March 9, 2022, U.S. EPA revised the standards for gas-fired subcategories: the compliance date for existing sources changed to March 9, 2022, and new sources (sources not existing or operating prior to March 9, 2022) must now comply upon startup of the affected source (87 FR 13192).

- Ohio EPA’s Director’s Findings and Orders for Globe Metallurgical - May 2023

In 2010, U.S. EPA revised the primary 1-hour SO<sub>2</sub> standard and revoked the primary annual and 24-hour SO<sub>2</sub> standards (75 FR 35520). In accordance with the CAA, Ohio EPA submitted its attainment demonstration SIP on April 3, 2015, and submitted revisions on October 13, 2015, and March 13, 2017.

On June 23, 2020, Ohio EPA submitted a supplement to the attainment demonstration for the Muskingum River SO<sub>2</sub> nonattainment area and submitted a revised supplement in June 2022 and May 2023.<sup>5</sup> The revisions to supplement submitted in May 2023 included revised DFFOs for facility Globe Metallurgical, located in the Muskingum River nonattainment area. This DFFOs set 24-hour average SO<sub>2</sub> emission limit combinations (lb/hour) for the two baghouses (Baghouse 1 includes units P902, P903, and P904, baghouse 2 includes units P907 and P907) to help the Muskingum River area come into attainment. Baghouse 1 has a maximum 24-hour average SO<sub>2</sub> emission limit of 195.3 lb/hour if baghouse 2 has 0.0 lb/hour 24-hour average SO<sub>2</sub> emissions. Baghouse 2 has a higher, maximum 24-hour SO<sub>2</sub> emission limit of 260.4 lb/hour if baghouse 1 has 0.0 lb/hour 24-hour average SO<sub>2</sub> emissions.<sup>6</sup> A SO<sub>2</sub> monitor was also installed at Globe Metallurgical and began operation on January 1, 2021 to provide additional assurance that the standard is being met.

- NSPS for Oil and Gas Production

On March 8, 2024, U.S. EPA finalized the NSPS for crude oil and natural gas production, transmission, and distribution for new and existing sources (89 FR 16820). The purpose of this rule is to reduce greenhouse gas (specifically methane), VOC, and SO<sub>2</sub> emissions for stationary sources that cause or contribute significantly to air pollution. The rule revises the NSPS to more stringent requirements for new and modified sources, and also requires states to create and enforce new emissions guidelines (EGs) for existing sources, which fulfills section 111(d) of the CAA. States have until March 2026 to develop the rules required under the finalized rule, and large oil and gas industrial source owners have until March 2029 to comply with the new requirements.

The U.S. EPA estimates that this ruling will result in a total reduction of 58 million tons of methane, 16 million tons of VOC, and 590,000 tons of HAP emissions by the year 2038.

### Area Sources

- Consumer solvents

Ohio's consumer products rules<sup>7</sup> became effective September 15, 2007. The rules specify reductions in VOCs required for any person who sells, supplies, offers for sale, or manufactures consumer products on or after January 1, 2009, for use in the state of Ohio.

In 2021, Ohio updated the rule to adopt more stringent requirements promulgated under the 2010 Phase III version, the 2012 Phase IV version, the 2013 update and the 2018 Phase V version

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<sup>5</sup> <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/state-implementation-plan-sip-2010-one-hour-so2-standard>

<sup>6</sup> The 24-hour average SO<sub>2</sub> emission limit combinations (lb/hr) can be found in table 2 of the May 2023 revised supplement to the 2010 1-hour SO<sub>2</sub> Attainment Demonstration, which can be found on Ohio EPA's website, <https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/27/sip/SO2/2023-RevSupp-MuskingRiv-Final.pdf>

<sup>7</sup> [http://www.epa.ohio.gov/dapc/regs/3745\\_112.aspx](http://www.epa.ohio.gov/dapc/regs/3745_112.aspx)

of the Ozone Transport Commission (OTC) model rule<sup>8</sup>. This decision followed the failure of the Cleveland ozone nonattainment areas to meet the 2015 ozone standard by August 3, 2021, resulting in the areas reclassification from marginal to moderate nonattainment. Ohio updated this rule to help and in accordance with the CAA to provide necessary additional emissions reductions in order for these areas to attain the standard and avoid further reclassification. This rule applies statewide.

- AIM coatings

Ohio's Architectural and Industrial Maintenance coatings rules<sup>9</sup> became effective September 21, 2007. The rules specify reductions in VOCs required for any person who supplies, sells, offers for sale, or manufacturers any AIM coating for use within the state of Ohio, as well as any person who applies or solicits the application of any AIM coating within the state of Ohio, on or after January 1, 2009.

In 2021, Ohio updated the rule to adopt more stringent requirements promulgated under the 2011 Phase II version of the OTC model rule<sup>10</sup>. This decision followed the failure of the Cleveland ozone nonattainment areas to meet the 2015 ozone standard by August 3, 2021, resulting in the areas reclassification from marginal to moderate nonattainment. Ohio updated this rule to help and in accordance with the CAA to provide necessary additional emissions reductions in order for these areas to attain the standard and avoid further reclassification. This rule applies statewide.

- NSPS for Residential Wood Heaters

On March 16, 2015, U.S. EPA finalized the residential wood heaters NSPS (80 FR 13672). This rule does not affect existing woodstoves or other wood burning devices; however, it does provide more stringent emissions standards for new woodstoves, outdoor hydronic heaters, and indoor wood-burning forced air furnaces. New "Phase 1" less-polluting heater standards began in 2015, with even more-stringent Phase 2 standards beginning in 2020. However, new units are assumed to replace retired units beginning in 2015. U.S. EPA estimates 9,265 tons of VOC emissions will occur annually. Phase 2 gave retailers until May 15, 2020, to sell wood-heating devices that did not comply with Phase 2's more stringent emissions standards.

On March 11, 2020, U.S. EPA issued final amendments for new residential wood heaters NSPS. This rule amends the 2015 NSPS by removing certain minimum requirements for pellet fuels and clarifying a requirement regarding the use of unseasoned wood in pellet fuel production. The final rule does not affect existing units or replace state or local requirements governing wood heating device use.

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<sup>8</sup> The OTC model rules are available at <https://otcair.org/document.asp?fview=modelrules>

<sup>9</sup> [http://www.epa.ohio.gov/dapc/regs/3745\\_113.aspx](http://www.epa.ohio.gov/dapc/regs/3745_113.aspx)

<sup>10</sup> The OTC model rules are available at <https://otcair.org/document.asp?fview=modelrules>

- Aerosol coatings

On March 24, 2008 (73 FR 15604) U.S. EPA promulgated national emission standards for the aerosol coatings (aerosol spray paints) category under CAA section 183(e). This regulation established nationwide reactivity-based standards for aerosol coatings controlling contributions to ozone formation by encouraging the use of less reactive VOC ingredients. U.S. EPA estimates that this rule will reduce nationwide emissions of VOC by 19.4% from the 1990 baseline level.

On November 7, 2008 (73 FR 66184), U.S. EPA promulgated regulations moving the compliance date from January 1, 2009 to July 1, 2009.

- Portable fuel containers

Ohio's portable fuel container rules<sup>11</sup> became effective February 10, 2006<sup>12</sup>. This rule reduces VOC emissions by requiring any portable fuel containers or spouts sold, supplied, offered for sale, or manufactured for sale in Ohio on or after July 1, 2007 to be certified by the California air resources board (CARB) (or equivalent).

#### Off-Highway Mobile Sources

- NO<sub>x</sub> Emissions Standards for New Commercial Aircraft Engines

On June 18, 2012, U.S. EPA finalized a rule to adopt NO<sub>x</sub> emission standards for certain commercial passenger and freighter aircraft engines in common use at airports across the U.S. (77 FR 36342). The rule contains six major provisions, two of which are new NO<sub>x</sub> emission standards for newly certified-engine models. The first standards, Tier 6, took effect when the rule became effective and represents approximately a 12% reduction from current Tier 4 levels. The second standards, Tier 8, took effect in 2014 and represents approximately a 15% reduction from Tier 6 levels. Equipment turnover will ensure continued emissions reductions from this category for many years.

- PM Emissions Standards for Commercial Aircraft Engines

On November 11, 2023, U.S. EPA finalized a rule to adopt PM emission standards and test procedures for civil aircraft engines (87 FR 72312). The final standards apply to new type design and in-production civil aircraft engines with rated output of greater than 26.7 kilonewtons. These engines are typically used in commercial passenger and freight aircraft and in larger business jets. The final standards align with the United Nations' International Civil Aviation Organization (ICAO) PM standards and took effect on January 1, 2023.

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<sup>11</sup> [http://www.epa.ohio.gov/dapc/regs/3745\\_113.aspx](http://www.epa.ohio.gov/dapc/regs/3745_113.aspx)

<sup>12</sup> [http://www.epa.ohio.gov/portals/27/regs/3745-21/3745-21-17\\_Final.pdf](http://www.epa.ohio.gov/portals/27/regs/3745-21/3745-21-17_Final.pdf)

- Federal control programs (e.g., nonroad diesel rule), plus the evaporative Large Spark Ignition and Recreational Vehicle standards

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%. Non-road diesel equipment, as described in this rule, accounted for 47% of diesel particulate matter (PM) and 25% of NO<sub>x</sub> from mobile sources nationwide. Sulfur levels were reduced in non-road diesel fuel by 99% from previous levels, from approximately 3,000 ppm to 15 ppm in 2009. New engine standards took effect, based on engine horsepower, starting in 2008. Effective in January 2003, the Non-road Spark-Ignition Engines and Recreational Engine Standards standard regulates NO<sub>x</sub>, VOCs, and carbon monoxide (CO) for groups of previously unregulated non-road engines. This standard applies to all new engines sold in the United States and imported after the standards went into effect. The standard applies to large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all-terrain vehicles), and recreational marine diesel engines. When all of the non-road spark-ignition engines and recreational engine standards are fully implemented, an overall 80% reduction in NO<sub>x</sub>, 72% reduction in VOC, and 56% reduction in CO emissions are expected by 2020.

