

Indiana Regional Haze Five-Year Progress Report State Implementation Plan

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EXECUTIVE SUMMARY

The Clean Air Act (CAA) mandates requirements to protect visibility, especially in Class I Federal Areas. In 1999, the U.S. Environmental Protection Agency (U.S. EPA) finalized the Regional Haze Rule, 40 Code of Federal Regulations (CFR) 51.308. The rule requires states to develop and implement State Implementation Plan (SIP) revisions to reduce visibility impairment resulting from “manmade air pollution,” or regional haze.

Indiana initially submitted its Regional Haze SIP to the U.S. EPA on January 14, 2011. The final refined version was submitted on March 10, 2011. In developing its Regional Haze SIP, Indiana calculated baseline and natural visibility conditions for affected Class 1 areas outside the state, established reasonable progress goals for those areas, provided Best Available Retrofit Technology (BART) determinations, adopted a Long Term Strategy supporting progress towards visibility goals, included a visibility monitoring strategy, and documented consultation with other states and Federal Land Managers (FLMs). The U.S. EPA finalized a limited approval and promulgation of Indiana’s Regional Haze SIP in the Federal Register on June 11, 2012.

The Regional Haze Rule requires a comprehensive analysis of each State’s Regional Haze SIP every 10 years and a progress report every five years to evaluate the effectiveness of the State’s long-term strategies for regional haze. Indiana submits this 5-year progress report SIP revision in accordance with the Regional Haze Rule requirements in 40 CFR 51.308(g) and (h) for progress reports. This report will evaluate the status of implementation and provide a summary of the emissions reductions achieved for all emission management measures implemented by the state of Indiana for the first 5-year review of the 2008 to 2018 planning period and is due March 2016.

Sulfur Dioxide (SO₂), nitrogen oxide (NO_x) and ammonia (NH₄) are the precursors to the formation of ammonium sulfate, ammonium nitrate and organic carbon, which are the most significant contributors to visibility impairment impacting Class 1 areas with SO₂ and NO_x from electric generating units (EGUs) being the primary source. For this reason, the discussion on emission reductions is focused on SO₂ and NO_x. The 5-year period evaluated for the purpose of this progress report was 2007 - 2012. During this time frame, actual SO₂ emissions reported from the major source categories decreased nearly 57%, while NO_x emissions decreased by 38% from 2007 - 2012. As a result, Indiana’s contributions to visibility impairment in Class 1 areas in other states were significantly reduced and surpassed improvements predicted by the modeling for 2012.

Based on the evidence presented herein, the Indiana Department of Environmental Management (IDEM) submits a negative declaration to the U.S. EPA Administrator specifying that further revision of the existing implementation plan is not needed at this time.

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ACRONYMS/ABBREVIATION LIST

BART	Best Available Retrofit Technology
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CAMD	Clean Air Markets Division
CEMS	Continuous Emissions Monitoring
CENRAP	Central Regional Air Planning Association
CFR	Code of Federal Regulations
CSAPR	Cross-State Air Pollution Rule
D.C.	District of Columbia
DRR	Data Requirements Rule
DSI	Dry Sorbent Injection
EGU	Electric Generating Unit
FGD	Flue Gas Desulfurization
FIP	Federal Implementation Plan
FLMs	Federal Land Managers
grains/scf	grains per standard cubic foot
HCl	hydrochloric acid
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
LADCO	Lake Michigan Air Directors Consortium
lbs/hr	pounds per hour
lbs/MMBtu	pounds per million British thermal units
MACT	Maximum Achievable Control Technology
MANE-VU	Mid-Atlantic / Northeast Visibility Union
MATS	Mercury and Air Toxics Standards Rule
MRPO	Midwest Regional Planning Organization
NAAQS	National Ambient Air Quality Standard
NEI	National Emission Inventory
NH ₃	ammonia
NO _x	nitrogen oxides
PM	particulate matter
PM ₁₀	course particulate matter with diameter of greater than 2.5 micrometers
PM _{2.5}	fine particulate matter with diameter of 2.5 micrometers or less
ppb	parts per billion
RPG	Reasonable Progress Goals
RPO	Regional Planning Organization
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SO ₂	sulfur dioxide
U.S. EPA	United States Environmental Protection Agency
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	volatile organic compounds
WRAP	Western Regional Air Partnership