- Heavy-duty diesel (2007) engine standard/Low sulfur fuel

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% reduction in NO<sub>x</sub> from diesel trucks and buses, a large sector of the mobile sources NO<sub>x</sub> inventory.

- Federal railroad/locomotive standards

In March 2008, U.S. EPA finalized a three part program that will dramatically reduce emissions from diesel locomotives of all types - line-haul, switch, and passenger rail. The rule will cut PM emissions from these engines by as much as 90% and NO<sub>x</sub> emissions by as much as 80% when fully implemented. The standards are based on the application of high-efficiency catalytic after treatment technology for freshly manufactured engines built in 2015 and later. U.S. EPA standards also apply for existing locomotives when they are remanufactured. Requirements are also in place to reduce idling for new and remanufactured locomotives. Emission standards and other requirements began reducing idle emissions as early as 2000. However, because it is common for locomotives to remain in service for as long as 50 years, the number of new ultralow-emission locomotives in a railroad's fleet will be small during the start of this program.

- Federal commercial marine vessel 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 NO<sub>x</sub> emissions that will begin in 2016. U.S. EPA is adopting changes to the diesel fuel program to allow for the production and sale of diesel fuel with up to 1,000 ppm sulfur for use in Category 3 marine vessels. The regulations generally forbid production and sale of fuels with more than 1,000 ppm sulfur for use in most U.S. waters unless operators achieve equivalent emission reductions in other ways. U.S. EPA is also adopting provisions to apply some emission and fuel standards to foreign flagged and in-use vessels that are covered by MARPOL Annex VI. When this strategy is fully implemented in 2030, U.S. EPA estimates that NO<sub>x</sub> and PM<sub>2.5</sub> emissions in the U.S. will be reduced by approximately 1.2 million TPY and 143,000 TPY, respectively.

- Ohio's Beneficiary Mitigation Plan for the Volkswagen Settlement

In 2018, Ohio EPA developed a Beneficiary Mitigation Plan to accept and distribute funds allocated to Ohio from the Volkswagen settlement. Ohio's plan allocates \$40 million to on-road fleets (school bus replacements, transit bus replacements, and class 4-8 local freight and port drayage trucks and shuttle buses), \$19 million to off-road equipment (tugboats and ferries, switcher locomotives, and airport ground support and port cargo handling equipment), and \$11.25 million for infrastructure to support light-duty zero emissions vehicles. Funds are planned to be distributed over six to eight years. Ohio EPA estimates that applying the entire amount of funding allocated to Ohio (\$75,302,522.67) to fund the Eligible Mitigation Actions will result in annual emission reductions of approximately 352 tons of NO<sub>x</sub>. Projects like these will also significantly reduce emissions of other pollutants of concern, such as PM<sub>2.5</sub>, hydrocarbons, carbon monoxide and carbon dioxide. Actual emission reductions are dependent on the types of projects that are ultimately selected to receive funding. Benefits will compound over the lifetime of the equipment purchased or repowered.

Since 2018, almost \$150 million (\$149,038,869.74) has been awarded across Diesel Emission Reduction Grant Program (DERG), Diesel Emissions Reduction Act (DERA), and Ohio's Diesel Mitigation Trust Fund (DMTF). This funding supported 1,268 vehicle upgrades and 758 electric vehicle charging port installations and is estimated to have resulted in reducing emissions of NO<sub>x</sub> by over 300 tons/year and other pollutants by over 1,900 tons/year in priority counties.

#### On-Highway Mobile Sources

- Federal Motor Vehicle Emission Control Program, low-sulfur gasoline and ultra-low sulfur diesel fuel

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 applied nationwide. The federal rules were phased in between 2004 and 2009. U.S. EPA has estimated that NO<sub>x</sub> emission reductions were approximately 77% for passenger cars, 86% for smaller SUVs, light trucks, and minivans, and 65 to 95% reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions were approximately 12% for passenger cars, 18% for smaller SUVs, light trucks, and minivans, and 15% for larger SUVs, vans, and heavier trucks. In March 2014, U.S. EPA finalized a federal rule to further strengthen Tier II vehicle emission and fuel standards. This rule will require automakers to produce cleaner vehicles and refineries to make cleaner, lower sulfur gasoline. This rule will be phased in between 2017 and 2025. Tier III requires all passenger vehicles to meet an average standard of 0.03 gram/mile of NO<sub>x</sub>. Compared to Tier II, the Tier III tailpipe standards for light-duty vehicles are expected to reduce NO<sub>x</sub> and VOC emissions by approximately 80%. Tier III vehicle 6 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.

- Inspection - maintenance (I/M) programs, including Ohio's E-check program in northeast Ohio

The U.S. EPA's final I/M regulations in 40 CFR Part 85 require the states to submit a fully adopted I/M program by November 15, 1993. U.S. EPA approved Ohio's enhanced I/M program (E-Check), on April 4, 1995 (60 FR 16989) and January 6, 1997 (62 FR 646). Ohio's E-Check program has been implemented since 1996 and reduces VOCs that form ground-level ozone.

### Review of BART Determination

It was shown in the Ohio Regional Haze SIP for the first implementation period, that one facility, P.H. Glatfelter Company in Chillicothe, had two boilers which were the only non-EGU "subject-to-BART" sources in Ohio. This analysis and determination is discussed at length in the Ohio Regional Haze SIP as revised August 2015, section 8.2.<sup>13</sup> As discussed in the SIP, Glatfelter elected to implement an alternative program to BART as allowed under 40 CFR 51.308(e)(2). It was decided that these alternative measures would achieve greater emissions reductions than would be achieved through the installation and operation of BART.

As Glatfelter was also subject to Industrial Boiler Maximum Achievable Control Technology (MACT) requirements, the two compliance dates were intentionally coordinated in order that Glatfelter would be able to select and implement a control strategy that would address both the MACT and BART together. As such, Glatfelter's compliance date for BART implementation

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<sup>13</sup> [https://epa.ohio.gov/Portals/27/sip/regional/Regional\\_Haze\\_SIP\\_2015-FINAL.pdf](https://epa.ohio.gov/Portals/27/sip/regional/Regional_Haze_SIP_2015-FINAL.pdf)

was extended to be no later than January 31, 2017, which was still within the appropriate range of 5 years after approval of the implementation plan revision (July 2, 2017), as allowed by U.S. EPA's regulations (40 CFR 51.308(308)(1)(iv)). In November 2016, Glatfelter (now Pixelle Specialty Solutions) converted its two coal-fired boilers to natural gas. This change brings even further reductions than required as part of the BART compliance.

### Reasonable Progress Determination

Ohio does not have any Class I areas for which to assess reasonable progress. However, Ohio is required to address Regional Haze in each mandatory Class I federal area located outside Ohio which may be affected by emissions from within Ohio. The following Class I areas were identified in the second Regional Haze SIP as being impacted by Ohio:

- Acadia National Park (Maine)
- Brigantine (New Jersey)
- Caney Creek Wilderness (Arkansas)
- Cohutta Wilderness (Georgia)
- Dolly Sods Wilderness (West Virginia)
- Great Gulf Wilderness (New Hampshire)
- Great Smokey Mountains National Park (Tennessee)
- Hercules-Glades Wilderness (Missouri)
- James River Face Wilderness (Virginia)
- Joyce-Kilmer-Slickrock Wilderness (Tennessee)
- Linville Gorge Wilderness (North Carolina)
- Mammoth Cave National Park (Kentucky)
- Mingo (Missouri)
- Moosehorn (Maine)
- Otter Creek Wilderness (West Virginia)
- Presidential Range-Dry River Wilderness (New Hampshire)
- Seney (Mississippi)
- Shenandoah National Park (Virginia)
- Shining Rock Wilderness (North Carolina)
- Sipsey Wilderness (Alabama)
- Swanquarter (North Carolina)
- Upper Buffalo Wilderness (Arkansas)

Ohio determined in its original SIP, based on modeling assessments performed by Lake Michigan Air Director's Consortium (LADCO) and in consultation with other states and RPOs, that on-the-books controls by Ohio constitute Ohio's fair share of emission reductions at all Class I areas at which emissions from Ohio contribute. Ohio maintains that complying with these on-the-books controls constitutes Ohio's fair share towards reasonable progress in Class I areas at present. Furthermore, Ohio continues to anticipate implementation of stricter

controls than were in existence at the time of the second Regional Haze SIP for meeting new pollutant standards will lead to even further emissions reductions than achieved under the first planning period.

#### MANE-VU ASK July 2007

In Ohio's first Regional Haze SIP, Ohio consulted with the Mid-Atlantic/Northeast Visibility Union (MANE-VU), who had requested that states outside the MANE-VU area examine controls for specific sources and suggested various control strategies.<sup>14</sup> As detailed in the SIP, MANE-VU identified sources that contributed to visibility impairment based on 2002 emissions and outlined plans for many Ohio units that already had, or were planning to, implement controls. In Ohio's previous 5-Year Progress report, Ohio reiterated its belief that on-the-books controls represented reasonable progress towards the requests of MANE-VU. Consultation with all other RPOs in the original SIP resulted in agreement that on-the-books controls constituted reasonable progress for Ohio's fair share of emission reductions.

MANE-VU suggested the following control strategies be adopted and implemented, as discussed in Ohio's first Regional Haze SIP:

- Application of BART.
- 90% (or greater) reduction in SO<sub>2</sub> emissions from each of the EGU stacks on MANE-VU's list of 167 stacks (located in 19 states), which reflect those stacks determined to be reasonably anticipated to cause or contribute to visibility impairment in the MANE-VU Class I areas.
- 28% reduction in non-EGU (point, area, on-road, and off-road) SO<sub>2</sub> emissions relative to on-the-books, on-the-way 2018 projections.
- Continued evaluation of other measures, including measures to reduce SO<sub>2</sub> and NO<sub>x</sub> emissions from coal-burning facilities and promulgation of new source performance standards for wood combustion.
- Further reduction in power plant SO<sub>2</sub> (and NO<sub>x</sub>) emissions beyond CAIR

In Ohio's first Regional Haze SIP, of the 167 stacks identified by MANE-VU, 28 were from 14 sources in Ohio. Ohio noted that, at the time, most of these stacks had or would have post-combustion emission controls for SO<sub>2</sub> emissions (i.e., scrubbers) to further reductions in emissions from these Ohio sources.

Ohio's first Regional Haze SIP, submitted March 11, 2011, provided additional information relevant since the 2002 inventory:

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<sup>14</sup> MANE-VU's document entitled "Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas - Methodology for Source Selection, Evaluation of Control Options, and Four Factor Analysis, July 2007" outlined MANE-VU's requests of states outside the MANE-VU area. <http://www.marama.org/technical-center/regional-haze-planning/reasonable-progress-analysis>, under "Work Products." The resulting request is referred to as the "MANE-VU Ask."

- The seven units (4 -185 MW; 300 MW; 2-600 MW) (identified as five stacks by MANE-VU) at First Energy W. H. Sammis facility began continuous operation of scrubbers in 2010.
- Two (600 MW each) of the three units at AEP Cardinal were operating scrubbers by the end of 2007 or early 2008. The third unit's (630 MW) scrubber is currently under construction but required by Consent Decree to continuously operate by 2012.
- AEP Muskingum currently has five units identified as two stacks by MANE-VU. The largest of five units (2-205 MW; 2-250 MW; 600 MW) at AEP Muskingum is required by Consent Decree to install and continuously operate a scrubber by 2016.
- The four units (573 MW each) at the Dayton P&L JM Stuart facility have installed and operated scrubbers continuously since spring of 2008.
- The unit (587 MW) at Dayton P&L Killen facility has installed and operated its scrubber since June 2007.
- In 2006, two of the units (each 125 MW) at AEP Conesville, and identified on MANE-VU's list, shut down (they comprised one stack). The second stack, comprised of one unit (800 MW), completed construction, and began operating its scrubber in June 2009.
- Duke Miami Fort had five units in operation. In 2007, two of these units shut down. Of the remaining three units, two units (490 MW each) began operating scrubbers in 2007; and for the third (smallest at 163 MW), Duke has indicated no immediate plans to install a scrubber.
- First Energy Burger has three units. Two units (156 MW each) will shut down by no later than 2012. For the third (smallest at 94 MW), First Energy has indicated no immediate plans to install a scrubber.
- OVEC Kyger Creek has five units (217 MW each)(identified as one stack by MANE-VU). All units are planned to have scrubbers installed and operating by mid-2012.

Ohio's Regional Haze 5-year Progress Report submitted on March 11, 2016 provided updated information relevant to these sources since the submittal of Ohio's first Regional Haze SIP:

- The third AEP Cardinal unit began operating its scrubber in December of 2012.
- AEP Muskingum permanently shut down all units by June of 2015.
- The only unit remaining at the Duke Miami Fort facility that did not have a scrubber permanently shut down in June of 2015.
- The two units planned for shut down by 2012 at the First Energy Burger facility (by 2012) permanently shut down in December of 2010.
- The five units at OVEC Kyger Creek began operating scrubbers by February 2012.
- All units at the Richard Gorsuch facility permanently shut down in November of 2010.
- All units at the Walter C. Beckjord facility permanently shut down in October of 2014.

- All units at the Eastlake facility permanently shut down in April of 2015.

Ohio's second Regional Haze SIP submitted on July 31, 2021 provided updated information relevant to the same sources since the submittal of Ohio's first Regional Haze 5-Year Progress Report:

- All units at the Dayton P&L J M Stuart facility permanently shut down in May of 2018.
- All units at the Dayton P&L Killen facility permanently shut down in May of 2018.
- Three units at the First Energy W.H. Sammis permanently shut down in May of 2020.

Since the submittal of Ohio's second Regional Haze SIP, the following are additional updates relevant to the sources outlined in the first Regional Haze SIP:

- All units at the First Energy W.H. Sammis facility shut down in May of 2023.

Ohio continues to believe our facilities have made significant progress in installing SO<sub>2</sub> controls as requested under the July 2007 MANE-VU's Ask.

#### MANE-VU ASK August 2017

On August 25, 2017, Ohio EPA received a "Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) States Concerning a Course of Action in Contributing States Located Upwind of MANE-VU Toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018-2028)" (herein "2017 MANE-VU Ask", Appendix M1 from Ohio's second Regional Haze SIP).<sup>15</sup> The 2017 MANE-VU Ask requested upwind states to adopt and implement several "emissions management" strategies to meet reasonable progress goals. MANE-VU's analysis supporting this Ask was based on actual 2015 emissions for EGUs and 2011 for other emission sources.

The 2017 MANE-VU Ask recommended states outside of the MANE-VU area consider the following "emissions management" strategies:

1. EGUs with a nameplate capacity larger than or equal to 25MW with already installed NO<sub>x</sub> and/or SO<sub>2</sub> controls - ensure the most effective use of control technologies on a year-round basis to consistently minimize emissions of haze precursors, or obtain equivalent alternative emission reductions;
2. Emission sources modeled by MANE-VU that have the potential for 3.0 Mm<sup>-1</sup> or greater visibility impacts at any MANE-VU Class I area, as identified by MANE-VU contribution analyses (see attached listing) - perform a four-factor analysis for reasonable installation or upgrade to emission controls;

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<sup>15</sup> A copy of the appendices for Ohio's Regional Haze SIP for the Second Implementation Period can be found online Ohio EPA's DAPC website under State Implementation Plan for Regional Haze, <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/appendix-information-for-regional-second-implementation-period-report>

3. States should pursue an ultra-low sulfur fuel oil standard similar to the one adopted by MANE-VU states in 2007 as expeditiously as possible and before 2028, depending on supply availability, where the standards are as follows:
  - a. distillate oil to 0.0015% sulfur by weight (15 ppm),
  - b. #4 residual oil to 0.5% sulfur by weight,
  - c. #6 residual oil to 0.5% sulfur by weight.
4. EGUs and other large point emission sources larger than 250 MMBtu per hour heat input that have switched operations to lower emitting fuels - pursue updating permits, enforceable agreements, and/or rules to lock-in lower emission rates for SO<sub>2</sub>, NO<sub>x</sub> and PM. The permit, enforcement agreement, and/or rule can allow for suspension of the lower emission rate during natural gas curtailment;
5. Each State should consider and report in their SIP measures or programs to: a) decrease energy demand through the use of energy efficiency, and b) increase the use within their state of Combined Heat and Power (CHP) and other clean Distributed Generation technologies including fuel cells, wind, and solar.

Ohio's process for source selection and four-factor analyses essentially follows MANE-VU's first and second requests. As part of Ohio's process, described in detail in steps 3 and 4 of Ohio's second Regional Haze SIP, larger sources with NO<sub>x</sub> and/or SO<sub>2</sub> controls were evaluated and determined to already be effectively controlled on a year-round basis, or four-factor analyses were performed to evaluate whether the existing controls could be upgraded or optimized. Four-factor analyses were performed for all of the specific sources in MANE-VU's second request (i.e. Avon Lake Power Plant and General James M. Gavin Power Plant), except for Muskingum River Power Plant which permanently shut down in 2015.

Ohio considered MANE-VU's third request for an ultra-low sulfur fuel oil standard and did not find it necessary or appropriate at the time. Ohio does not believe that use of distillate oil, #4 residual oil or #6 residual oil comprise a significant portion of fuel usage in Ohio. Thus, establishing an ultra-low sulfur fuel standard would have little impact on visibility and further evaluating this potential control would not be an efficient use of state resources.

Regarding MANE-VU's fourth request for sources that have switched to lower emitting fuels, in most cases the fuel switch is already incorporated into federally enforceable permits. However, Ohio does not agree that establishing lower emission rates commensurate with the fuel switch is either required or appropriate.

Regarding MANE-VU's fifth request for energy efficiency, CHP and other Distributed Generation technologies, Ohio is a fully deregulated energy market and relies on PJM Interconnection, LLC (PJM), the regional transmission organization (RTO) established by the Federal Energy Regulatory Commission (FERC), to ensure the adequate and efficient distribution of power in Ohio. Ohio EPA lacks the legislative authority to dictate energy policy, including the type of fuel

used by a source and the order of distribution of electricity. Even if such measures were possible to be implemented by Ohio EPA, making such measures federally enforceable would severely limit the flexibility necessary to maintain electric reliability. Lastly, incorporating such measures into a SIP would severely and senselessly limit the ability of generators to apply emerging technologies in energy efficiency and renewable energy. While Ohio EPA lacks regulatory authority to establish federally enforceable measures in response to this Ask, Ohio EPA does encourage and promote energy efficiency, for example, through our Encouraging Environmental Excellence (E<sub>3</sub>)<sup>16</sup> Program which recognizes organizations achievements in environmental stewardship.