1.0 OVERVIEW

1.1 INTRODUCTION AND BACKGROUND

In the 1977 amendments to the CAA, Congress added Section 169 (42 U.S.C. 7491) setting forth the following national visibility goal in Section 169A: “Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution.” A mandatory Class I Federal area is one in which visibility is protected more stringently than under the national ambient air quality standards and includes national parks and wilderness areas of special national and cultural significance. There are 156 mandatory Class I Federal areas across the country. These protected areas are called “mandatory Class I Federal areas” in the CAA but are referred to in this document as “Class 1 areas.”

Congress added section 169B as part of the 1990 Amendments to the CAA to focus attention on regional haze impairment. Regional haze is produced by a multitude of sources and activities, natural and manmade, which emit air pollution in the form of tiny particles that absorb and scatter sunlight, creating white and brown haze in the atmosphere over a broad geographic area. Section 169B called for the United States Environmental Protection Agency (U.S. EPA) to promulgate regulations under 169A to address regional haze. On November 29, 1999, the U.S. EPA finalized the Regional Haze Rule, 40 CFR 51.308. The Regional Haze Rule is aimed at achieving a national goal of natural visibility conditions in Class 1 areas by the year 2064.

The Regional Haze Rule provides a regulatory framework within which states are required to develop and implement State Implementation Plan (SIP) revisions to improve and protect visibility in Class 1 areas and assure reasonable progress towards meeting the national goal. The States must address regional haze in each Class 1 area located within the state and in each Class 1 area located outside the state which may be affected by emissions from within the state. Regional Haze SIPs must include Class 1 area visibility improvement goals and emission management strategies needed to reach those goals. Indiana has no Class 1 areas within the state; however, emissions from Indiana sources have been determined to impact visibility in Class 1 areas in other states.

1.2 INDIANA’S REGIONAL HAZE STATE IMPLEMENTATION PLAN

Indiana initially submitted its Regional Haze SIP to the U.S. EPA on January 14, 2011. The final corrected version was submitted on March 10, 2011. In developing its Regional Haze SIP, Indiana calculated baseline and natural visibility conditions for affected Class 1 areas outside the state, established reasonable progress goals (RPGs) for those areas, provided BART determinations, adopted a Long Term Strategy supporting progress towards visibility goals, included a visibility monitoring strategy, and documented consultation with other states and FLMs. The U.S. EPA finalized a limited approval and promulgation of Indiana’s Regional Haze SIP in the Federal Register on June 11, 2012.

The U.S. EPA designated five Regional Planning Organizations (RPOs) to assist with the coordination and cooperation needed to address the haze issue. Indiana's Regional Haze SIP was developed in consultation with the Midwest Regional Planning Organization (MRPO). Members of the MRPO include five states: Illinois, Indiana, Michigan, Ohio, and Wisconsin, tribes located within the five states, Federal Land Managers (U.S. National Park Service, U.S. Fish & Wildlife Service, and U.S. Forest Service), and U.S. EPA. The Lake Michigan Air Directors Consortium (LADCO) was designated as the agency to receive federal grant funds for air quality technical assessments and assistance on behalf of the MRPO.

The other RPOs established for this purpose are Mid-Atlantic / Northeast Visibility Union (MANE-VU), Central Regional Air Planning Association (CENRAP), Visibility Improvement State and Tribal Association of the Southeast (VISTAS), and Western Regional Air Partnership (WRAP). Figure 1.1 below shows a map of the regional planning organizations boundaries.

Figure 1.1
Regional Planning Organizations



Indiana does not have any Class 1 areas. However, emissions from Indiana sources have been determined to impact Class 1 areas in other states. Table 1.1, taken from the Indiana Regional Haze SIP, Appendix 1, contains a list of these Class 1 areas for all the LADCO states, and the analyses performed to assess the impact from Indiana compiled by the MRPO.