#### VISTAS ASK June 2020

On June 22, 2020, VISTAS, on behalf of Alabama, Georgia, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia, requested that Ohio conduct a reasonable progress analysis for four Ohio sources that were identified by VISTAS to have an impact on visibility in Class I areas located in VISTAS states (Appendix N1 from Ohio's second Regional Haze SIP). In this letter, it was also requested that if it is determined that a four-factor analysis is not warranted for one or more of the identified sources, rationale for this determination be provided. On October 29, 2020, Ohio responded indicating that each of the four sources meets U.S. EPA's guidance for effectively controlled, and therefore Ohio believes it is reasonable not to perform a four-factor analysis on these sources (Appendix N2 from Ohio's second Regional Haze SIP).<sup>17</sup>

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<sup>16</sup> <https://www.epa.state.oh.us/ocapp/ohioe3>

<sup>17</sup> A copy of the appendices for Ohio's Regional Haze SIP for the Second Implementation Period mentioned can be found online Ohio EPA's DAPC website under State Implementation Plan for Regional Haze, <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/appendix-information-for-regional-second-implementation-period-report>

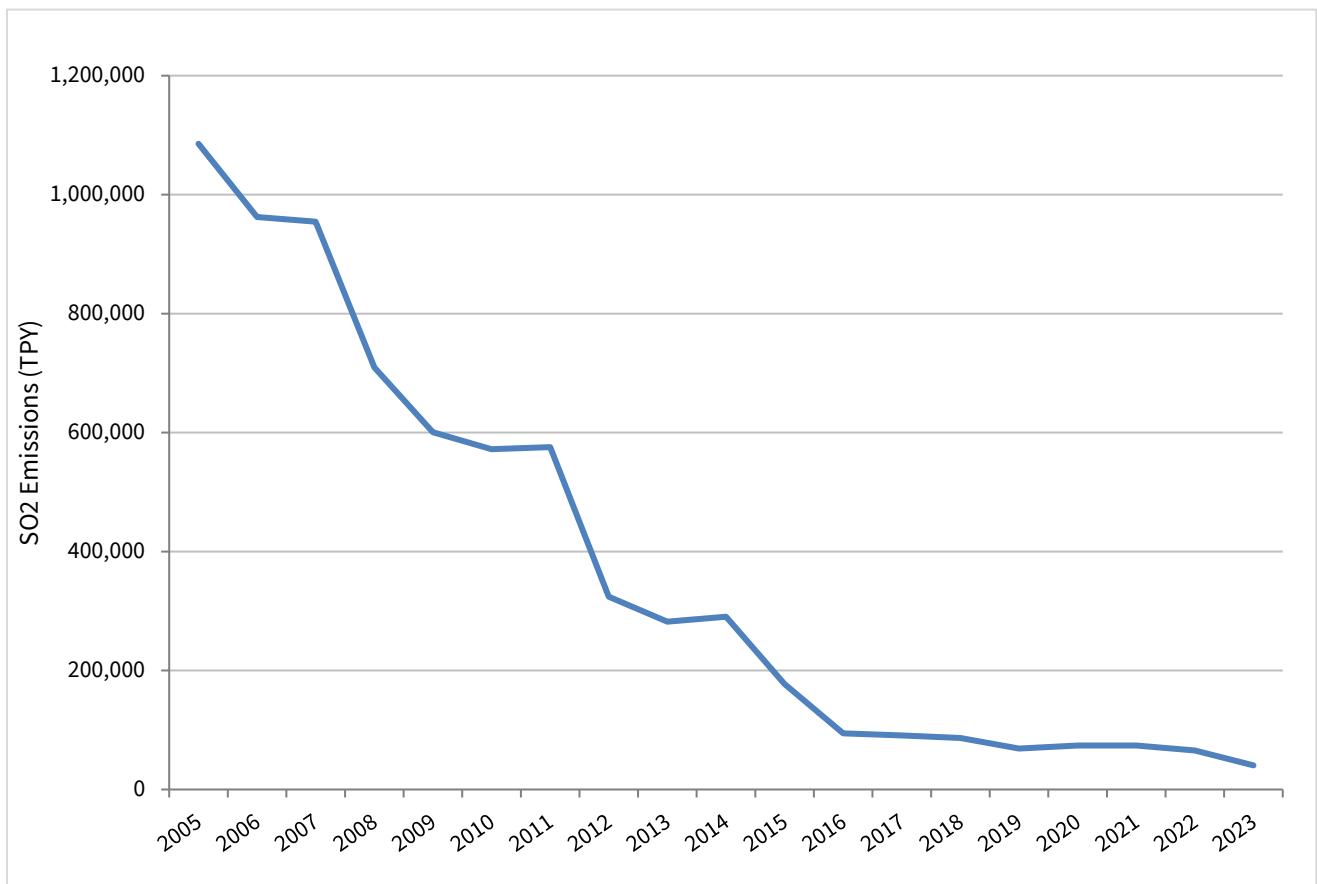
## B. Emissions Reductions from Regional Haze SIP Strategies

Sections 51.308(g)(2)

*A summary of the emissions reductions achieved throughout the State through implementation of the measures described in paragraph (g)(1) of this section.*

The overall trend from 2005 to 2023 shows decreasing emissions from EGUs. Historically, the EGU sector was the highest contributor of SO<sub>2</sub> emissions in 2005, comprising 89% of total SO<sub>2</sub> emissions. For emissions of NO<sub>x</sub>, the EGU sector was the second highest contributor in the 2005, comprising 34% of total NO<sub>x</sub> emissions.

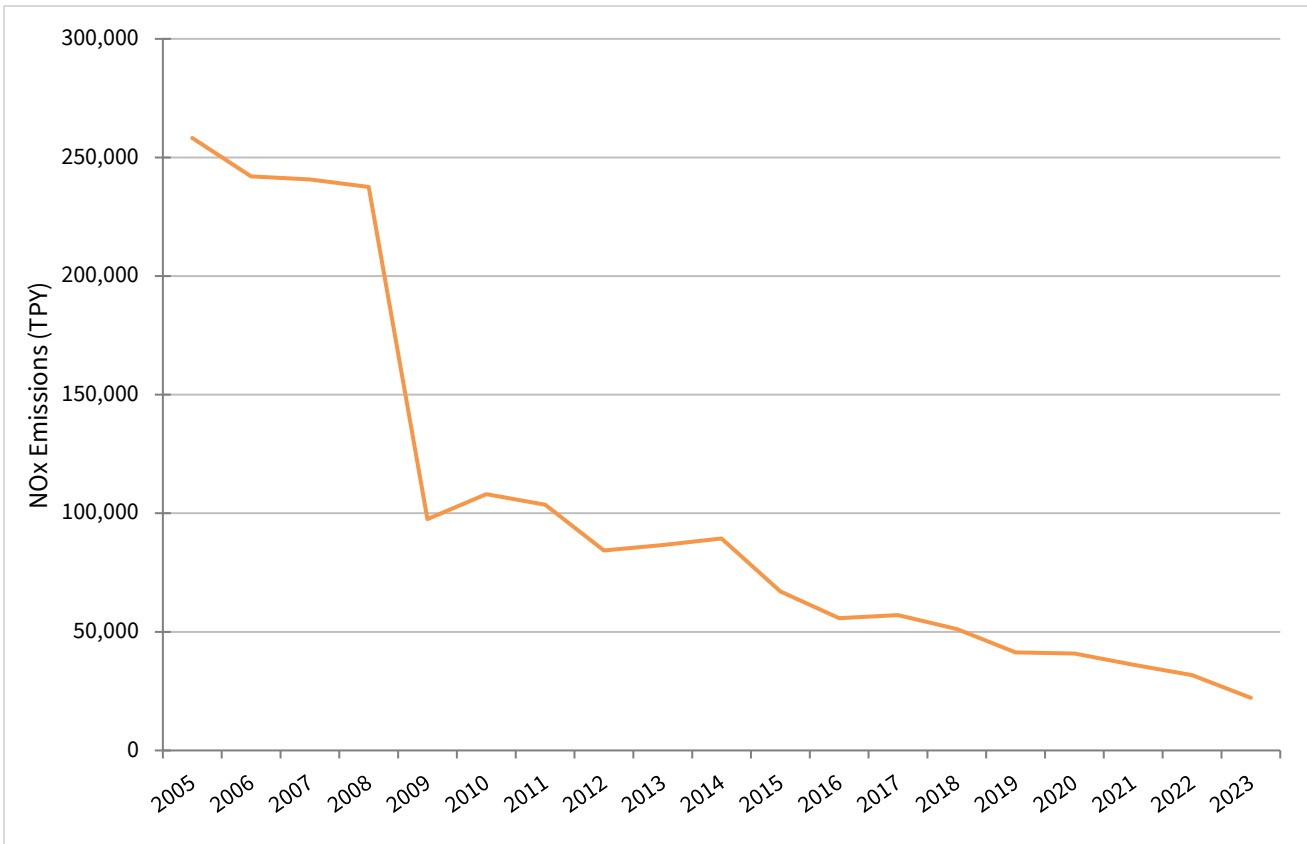
**Figure 1: Ohio SO<sub>2</sub> Emissions from EGUs (2005-2023)**



Source U.S. EPA's Clean Air Markets Program Data (CAMPD)

As shown in figure 1, SO<sub>2</sub> has dramatically decreased from 1,085,485 TPY in 2005 to only 40,533 TPY in 2023. This is a 96% decrease in EGU SO<sub>2</sub> emissions over those eighteen years. This dramatic decrease is a result of CAIR and CSAPR and other control strategies and programs implemented.

**Figure 2: Ohio NO<sub>x</sub> Emissions from EGUs (2005-2023)**



Source U.S. EPA’s Clean Air Market Program Data (CAMPD)

As seen in figure 2 above, NO<sub>x</sub> emissions have also dramatically decreased in the EGU sector. Emissions have fallen from 258,221 TPY in 2005 to 22,178 TPY in 2023, as shown in figure 2. This is a 91% decrease in NO<sub>x</sub> emissions from 2005 to 2023.

Tables 1 and 2 identify, by Ohio facility, SO<sub>2</sub> and NO<sub>x</sub> emissions reported to U.S. EPA’s Clean Air Market Program Data (CAMPD) from 2019 to 2023. Not all facilities listed in Table 1 are also listed in Table 2, as not every facility reports both SO<sub>2</sub> and NO<sub>x</sub> emissions to CAMPD. Though each facility’s emissions fluctuate year to year, total state emissions still decreased from 2019 to 2023. In 2019, Ohio facilities reported a total of 68,905.00 tons of SO<sub>2</sub> emissions and 41,351.54 tons of NO<sub>x</sub> emissions. In 2023, SO<sub>2</sub> emissions decreased to 40,534.80 tons and NO<sub>x</sub> emissions decreased to 22,201.36 tons. This is a 41% decrease in SO<sub>2</sub> emissions and a 46% decrease in NO<sub>x</sub> emissions from 2019 to 2023.