**Table 1.1
Impacts of LADCO States on Class 1 Areas**

AREA NAME	IL	IN	MI	OH	WI
81.401 Alabama.					
Sipsey Wilderness Area	(1)	(1)			
81.404 Arkansas.					
Caney Creek National Wilderness Area	(2), (4)	(2), (4)		(2), (4)	
Upper Buffalo National Wilderness Area	(1),(2),(4),(5)	(2), (4)		(2), (4)	(2)
81.408 Georgia.					
Cohotta Wilderness Area					
Okefenokee Wilderness Area					
Wolf Island Wilderness Area					
81.411 Kentucky.					
Mammoth Cave National Park	(1), (2), (5)	(1), (2), (5)	(1), (2)	(1), (2), (5)	
81.412 Louisiana.					
Breton Wilderness Area					
81.413 Maine.					
Acadia National Park	(3)	(3)	(3)	(3)	
Moosehorn Wilderness Area	(3)	(3)	(3)	(3)	
81.414 Michigan.					
Isle Royale National Park	(1), (2)	(1), (2)	(1), (2)		(1), (2)
Seney National Wilderness Area	(1), (2)	(1), (2)	(1), (2)	(1), (2)	(1), (2)
81.415 Minnesota.					
Boundary Waters Canoe Area National Wilderness Area	(2)	(2)	(2)		(1), (2)
Voyageurs National Park	(2)	(2)			(1), (2)
81.416 Missouri.					
Hercules-Glades National Wilderness Area	(2), (4), (5)	(2), (4), (5)		(2), (4)	(2)
Mingo National Wilderness Area	(2), (4), (5)	(2), (4), (5)	(2)	(2), (4)	(2)
81.419 New Hampshire.					
Great Gulf National Wilderness Area	(3)	(3)	(3)	(1), (3)	
Pres. Range-Dry River National Wilderness Area					

AREA NAME	IL	IN	MI	OH	WI
81.42 New Jersey.					
Brigantine National Wilderness Area	(3)	(3)	(1), (3)	(1), (3)	
81.422 North Carolina.					
Great Smoky Mountains NP {1}	(1)	(1)		(1)	
Joyce Kilmer-Slickrock Wilderness Area {2}					
Linville Gorge Wilderness Area					
Shining Rock Wilderness Area					
Swanquarter Wilderness Area					
81.426 South Carolina.					
Cape Romain Wilderness					
81.428 Tennessee.					
Great Smoky Mountains NP {1}	(1)	(1)		(1)	
Joyce Kilmer-Slickrock Wilderness Area {2}					
81.431 Vermont.					
Lye Brook National Wilderness Area	(2), (3)	(2), (3)	(2), (3)	(1), (2), (3)	
81.433 Virginia.					
James River Face National Wilderness Area	(2)	(2)	(2)	(2), (5)	
Shenandoah National Park	(2), (3)	(1), (2), (3)	(2), (3)	(1),(2),(3),(5)	
81.435 West Virginia.					
Dolly Sods/Otter Creek National Wilderness Area	(2), (3)	(1), (2), (3)	(1), (2), (3)	(1),(2),(3),(5)	

Key

- (1) MRPO Back Trajectory Analyses
- (2) MRPO PSAT Modeling
- (3) MANE-VU Contribution Assessment
- (4) Missouri-Arkansas Contribution
- (5) VISTAS Areas of Influence

The following Class 1 areas in other states were identified as possibly being impacted by Indiana sources:

Southeastern U.S. (VISTAS) - Sipsey Wilderness Area, AL; Mammoth Cave National Park, KY; Great Smoky Mountains National Park, NC and TN; James River Face Wilderness Area, VA; Shenandoah National Park, VA; and Dolly Sods/Otter Creek Wilderness Areas, WV

Eastern U.S. (MANE-VU) - Acadia National Park, ME; Moosehorn Wilderness Area, ME; Great Gulf Wilderness Area, NH; Brigantine Wilderness Area, NJ; and Lye Brook Wilderness Area, VT

Northern U.S. (MRPO and CENRAP) - Isle Royale National Park, MI; Seney National Wildlife Refuge, MI; Boundary Waters Canoe Area Wilderness Area, MN; and Voyageurs National Park, MN

South Central U.S. (CENRAP) - Hercules-Glades Wilderness Area, MO; Mingo Wilderness Area, MO; Caney Creek Wilderness Area, AR; and Upper Buffalo Wilderness Area, AR

Class I areas outside the areas listed above were not analyzed further, as there was no impact from Indiana sources shown. Further, no impacts from Indiana were noted in the WRAP states and no requests for controls were initiated by those states. Indiana participated in meetings and conference calls with states within the MRPO and the RPOs outside the Midwest to discuss their assessments of visibility conditions, analyses of culpability, and possible measures that could be taken to meet visibility goals for 2018.

1.3 INDIANA'S REGIONAL HAZE FIVE-YEAR PROGRESS REPORT STATE IMPLEMENTATION PLAN

The Regional Haze Rule requires a comprehensive analysis of each State's regional haze SIP every 10 years and a progress report every five years to evaluate the effectiveness of the State's long-term strategies for regional haze. Indiana submits this 5-year progress report SIP revision in accordance with the Regional Haze Rule requirements in 40 CFR 51.308(g) and (h) for progress reports. This report will evaluate the status of implementation and provide a summary of the emissions reductions achieved for all emission management measures implemented by the state of Indiana for the first 5-year review of the 2008 to 2018 planning period and is due March 2016. This report also documents Indiana's determination that its current Regional Haze SIP is adequate and requires no further substantive revision at this time to achieve 2018 visibility goals.

2.0 **PROGRESS REPORT ELEMENTS**

Section 51.308(g) of the Regional Haze Rule specifies the requirements for periodic reports describing progress towards the reasonable progress goals. Periodic progress reports must contain, at a minimum, the following elements:

1. Status of control strategies in the Regional Haze SIP
2. Emissions reductions from Regional Haze SIP Strategies
3. Visibility progress (states with Class 1 areas only)
4. Emissions progress
5. Assessment of changes impeding visibility progress
6. Assessment of current strategy
7. Review of visibility monitoring strategy (states with Class 1 areas only)
8. Determination of adequacy

2.1 STATUS OF CONTROL STRATEGIES IN THE REGIONAL HAZE SIP

Section 51.308(g)(1) of the Regional Haze Rule requires a description of the status of implementation of all measures included in the implementation plan for achieving reasonable

progress goals for Class 1 areas both within and outside the state. This section includes a summary and status of control measures in Indiana's Regional Haze SIP relied upon to meet the requirements of the Regional Haze program. This section also identifies control measures regulated explicitly for the purposes of the regional haze program, as well as additional control measures not specifically developed for the regional haze program that were expected to take effect in the first planning period for sources and source categories located within the state.

2.1.1 Regional Haze Controls

The Regional Haze Rule requires two specific approaches for reducing visibility-impairing pollutants, implementation of BART and implementation of a Long Term Strategy that includes enforceable measures designed to meet reasonable progress goals. Both approaches are a part of Indiana's Regional Haze controls and a detailed description and status of each approach are provided below.

Implementation of BART

The process of establishing BART emission limitations includes identification of those sources that meet the definition of "BART-eligible source", a determination of whether these sources are emitting any air pollutant that may be contributing to any impairment of visibility in a Class 1 area, and identification of the appropriate type and the level of control for reducing emissions. IDEM began the BART rulemaking process in August 2006. Following the due process of rulemaking which included notices of hearings and public comment periods, the Indiana Administrative Code (IAC) was amended on October 3, 2007 by adding 326 IAC 26-1, Best Available Retrofit Technology (effective on February 22, 2008). The rule requires that sources subject to BART, upon notification from the department, submit to the department a BART analysis. The rule incorporates by reference the BART Guidelines codified in Appendix Y at 40 CFR 51.