**Table 1: SO<sub>2</sub> Emissions for Ohio Facilities (2019-2023)**

Facility	CAMPD ID	2019	2020	2021	2022	2023
AMP-Ohio Gas Turbines Bowling Green	55262	0.01	0.01	0.01	0.00	0.01
AMP-Ohio Gas Turbines Galion	55263	0.01	0.01	0.01	0.00	0.01
AMP-Ohio Gas Turbines Napoleon	55264	0.01	0.01	0.01	0.01	0.01
Avon Lake Power Plant	2836	1,597.61	853.27	2,829.07	1,554.85	NA

Facility	CAMPD ID	2019	2020	2021	2022	2023
Bay Shore	2878	1,536.56	2,528.57	2,373.87	2,239.95	2,337.56
Cardinal	2828	9,452.97	9,891.25	10,613.43	11,274.00	10,688.65
Carroll County Energy	59773	11.37	11.63	10.57	11.75	12.19
Clean Energy Future - Lordstown, LLC	60376	12.20	12.47	12.07	13.13	12.61
Conesville	2840	2,266.05	1,101.13	NA	NA	NA
Darby Electric Generating Station	55247	2.46	2.07	2.24	6.74	1.09
Dicks Creek Power Company LLC	2831	0.05	0.05	0.04	0.03	0.01
Dresden Energy Facility	55350	8.63	9.03	8.02	8.87	8.13
Eastlake	2837	3.36	NA	NA	NA	NA
Frank M Tait Station	2847	0.84	0.99	1.00	2.81	3.45
Fremont Energy Center	55701	7.43	7.52	7.81	8.40	7.10
Gen J M Gavin	8102	26,473.64	28,156.56	25,792.60	20,338.66	18,431.86
Greenville Electric Gen Station	55224	1.37	0.35	0.65	0.74	0.25
Guernsey Power Station	62949	NA	NA	NA	NA	17.73
Hanging Rock Power Company LLC	55736	21.31	21.14	20.78	21.65	23.11
Kyger Creek	2876	3,746.69	3,320.20	3,812.99	3,728.63	3,297.68
Long Ridge Energy Generation	61322	NA	NA	1.14	4.90	7.35
Madison Generating Station	55110	1.36	1.22	2.07	2.50	3.53
Miami Fort Power Station	2832	14,396.51	16,729.51	17,737.82	16,958.68	5,274.75
Middletown Energy Center	59326	6.89	6.94	5.49	7.20	6.84
Niles	2861	1.94	1.36	1.31	0.65	0.27
O H Hutchings	2848	NA	NA	0.01	0.00	0.00
Omega JV2 Bowling Green	7783	0.01	0.01	0.01	0.00	0.01
Omega JV2 Hamilton	7782	0.01	0.01	0.01	0.01	0.01
Oregon Clean Energy Center	59764	10.98	11.42	12.24	11.62	13.16
Richland Peaking Station	2880	0.88	0.95	1.43	1.06	0.94
Robert P Mone	7872	0.66	1.93	1.79	2.20	0.85
Rolling Hills Generating LLC	55401	1.92	0.90	1.88	4.65	7.45
South Field Energy, LLC	60356	NA	NA	4.36	16.76	16.52
Tait Electric Generating Station	55248	8.20	2.59	16.99	20.35	5.82
Troy Energy, LLC	55348	1.43	2.95	2.94	3.29	2.65
W H Sammis	2866	1,639.30	1,702.89	1,843.03	3,137.93	324.04
W H Zimmer Generating Station	6019	7,663.11	9,625.74	8,719.71	6,285.65	NA
Washington Power Company LLC	55397	10.87	10.90	10.34	10.89	11.53
Waterford Plant	55503	12.77	13.92	13.08	14.04	11.44
West Lorain	2869	1.73	2.07	2.20	8.59	5.14
Woodsdale	7158	3.86	0.33	0.60	2.22	1.05
<b>TOTAL</b>		<b>68,905.00</b>	<b>74,031.90</b>	<b>73,863.62</b>	<b>65,703.41</b>	<b>40,534.80</b>

Source U.S. EPA's Clean Air Market Program Data (CAMPD), the facility IDs in this table are the IDs assigned in CAMPD

**Table 2: NO<sub>x</sub> Emissions from Ohio Facilities (2019-2023)**

Facility Name	CAMPD ID	2019	2020	2021	2022	2023
AMP-Ohio Gas Turbines Bowling Green	55262	2.39	2.13	2.23	1.18	1.84
AMP-Ohio Gas Turbines Galion	55263	1.85	2.53	2.54	1.00	1.88
AMP-Ohio Gas Turbines Napoleon	55264	2.00	1.52	2.57	1.25	1.94
Avon Lake Power Plant	2836	609.00	308.98	1,065.64	678.63	NA
Bay Shore	2878	319.00	558.68	414.79	341.54	458.84
Cardinal	2828	3,886.98	4,176.14	4,110.40	3,771.02	3,596.17
Cargill Incorporated - Dayton	880039	94.68	88.41	NA	NA	NA
Carroll County Energy	59773	106.97	110.96	97.97	107.20	116.28
Clean Energy Future - Lordstown, LLC	60376	119.90	121.89	120.78	131.77	135.22
Cleveland-Cliffs Cleveland Works LLC	10398	337.57	NA	NA	NA	NA
Cleveland-Cliffs Steel - Middletown	880042	139.58	142.85	97.95	77.64	168.79
Cleveland-Cliffs Warren	54207	88.55	47.37	NA	NA	NA
Conesville	2840	1,014.66	460.51	NA	NA	NA
Darby Electric Generating Station	55247	270.46	279.03	277.10	299.59	76.50
Dicks Creek Power Company LLC	2831	56.16	58.05	50.93	30.58	12.74
Dresden Energy Facility	55350	157.25	175.56	163.32	177.35	162.04
Eastlake	2837	8.06	NA	NA	NA	NA
Frank M Tait Station	2847	123.36	182.63	177.02	270.00	228.67
Fremont Energy Center	55701	129.99	137.88	134.10	141.11	117.78
Gen J M Gavin	8102	7,343.32	8,026.27	8,150.17	5,503.79	6,264.21
Greenville Electric Gen Station	55224	107.25	44.99	82.33	94.24	34.30
Guernsey Power Station	62949	NA	NA	NA	NA	244.09
Hanging Rock Power Company LLC	55736	298.03	314.58	306.01	265.86	284.59
Kyger Creek	2876	5,374.74	4,680.00	2,975.92	3,293.70	3,144.70
Lima Refinery	880083	16.68	23.02	17.84	31.98	33.21
Long Ridge Energy Generation	61322	NA	NA	10.89	46.18	69.67
Madison Generating Station	55110	82.94	70.88	125.41	147.78	192.20
McCracken Power House	50044	0.02	0.04	0.06	0.02	0.01
Miami Fort Power Station	2832	11,359.35	9,612.49	9,285.00	7,402.65	3,921.63
Middletown Energy Center	59326	70.44	73.30	53.86	70.84	67.65
Niles	2861	4.66	3.26	3.15	1.57	0.65
O H Hutchings	2848	0.31	0.20	11.21	4.69	3.71
Ohio Refining Company LLC	880030	13.61	15.50	20.64	11.19	11.17
Omega JV2 Bowling Green	7783	1.49	9.59	10.51	3.77	1.52
Omega JV2 Hamilton	7782	2.12	12.43	10.88	5.30	1.52
Oregon Clean Energy Center	59764	99.49	102.20	114.05	111.50	122.64
Pixelle Specialty Solutions LLC	10244	105.13	95.31	97.83	225.36	129.30
Pratt Paper (OH)	880109	0.43	11.02	11.02	11.02	11.02

Facility Name	CAMPD ID	2019	2020	2021	2022	2023
Procter & Gamble Company - Ivorydale	88028	49.66	NA	NA	NA	NA
Richland Peaking Station	2880	126.19	135.62	208.97	149.82	132.78
Robert P Mone	7872	67.00	191.59	150.33	245.60	130.02
Rolling Hills Generating LLC	55401	146.59	68.15	132.38	298.06	394.63
South Field Energy, LLC	60356	NA	NA	63.09	173.61	165.00
Tait Electric Generating Station	55248	279.45	305.66	326.27	413.22	389.62
Troy Energy, LLC	55348	75.96	166.30	169.51	189.55	147.86
W H Sammis	2866	2,401.52	2,192.98	2,580.88	2,669.48	510.43
W H Zimmer Generating Station	6019	5,328.96	7,340.17	3,982.86	3,693.86	NA
Washington Power Company LLC	55397	181.80	182.28	176.65	145.70	144.14
Waterford Plant	55503	197.39	222.87	211.84	224.08	173.28
West Lorain	2869	13.37	23.65	65.69	136.01	186.71
Woodsdale	7158	135.23	62.73	71.63	129.12	210.41
TOTAL		41,351.54	40,842.20	36,144.22	31,279.41	22,201.36

Source U.S. EPA's Clean Air Market Program Data (CAMPD) the facility IDs in this table are the IDs assigned in CAMPD

Given the magnitude of the emissions of these pollutants and their substantial contribution to visibility impairment, these reductions from EGUs represent large decreases in Ohio's contribution to visibility impairment at the Class I areas it affects. Ohio expects the implementation of CSAPR as well as other regulations and control strategies (discussed previously) to generate even further reductions in emissions as the requirements are phased in over the next several years.

### **C. Visibility Progress**

Sections 51.308(g)(3) and 51.309(d)(10)(i)(C)

*For each mandatory Class I Federal area within the State, the State must assess the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of 5-year averages of these annual values.*

*(i) The current visibility conditions for the most impaired and least impaired days;*

*(ii) The difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions;*

*(iii) The change in visibility impairment for the most impaired and least impaired days over the past 5 years.*

There are no Class I Federal areas within the State of Ohio; therefore, the Ohio Regional Haze SIP is concerned only with the contribution of Ohio's emissions to Class I areas in other states and has no assessment of visibility conditions and changes in Class I areas.

### **D. Emissions Progress**

Sections 51.308(g)(4)

*An analysis tracking the change over the past 5 years in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.*

In Ohio's second Regional Haze SIP, Ohio used the 2017 national emissions inventory (NEI) data and compared it to the 2005 emissions inventory summary from Ohio's first Regional Haze SIP. For the specific point sources discussed in the second Regional Haze SIP, Ohio used 2016 actual emissions data, 2017 NEI data and Ohio's 2018 emissions inventory system (EIS) data.