The BART Guidelines stipulate that the analysis must address, at a minimum, SO₂, NO_x, and particulate matter (PM) and consider the following factors: (1) the cost of compliance, (2) the energy and non-air quality environmental impacts of compliance, (3) any existing pollution control technology in use at the source, (4) the remaining useful life of the source, and (5) the degree of visibility improvement that may reasonably be anticipated from the use of BART. The BART Guidelines require states to consider, at a minimum, certain control alternatives in determining BART controls. These alternatives include: Best Available Control Technologies, Lowest Achievable Emission Rate, New Source Performance Standard, and Maximum Achievable Control Technology (MACT), as applicable, pollution prevention, use of retrofit controls, and, if available, improvement of existing controls.

In addition, the rule allows sources to propose alternatives to source-specific BART, provided the alternative achieves greater reasonable progress towards improving visibility. The alternative could include emission controls at different locations of the same source, different sources, or at a source not subject to BART. The requirements for sources that choose an alternative to source-specific BART, in detail, are included in 326 IAC 26-1 and 40 CFR 51.308(e). The department is required to review the analyses for completeness and approvability in accordance with these

regulations. The emission limits representing BART or an alternative to BART are to be included in the sources' Part 70 permits and submitted to the U.S. EPA for approval into the SIP. The sources shall be required to comply with these requirements within five years of the effective date of the state rule, i.e., in 2013.

BART for Electric Generating Units (EGUs)

Of the sources that meet the definition of "BART-eligible", modeling indicated that several EGU sources are subject to BART. IDEM also identified EGUs at fossil fuel-fired generating power plants having a capacity in excess of 750 megawatts as sources subject to BART. Indiana relied on requirements established under the Clean Air Interstate Rule (CAIR) to satisfy certain regional haze requirements related to BART for EGUs because the U.S. EPA had determined at that time that CAIR achieved greater progress than BART and could be used by states as a BART substitute to source-specific BART determinations. However, CAIR is not applicable to emissions of PM; therefore, the PM impact on visibility in Class 1 areas was modeled for EGU sources subject to BART. One EGU, Boiler #4 at Alcoa Power Generating Inc. - Warrick Power Plant was determined to be subject to BART for PM.

The U.S. EPA signed CAIR on March 10, 2005. The rule required 28 states and the District of Columbia to submit SIP revisions to reduce emissions of SO₂ and NO_x from fossil-fuel-fired power plants. CAIR consisted of three cap and trade programs: an annual SO₂ trading rule that builds on the existing Acid Rain program; an ozone season NO_x trading rule that builds on the existing NO_x SIP Call program; and a new annual NO_x trading program. Reductions were required to take place in two phases: 2009 and 2015 for NO_x and 2010 and 2015 for SO₂.

On November 1, 2006, the Indiana Air Pollution Control Board adopted CAIR for the Indiana EGUs to participate in the cap and trade program. CAIR, therefore, was used to satisfy the BART NO_x and SO₂ requirements for EGU sources in Indiana's Regional Haze SIP. However, on December 23, 2008, the District of Columbia (D.C.) Circuit Court remanded CAIR to the U.S. EPA without vacatur. CAIR requirements remained in place and CAIR's regional control programs continued operating while the U.S. EPA developed a replacement rule in response to the remand.

On July 6, 2011, the U.S. EPA finalized the Cross State Air Pollution Rule (CSAPR). This rule was developed in accordance with the U.S. Court of Appeals for the D.C. Circuit's July 11, 2008 opinion regarding CAIR, which led to the rule being remanded in December 2008. As established under CAIR, CSAPR requires 28 states in the East, Midwest, and South to improve air quality by reducing power plant emissions that cross state lines and contribute to ozone and fine particle pollution in other states.

On December 23, 2011, the U.S. EPA proposed revisions to the rules that govern the regional haze program. In this action, the U.S. EPA is proposing that the trading program under CSAPR, achieves greater reasonable progress towards the national goal of achieving natural visibility conditions in Class 1 areas than source-specific BART in those states covered by the rule (76 FR 82219). The U.S. EPA is also proposing a limited disapproval of the regional haze SIPs that had been submitted by Alabama, Florida, Georgia, Indiana, Iowa, Louisiana, Michigan, Mississippi, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, and Texas.

These states relied on requirements of CAIR to satisfy certain regional haze requirements. To address deficiencies in all of the CAIR-dependent regional haze SIPs, in this action, the U.S. EPA is proposing Federal Implementation Plans (FIPs) to replace reliance on the CAIR requirements in these SIPs with reliance on CSAPR as an alternative to BART. States are encouraged, at any time, to submit a revision to their regional haze SIP incorporating the requirements of CSAPR at which time the U.S. EPA will withdraw the FIP being proposed in this action. Indiana has not yet replaced CAIR with CSAPR in the state's regional haze rules but intends to revise 326 IAC 26, to reflect this change.

CSAPR was scheduled to replace CAIR starting January 1, 2012. However, the rule was challenged by several states, local governments, industry groups, and labor groups. On December 30, 2011, the U.S. Court of Appeals for the D.C. Circuit ordered a stay of CSAPR and ordered that CAIR be implemented until judicial review of CSAPR was completed. The same court ultimately vacated CSAPR on August 21, 2012, and ordered that CAIR be continued to be implemented until the rule was rewritten.

The United States government petitioned the U.S. Supreme Court asking the Court to review the D.C. Circuit Court's decision on CSAPR. On April 29, 2014, the Supreme Court upheld the U.S. EPA's authority to regulate cross-state air pollution by reversing the D.C. Circuit Court's ruling vacating CSAPR. A motion to lift the stay of CSAPR was filed with the U.S. Court of Appeals for the D.C. Circuit, which ordered that the U.S. EPA's motion be granted on October 23, 2014. CSAPR took effect January 1, 2015 for SO₂ and annual NO_x, and May 1, 2015 for ozone season NO_x.

Indiana's EGU sources have undertaken many projects to reduce SO₂ and NO_x emissions as a result of CAIR and in preparation for CSAPR. See Appendix A for EGU existing and projected controls. As a result of these projects, SO₂ and NO_x emissions from EGUs have decreased significantly since 2009 when CAIR was implemented. As shown in Graphs 2.1 and 2.2 in the next section, IDEM's most recent EGU emissions data reported to the U.S. EPA's Clean Air Markets program demonstrates that Indiana's current EGU emissions of SO₂ and NO_x currently fall below the levels set by CSAPR emissions budgets.

BART for Alcoa

Of the sources identified as BART-eligible, modeling indicated that one non-EGU at Alcoa Inc. - Warrick Operations was subject to BART. Other non-EGU sources were also identified as being BART-eligible. These sources submitted modeling analyses showing that they did not contribute significantly to visibility impairment at any Class 1 areas. IDEM found that these analyses met all applicable criteria and accepted the findings.

Alcoa submitted a BART analysis in which it developed BART and alternative BART control strategies. Due to technical or economic concerns relating to its BART units, the alternative required less emissions reductions from several subject-to-BART units. However, it proposed to control emissions from a boiler that is not a BART-eligible unit as part of its alternative BART strategy. The modeling analysis showed that the alternative achieved greater visibility improvement than BART. IDEM reviewed and accepted the analyses for completeness and

approvability in accordance with 326 IAC 26-1, the BART Guidelines, and 40 CFR 51.308(e) and adopted SO₂, NO_x, and PM emission limits for Alcoa into the IAC at 326 IAC 26-2.