In this section, the 2017 NEI data presented in Ohio's second Regional Haze SIP is compared to 2020 emissions data from the 2020 NEI (shown in table 3). Then, for the point sources discussed in the second Regional Haze SIP and their accompanying 2016 - 2018 data, data from 2019 - 2023 is used to compare emissions (SO<sub>2</sub> and NO<sub>x</sub> emissions and their emission rates provided by CAMPD, PM<sub>2.5</sub> and NH<sub>3</sub> emissions provided by Ohio's EIS for 2019 - 2022 (Ohio's 2023 EIS is not yet published)).

**Table 3: 2005 Ohio Emissions Summary by Source Category and Pollutant**

Source Category	VOC	NOx	PM25-PRI	PM10-PRI	NH3	SO2
EGU Point	1,354	255,556	9,158	17,324	107	1,100,511
Non-EGU Point	27,848	66,229	9,920	15,012	3,175	115,547
Non-Road	89,584	85,887	7,384	7,719	77	8,747
Other	226,910	39,582	16,708	16,764	109,047	5,632
MAR	2,706	47,021	1,452	1,634	27	4,687
On-Road	171,331	259,299	4,735	6,797	11,381	6,290
<b>Total</b>	<b>519,733</b>	<b>753,574</b>	<b>49,357</b>	<b>65,250</b>	<b>123,814</b>	<b>1,241,414</b>

Source: Ohio EPA's Regional Haze State Implementation Plan under Section 6 "Emissions Inventory", a copy can be found here <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/state-implementation-plan-sip-regional-haze>

**Table 4: 2017 Ohio Emissions Summary by Source Category and Pollutant**

Source Category	VOC	NOx	PM25-PRI	PM10-PRI	NH3	SO2
EGU Point	1,112	58,741	7,369	8,668	1,608	93,183
Non-EGU Point	42,413	50,417	16,149	25,568	2,760	29,753
Non-Road	35,954	38,745	3,523	3,700	46	63
Other	201,020	17,833	24,602	26,094	84,287	1,674
MAR	2,056	28,287	978	1,055	6	219
On-Road	64,880	133,344	4,435	9,564	3,584	770
Fires	6,735	447	2,505	2,952	474	236
<b>Total</b>	<b>354,170</b>	<b>327,814</b>	<b>59,561</b>	<b>77,601</b>	<b>92,765</b>	<b>125,898</b>
<i>Dust</i>			<i>30,317</i>	<i>190,883</i>		
<i>Total including Dust</i>	<i>354,170</i>	<i>327,814</i>	<i>89,878</i>	<i>268,484</i>	<i>92,765</i>	<i>125,898</i>

Source: 2017 NEI data from <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>

**Table 5: 2020 Ohio Emissions by Source Category and Pollutant**

Source Category	VOC	NOx	PM25-PRI	PM10-PRI	NH3	SO2
EGU Point	848	41,834	4,881	5,428	885	75,733
Non-EGU Point	42,729	42,851	13,601	23,688	2,738	21,963
Non-Road	32,013	32,320	2,911	3,065	52	12
Other	157,995	19,165	33,618	35,264	92,479	9,957
MAR	1,533	19,933	647	703	2	122
On-Road	35,128	91,127	2,969	7,437	3,145	324
Fires	3,485	285	1,379	1,613	280	128
<b>Total</b>	<b>273,731</b>	<b>247,515</b>	<b>60,006</b>	<b>77,198</b>	<b>99,581</b>	<b>108,239</b>
<i>Dust</i>			<i>35,801</i>	<i>231,146</i>		
<i>Total including Dust</i>	<i>273,731</i>	<i>247,515</i>	<i>95,807</i>	<i>308,344</i>	<i>99,581</i>	<i>108,239</i>

Source: 2020 NEI data from <https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data>

Green percent/negative difference (% DIFF) means a decrease in emissions from 2017 to 2020, and red percent/positive difference (% DIFF) means an increase in emissions from 2017 to 2020.

**Table 6: Difference in 2017 and 2020 Ohio Emissions**

<b>VOC</b>				
	2017	2020	DIFF	% DIFF
EGU Point	1,112	848	-264	-24%
Non-EGU Point	42,413	42,729	316	+1%
Non-Road	35,954	32,013	-3,941	-11%
Other	201,020	157,995	-43,025	-21%
MAR	2,056	1,533	-523	-25%
On-Road	64,880	35,128	-29,752	-46%
Fires	6,735	3,485	-3,250	-48%
Total	354,170	273,731	-80,439	-23%
<i>Dust</i>				
<i>Total including Dust</i>	<i>354,170</i>	<i>273,731</i>	<i>-80,439</i>	<i>-23%</i>
<b>NOx</b>				
	2017	2020	DIFF	% DIFF
EGU Point	58,741	41,834	-16,907	-29%
Non-EGU Point	50,417	42,851	-7,566	-15%
Non-Road	38,745	32,320	-6,425	-17%
Other	17,833	19,165	1,332	+7%
MAR	28,287	19,933	-8,354	-30%
On-Road	133,344	91,127	-42,217	-32%
Fires	447	285	-162	-36%
Total	327,814	247,515	-80,299	-24%
<i>Dust</i>				
<i>Total including Dust</i>	<i>327,814</i>	<i>247,515</i>	<i>-80,299</i>	<i>-24%</i>
<b>PM25-PRI</b>				
	2017	2020	DIFF	% DIFF
EGU Point	7,369	4,881	-2,488	-34%
Non-EGU Point	16,149	13,601	-2,548	-16%
Non-Road	3,523	2,911	-612	-17%
Other	24,602	33,618	9,016	+37%
MAR	978	647	-331	-34%
On-Road	4,435	2,969	-1,466	-33%
Fires	2,505	1,379	-1,126	-45%
Total	59,561	60,006	445	+1%
<i>Dust</i>	<i>30,317</i>	<i>35,801</i>	<i>5,484</i>	<i>+18%</i>
<i>Total including Dust</i>	<i>89,878</i>	<i>95,807</i>	<i>5,929</i>	<i>+7%</i>

<b>PM10-PRI</b>				
	2017	2020	DIFF	% DIFF
EGU Point	8,668	5,428	-3,240	-37%
Non-EGU Point	25,568	23,688	-1,880	-7%
Non-Road	3,700	3,065	-635	-17%
Other	26,094	35,264	9,170	+35%
MAR	1,055	703	-352	-33%
On-Road	9,564	7,437	-2,127	-22%
Fires	2,952	1,613	-1,339	-45%
Total	77,601	77,198	-403	-1%
<i>Dust</i>	190,883	231,146	40,263	+21%
<i>Total including Dust</i>	268,484	308,344	39,860	+15%
<b>NH3</b>				
	2017	2020	DIFF	% DIFF
EGU Point	1,608	885	-723	-45%
Non-EGU Point	2,760	2,738	-22	-1%
Non-Road	46	52	6	+13%
Other	84,287	92,479	8,192	+10%
MAR	6	2	-4	-67%
On-Road	3,584	3,145	-439	-12%
Fires	474	280	-194	-41%
Total	92,765	99,581	6,816	+7%
<i>Dust</i>				
<i>Total including Dust</i>	92,765	99,581	6,816	+7%
<b>SO2</b>				
	2017	2020	DIFF	% DIFF
EGU Point	93,183	75,733	-17,450	-19%
Non-EGU Point	29,753	21,963	-7,790	-26%
Non-Road	63	12	-51	-81%
Other	1,674	9,957	8,283	+495%
MAR	219	122	-97	-44%
On-Road	770	324	-446	-58%
Fires	236	128	-108	-46%
Total	125,898	108,239	-17,659	-14%
<i>Dust</i>				
<i>Total including Dust</i>	125,898	108,239	-17,659	-14%

Source: 2020 NEI data from <https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data>, 2017 NEI data from <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>, differences (DIFF) and percent differences (% DIFF) calculated by hand

Between the 2017 and 2020 NEI, major methodology changes and adjustments were made to different sectors and groups, causing emissions in those sectors to increase from 2017.

The major increase in NH<sub>3</sub> emissions from the “Other” category can be attributed to two different changes between the 2017 inventory and the 2020 inventory. First, the addition of NH<sub>3</sub> emissions for the Waste Disposal – Open Burning, Land Clearing Debris SCC group. These emissions were not included in previous inventories. Second, the Agriculture – Fertilizer Application SCC group went under major methodology changes in the 2020 NEI, detailed specifically in section 9.3.4 of the technical support documents for the 2020 NEI<sup>18</sup>. Both of these changes resulted in higher estimations of NH<sub>3</sub> emissions across the country in the 2020 NEI. However, Ohio does not believe there has been an “actual” increase in NH<sub>3</sub> emissions.

The Fuel Combustion – Residential Wood SCC group (grouped in the “Other” category in the tables above) had major changes to its input data and the calculation tool was revised for the 2020 NEI, resulting in higher PM<sub>2.5</sub>, VOC, NO<sub>x</sub>, and SO<sub>2</sub> emissions factors compared to the 2017 NEI. This then caused higher estimated emissions in the Residential Wood group for those four pollutants in the 2020 NEI, and not because of an “actual” increase in Ohio of those pollutant emissions attributed to the Residential Wood SCC group.

The high increase in PM emissions (PM<sub>2.5</sub> and PM<sub>10</sub>) in the “Dust” category is because the meteorological adjustment factor was changed between the 2017 NEI and 2020 NEI, causing an increase in estimated PM emissions across the country. Therefore, this increase in PM is attributed to the methodology change and not because there was an “actual” PM increase in Ohio between 2017 and 2020.

There is a stark difference in SO<sub>2</sub> emissions from the “Other” category between 2017 and 2020. The majority of these emissions come from the Waste Disposal source category. Ohio EPA has linked two facilities in Ohio from the Waste Disposal source category that have majorly contributed to this increase: WIN Waste Innovations, previously Sunny Farms Landfill, (facility ID 0374010199) and Tunnel Hill Reclamation (facility ID 0664000116).

WIN Waste Innovations is a landfill located in Seneca County. In Ohio EPA’s SO<sub>2</sub> annual emissions review for 2022 (submitted June 2023)<sup>19</sup>, it is explained that this facility emitted 460.48 tons of SO<sub>2</sub> in 2018 and emitted 2,855.57 tons of SO<sub>2</sub> in 2020 - a 520.1% increase in SO<sub>2</sub> emissions. This is a significant increase in emissions from the 2008 SO<sub>2</sub> emissions submitted<sup>20</sup> in Ohio’s designation recommendations for the 2010 1-hour SO<sub>2</sub> standard (submitted to U.S. EPA June 3, 2011). Therefore, for the 2022 SO<sub>2</sub> annual emissions review, Ohio EPA included

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<sup>18</sup> The technical support documents for the 2020 NEI discussed in this section can be found on U.S. EPA’s website, <https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-technical-support-document-tds>

<sup>19</sup> A copy of Ohio’s submitted SO<sub>2</sub> annual emissions review for 2022 and all previous years along with any supporting documents can be found here, <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/state-implementation-plan-sip-2010-one-hour-so2-standard>

<sup>20</sup> A copy of emissions information (Appendix F of Ohio’s 2010 1-hour SO<sub>2</sub> SIP) submitted to the U.S. EPA can be found online at Ohio EPA’s website, <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/state-implementation-plan-sip-so2-nonattainment-area-recommendation-appendix-information>

Waste Innovations in the modeling evaluation for the 2019-2021 period. The significant increase in SO<sub>2</sub> emissions from Waste Innovations prompted Ohio EPA to issue DFFOs requiring the facility to install sulfur controls. As a result of Ohio's orders, Waste Innovations applied for and received a permit to install a landfill gas sulfur treatment system (permit P0128797, effective 12/01/2021). Additionally, Waste Innovations replaced the three open flares with one single enclosed flare for the combustion of excess landfill gas (with a maximum short term allowable emission rate of 35.5 lbs/hour of SO<sub>2</sub>) and installed a landfill gas treatment system with its own enclosed flare to further reduce sulfur, methane, VOC, and hydrogen sulfide emissions.

Tunnel Hill Reclamation is a landfill located in Perry County. This facility also has one open flare, and two landfill gas treatment systems with enclosed flares as control equipment to reduce VOC, hydrogen sulfide, methane, and sulfur emissions. Tunnel Hill is also required to employ best available control technology (BACT) for the control of the emissions from the landfill and to follow all the emissions and recordkeeping requirements detailed in their permit (permit P0131173, issued May 8, 2023).

Since the controls for both facilities were implemented after the 2020NEI data was collected, the emissions reductions credited to these controls will not be reflected in this data. Ohio EPA expects future SO<sub>2</sub> emissions from these facilities to decrease and Ohio's overall SO<sub>2</sub> emissions to decrease.

Aside from the emissions increases discussed previously, Ohio has seen reductions in VOC, PM<sub>2.5</sub>, PM<sub>10</sub>, NH<sub>3</sub>, NO<sub>x</sub>, and SO<sub>2</sub> emissions in all sector categories from 2017 to 2020. The most significant reductions have been made in NO<sub>x</sub> emissions, followed by VOC and SO<sub>2</sub> emissions. These reductions can be attributed to the many emission control programs and regulations effective in Ohio (discussed at length above). Notable reductions, especially in NO<sub>x</sub>, are due to CAIR/CSAPR.

As discussed above, in Ohio's second Regional Haze SIP, four different point sources were discussed regarding unit emissions and possible controls to reduce their emissions. These sources included Avon Lake Power Plant, Carmeuse Lime Inc. - Maple Grove operations, Dover Municipal Light and General James M. Gavin Power Plant. A four-factor analysis was originally performed for these sources in the second Regional Haze SIP. Two additional point sources, Cardinal Power Plant and OVEC Kyger Creek Station, were later analyzed in Ohio's Supplement and emissions limits were applied to both of them along with General James M. Gavin Power Plant. These point sources emissions from 2016 - 2023 are discussed below.

Avon Lake Power Plant

**Table 7: Avon Lake B012 Emissions (2016 - 2023)**

Unit	Year	SO2 (tons)	SO2 rate (lb/MMBtu)	NOx (tons)	NOx Rate (lb/MMBtu)	PM25 (tons)	NH3 (tons)
B012	2016	8,863	1.60	2,031	0.33	240	0
	2017	1,922	0.72	918	0.30	118	0
	2018	3,693	0.72	1,670	0.29	238	0
	2019	1,597	0.70	608	0.24	103	0
	2020	853	0.58	308	0.21	2.0	0
	2021	2,829	0.65	1,065	0.23	6.3	0.1
	2022	1,550	0.65	668	0.27	Not available	
	2023	Not available					

Source: SO<sub>2</sub> and NO<sub>x</sub> emissions and emission rates from U.S. EPA's Clean Air Markets Program Data (CAMPD), PM<sub>2.5</sub> and NH<sub>3</sub> emissions from Ohio EPA's Emissions Inventory System (EIS)

B012 is not a significant source of PM<sub>2.5</sub> or ammonia (NH<sub>3</sub>). This unit has seen significant decreases in PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>x</sub> emissions from 2016 to 2023. Avon Lake power plant permanently shut down on April 1, 2022.

Carmeuse Lime, Inc – Maple Grove Operations

**Table 8: Carmeuse Lime Inc - Maple Grove Operations P003 and P004 emissions (2016 - 2023)<sup>21</sup>**

Unit	Year	SO2 (tons)	NOx (tons)	PM25 (tons)	NH3 (tons)
P003	2016	2,503	1,280	11	0
	2017	3,229	1,570	6	0
	2018	2,904	1,657	6	0
	2019	3,262	1,543	7	0
	2020	2,805	1,351	5	0
	2021	3,792	1,379	6	0
	2022	3,899	1,407	6	0
	2023	Not available			
P004	2016	2,323	1,187	10	0
	2017	3,070	1,375	5	0
	2018	3,323	1,596	6	0
	2019	2,963	1,294	6	0
	2020	2,840	1,379	5	0
	2021	4,190	1,409	6	0
	2022	3,656	1,401	5	0

<sup>21</sup> Carmeuse Lime Inc – Maple Grove operations does not report emission data to CAMPD and therefore all data is provided by Ohio EPA's EIS. Since Ohio's 2023 EIS is not published yet, 2023 data is missing for these units at this facility.

	2023	Not available
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Source: Ohio EPA's Emissions Inventory System (EIS)

Neither unit is a significant source of PM<sub>2.5</sub> or ammonia (NH<sub>3</sub>). Both units have had variable SO<sub>2</sub> and NO<sub>x</sub> emissions from 2016 to 2022.

Dover Municipal Light

**Table 9: Dover Municipal Light B004 Emissions (2016 - 2023)<sup>22</sup>**

Unit	Year	SO <sub>2</sub> (tons)	NO <sub>x</sub> (tons)	PM <sub>25</sub> (tons)	NH <sub>3</sub> (tons)
B004	2016	1,348	172	16	0
	2017	967	188	19	0
	2018	1,067	212	21	0
	2019	902	191	18	0
	2020	910	200	0.93	0
	2021	1,269	211	0.12	0
	2022	2,092	299	0.16	0.03
	2023	Not available			

Source: Ohio EPA's Emissions Inventory System (EIS)

B004 is not a significant source of NO<sub>x</sub>, PM<sub>2.5</sub>, or ammonia (NH<sub>3</sub>). This unit has seen decreases in PM<sub>2.5</sub> from 2016 to 2022. SO<sub>2</sub> and NO<sub>x</sub> emissions have been variable from 2016 to 2022.

General James M. Gavin Power Plant

**Table 10: Gavin Power Plant B003 and B004 Emissions (2016 - 2023)**

Unit	Year	SO <sub>2</sub> (tons)	SO <sub>2</sub> rate (lb/MMBtu)	NO <sub>x</sub> (tons)	NO <sub>x</sub> Rate (lb/MMBtu)	PM <sub>25</sub> (tons)	NH <sub>3</sub> (tons)
B003	2016	9,039	0.27	3,572	0.11	608	1
	2017	13,785	0.32	4,441	0.10	650	1
	2018	13,172	0.38	3,495	0.10	567	1
	2019	12,161	0.37	3,485	0.11	219	1
	2020	14,710	0.36	4,439	0.11	54	1
	2021	14,442	0.36	4,486	0.12	62	1
	2022	10,329	0.33	3,053	0.10	51	1
	2023	9,878	0.31	3,399	0.09	Not available	
B004	2016	10,990	0.29	3,757	0.10	1,007	1
	2017	11,640	0.36	3,382	0.11	518	1
	2018	14,420	0.34	4,553	0.11	644	1
	2019	14,313	0.39	3,857	0.11	403	1
	2020	13,447	0.39	3,573	0.10	35	1

<sup>22</sup> Dover Municipal Light does not report emission data to CAMPD and therefore all data is provided by Ohio EPA's EIS. Since Ohio's 2023 EIS is not published yet, 2023 data is missing for these units at this facility.

	2021	11,350	0.34	3,495	0.11	30	1
	2022	10,010	0.35	2,398	0.09	28	1
	2023	8,554	0.24	2,864	0.09	Not available	

Source: SO<sub>2</sub> and NO<sub>x</sub> emissions and emission rates from U.S. EPA's Clean Air Markets Program Data (CAMPD), PM<sub>2.5</sub> and NH<sub>3</sub> emissions from Ohio EPA's Emissions Inventory System (EIS)

Neither unit is a significant source of PM<sub>2.5</sub> or ammonia (NH<sub>3</sub>). NO<sub>x</sub> emissions have varied for both units from 2016 to 2023, while SO<sub>2</sub> emissions have varied but decreased since 2020. Both units have had a significant decrease in PM<sub>2.5</sub> emissions from 2016 to 2022.

Cardinal Power Plant (Cardinal Operating Company)

**Table 11: Cardinal Power Plant B001, B002, and B009 Emissions (2016 - 2023)**

Unit	Year	SO <sub>2</sub> (tons)	SO <sub>2</sub> rate (lb/MMBtu)	NO <sub>x</sub> (tons)	NO <sub>x</sub> Rate (lb/MMBtu)	PM <sub>2.5</sub> (tons)	NH <sub>3</sub> (tons)
B001	2016	3,885	0.26	1,497	0.09	18	0.89
	2017	3,796	0.23	1,166	0.08	16	0.75
	2018	3,794	0.22	1,348	0.08	19	0.55
	2019	3,685	0.18	1,479	0.08	28	0.64
	2020	2,702	0.16	1,397	0.08	22	0.48
	2021	3,234	0.22	1,322	0.09	2	0.53
	2022	3,624	0.23	1,277	0.07	3	0.59
	2023	3,040	0.20	962	0.07	Not available	
B002	2016	3,234	0.22	1,322	0.09	16	0.70
	2017	3,624	0.23	1,277	0.07	18	0.87
	2018	3,986	0.28	1,146	0.08	18	0.50
	2019	5,205	0.24	1,446	0.07	20	0.60
	2020	3,103	0.21	1,024	0.08	20	0.55
	2021	3,933	0.24	1,356	0.08	2	0.48
	2022	4,761	0.27	1,362	0.07	2	0.65
	2023	4,654	0.27	1,298	0.07	Not available	
B009	2016	3,714	0.24	1,242	0.08	28	0.96
	2017	3,738	0.22	1,379	0.09	19	0.94
	2018	3,933	0.24	1,356	0.08	26	0.56
	2019	4,761	0.27	1,362	0.07	20	0.52
	2020	1,324	0.10	1,112	0.09	287	0.62
	2021	3,446	0.17	1,427	0.07	301	0.78
	2022	2,889	0.20	1,129	0.07	295	0.56
	2023	2,995	0.27	1,334	0.08	Not available	

Source: SO<sub>2</sub> and NO<sub>x</sub> emissions and emission rates from U.S. EPA's Clean Air Markets Program Data (CAMPD), PM<sub>2.5</sub> and NH<sub>3</sub> emissions from Ohio EPA's Emissions Inventory System (EIS)

None of these units are significant sources of PM<sub>2.5</sub> or ammonia (NH<sub>3</sub>). Most units have seen decreases in NO<sub>x</sub> and SO<sub>2</sub> emissions from 2016 to 2023. Unit B002 has had increases in SO<sub>2</sub> emissions and steady NO<sub>x</sub> emissions from 2016 to 2023.

OVEC Kyger Creek Station

**Table 12: Ohio Valley Electric Corp. Kyger Creek B001, B002, B003, B004, and B005  
Emissions (2016 - 2023)**

Unit	Year	SO2 (tons)	SO2 rate (lb/MMBtu)	NOx (tons)	NOx Rate (lb/MMBtu)	PM25 (tons)	NH3 (tons)
B001	2016	752	0.14	1,159	0.22	5	0.40
	2017	1,025	0.15	970	0.15	6	0.48
	2018	1,157	0.16	1,385	0.20	4	0.50
	2019	675	0.11	997	0.19	3	0.42
	2020	710	0.13	1,027	0.21	2	0.40
	2021	639	0.11	545	0.11	11	0.38
	2022	806	0.13	696	0.12	12	0.44
	2023	657	0.13	649	0.13	Not available	
B002	2016	639	0.11	545	0.11	5	0.38
	2017	806	0.13	696	0.12	5	0.40
	2018	703	0.14	1,146	0.24	4	0.50
	2019	844	0.16	687	0.13	4	0.46
	2020	1,144	0.16	1,404	0.20	2	0.40
	2021	608	0.11	528	0.12	10	0.36
	2022	903	0.12	843	0.12	14	0.50
	2023	669	0.16	610	0.13	Not available	
B003	2016	718	0.11	1,245	0.20	10	0.41
	2017	698	0.13	971	0.20	11	0.43
	2018	608	0.11	528	0.12	14	0.43
	2019	903	0.12	843	0.12	10	0.43
	2020	841	0.18	1,209	0.23	10	0.36
	2021	879	0.14	665	0.11	11	0.44
	2022	718	0.11	672	0.11	10	0.45
	2023	642	0.12	585	0.12	Not available	
B004	2016	867	0.15	729	0.13	10	0.40
	2017	914	0.16	1,100	0.18	13	0.47
	2018	744	0.15	1,043	0.18	13	0.41
	2019	589	0.12	662	0.15	12	0.47
	2020	879	0.14	665	0.11	10	0.38

	2021	854	0.14	606	0.11	11	0.43
	2022	619	0.13	450	0.1	7	0.36
	2023	669	0.12	629	0.12	Not available	
B005	2016	718	0.11	672	0.11	10	0.41
	2017	845	0.16	1,133	0.22	12	0.47
	2018	982	0.15	968	0.15	13	0.41
	2019	880	0.15	1,102	0.19	11	0.45
	2020	823	0.13	1,086	0.17	11	0.40
	2021	833	0.14	632	0.11	10	0.42
	2022	683	0.12	633	0.11	9	0.43
	2023	661	0.12	671	0.12	Not available	

Source: SO<sub>2</sub> and NO<sub>x</sub> emissions and emission rates from U.S. EPA's Clean Air Markets Program Data (CAMPD), PM<sub>2.5</sub> and NH<sub>3</sub> emissions from Ohio EPA's Emissions Inventory System (EIS)

None of the units are a significant source of PM<sub>2.5</sub> or ammonia (NH<sub>3</sub>). Units B001, B003, and B005 had seen decreases in SO<sub>2</sub> emissions from 2016 to 2023. Unit B004 has seen significant decreases in NO<sub>x</sub> emissions from 2016 to 2023.

Overall, emissions tend to fluctuate from year to year, but there is an over-arching downwards trend in emissions from all the sources previously discussed. Ohio expects further decreases in emissions from the above-mentioned sources, and sources all across the state, in future years as new regulations and more stringent requirements and emission limits are promulgated.

## E. Assessment of Changes Impeding Visibility Progress

Sections 51.308(g)(5)

*An assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.*

Ohio EPA believes that no changes in anthropogenic emissions within or outside Ohio have occurred in the past 5 years to limit or impede progress in reducing pollutant emissions in Ohio. As previously discussed, many changes have occurred due to the Good Neighbor Plan and in the process of CSAPR replacing CAIR previously. However, these changes, as well as additional legislation and measures not directly for the purpose of improving visibility impairment, will only act as an additional benefit by producing even more reductions on visibility impairing pollutants than previously anticipated. As shown in section D above, good progress is being made in reducing emissions of visibility-impairing pollutants and changes that are being made or have been made in the past five years should only serve to reduce emissions even further than anticipated.

## **F. Assessment of Current Strategy**

Sections 51.308(g)(6)

*An assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or other States with mandatory Federal Class I areas affected by emissions from the State, to meet all established reasonable progress goals.*

Ohio believes that the second Regional Haze SIP, including the control strategies discussed in section A above, is sufficient to achieve the emissions reductions that will constitute Ohio's fair share toward meeting the reasonable progress goals at all federal Class I areas to which Ohio's emissions contribute to the visibility impairment. The figures in section B and tables in section D demonstrate the progress Ohio is making in reducing emissions, and these reductions are expected to continue at an even quicker pace than originally predicted in the Ohio Regional Haze SIP due to the implementation of stricter controls than originally expected at the time of the SIP.

Furthermore, the four point sources that were shown in the second Regional Haze SIP to have majorly contributed to visibility impairment in other states (discussed above in section D) have since reduced emissions through updated control equipment and federally enforceable emission limits. Ohio projects these facilities will continue to see emission reductions as new, more stringent requirements at the federal, state and local level are promulgated in future years.

## **G. Review of Visibility Monitoring Strategy**

Sections 51.308(g)(7)

*A review of the State's visibility monitoring strategy and any modifications to the strategy as necessary.*

There are no Class I Federal areas within the State of Ohio and so Ohio's SIP is concerned only with the contribution of Ohio's emissions to Class I areas in other states and has no visibility monitoring strategy to review.

## **H. Determination of Adequacy**

Sections 51.308(h)

*(h) Determination of the adequacy of existing implementation plan. At the same time the State is required to submit any 5-year progress report to the EPA in accordance with paragraph (g) of this section, the State must also take one of the following actions based upon the information presented in the progress report:*

*(1) If the State determines that the existing implementation plan requires no further substantive revision at this time in order to achieve established goals for visibility improvement and emissions reductions, the State must provide to the Administrator a negative declaration that further revision of the existing implementation plan is not needed at this time.*

*(2) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another State(s) which participated in a regional planning process, the State must provide notification to the Administrator and to the other State(s) which participated in the regional planning process with the States. The State must also collaborate with the other State(s) through the regional planning process for the purpose of developing additional strategies to address the plan's deficiencies.*

*(3) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another country, the State shall provide notification, along with available information, to the Administrator.*

*(4) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources within the State, the State shall revise its implementation plan to address the plan's deficiencies within one year.*

Based on the information presented in this progress report, Ohio EPA submits a negative declaration to U.S. EPA that further revision of the existing implementation plan is not needed at this time and that the SIP for the Second Implementation Period is sufficient for meeting the goals outlined in the RHR. This progress report shows that no revisions to the Ohio Regional Haze SIP for the Second Implementation Period are needed and that the on-the-books controls deemed sufficient in the original SIP, along with additional controls implemented since, remain the only controls needed. As such, no additional controls are necessary at this time, and Ohio submits the following language as required by the RHR:

*(1) If the State determines that the existing implementation plan requires no further substantive revision at this time in order to achieve established goals for visibility improvement and emissions reductions, the State must provide to the Administrator a negative declaration that further revision of the existing implementation plan is not needed at this time.*

### **III. PUBLIC PARTICIPATION**

Ohio EPA provided an opportunity for 60-day Federal Land Manager review on August 27, 2024. Comments were received and Ohio EPA has attempted to address those comments prior to full public participation. Appendix A contains a record of the opportunity for comment and comments received.

Ohio will publish a notification for the 30-day public comment period and opportunity to request a public hearing concerning the draft 5-year Regional Haze second progress report on Ohio EPA's website on October 28, 2024. The comment period and public hearing option was also noticed in Ohio's Weekly Review and interested parties were notified via electronic mailing lists.

The public comment period closed on December 2, 2024. A request to hold a public hearing was not received by the close of the comment period, and therefore one was not held. Appendix B contains a copy of the public notice, Appendix C contains copies of the comments received during the public comment period, and Appendix D contains the responses to all comments received during the FLM and public comment periods.