On June 11, 2012, the U.S. EPA finalized a limited approval of the revisions to the Indiana SIP addressing regional haze for the first implementation period. As part of this action, the U.S. EPA proposed to conclude that the emission reductions from 326 IAC 26-2 would suffice to address the BART requirements for Alcoa and approved regulation 326 IAC 26-2 for incorporation into Indiana’s SIP. Tables 2.1 and 2.2 below show Alcoa’s BART control strategy, emission limits, and compliance methods that were incorporated into Indiana’s Regional Haze SIP and BART Emission Limitations Rule, 326 IAC 26-2.

Alcoa’s BART control measures and emission limits have been implemented and incorporated into the source’s Part 70 Operating permits. The date for compliance with Indiana’s Regional Haze SIP and BART Emission Limitations Rule, 326 IAC 26-2 was February 22, 2013. Subsequently, Alcoa discovered a mistake related to the NO_x emission limit’s averaging period for Boilers 2 and 3. As shown on Table 2.2, the NO_x emission limit was listed as a 24 hour rolling average limit when it should have been listed as a 24 hour daily average limit. A SIP revision to correct this mistake was submitted to the U.S. EPA and approved on August 21, 2015. On January 7, 2016, Alcoa announced it will permanently close its 269,000 metric ton Warrick Operations smelter by the end of the first quarter 2016. This will reduce SO₂ emissions in the area and further reduce Indiana’s contributions on visibility impairment in nearby Class 1 areas.

**Table 2.1
Alcoa BART Control Strategy**

Emission Unit/Pollutant	BART Control Measure
Boiler 1	
PM	Electrostatic Precipitator (ESP)
SO ₂	wet Flue Gas Desulfurization (FGD) with 91% emissions reduction efficiency
NO _x	Low NO _x Burner (LNB) with staged Overfire Air (OFA)
Boilers 2 and 3	
PM	ESP
SO ₂	wet FGD with 90% emissions reduction efficiency
NO _x	LNB with staged OFA
Boiler 4	
PM	ESP
Potlines	
- Fugitive emissions	
PM	no add-on control
SO ₂	limit anode grade coke to 3.5% sulfur
NO _x	no add-on control
- Primary emissions	
PM	gas treatment system followed by fabric filter
SO ₂	limit anode grade coke to 3.5% sulfur
NO _x	no add-on control
Ingot Furnaces	no add-on control

**Table 2.2
Alcoa BART Emission Limits**

Emission Unit/ Pollutant	Emission Limit	Compliance Demonstration Method
Boiler # 1		
PM (filterable)	0.03 pounds per million British thermal units (lbs/MMBtu), 24-hour daily average	Continuous Emissions Monitoring (CEMS) at the scrubber outlet according to PS-11, 40 CFR Part 60, Appendix B
SO ₂	91% reduction, 24-hour daily average	CEMS at the scrubber inlet and outlet, according to 40 CFR Part 60, following Appendix B, PS-2
NO _x	0.38 lbs/MMBtu, 24-hour daily average	CEMS at the scrubber outlet, following PS-2
Boilers #2 & 3		
PM (filterable)	0.03 lbs/MMBtu, 24-hour daily average	CEMS at the scrubber outlet according to PS-11, 40 CFR Part 60, Appendix B
SO ₂	90% reduction, 24-hour daily average	CEMS at the scrubber inlet and outlet, following PS-2
NO _x	0.38 lbs/MMBtu, 24-hour rolling daily average	CEMS at the scrubber outlet, following PS-2
Boiler #4		
PM (filterable and sulfuric acid)	0.1 lbs/MMBtu	The compliance method is according to 40 CFR 60, Appendix A, Method 5
Potlines 2-6		
PM (filterable)	0.005 grains per standard cubic foot (grains/scf)	The compliance method is according to 40 CFR 60, Appendix A, Method 5
SO ₂	The sulfur content in each monthly baked anode composite shall not exceed 2.919%, provided however that hourly SO ₂ emissions from the potlines shall not exceed 1,456 pounds per hour (lbs/hr) on a combined basis, and determined on a monthly basis.	ASTM D3177-02, modified by adding saturated bromine water before the pH adjustment. Alternatively, determination of sulfur content by x-ray fluorescence.

Implementation of Long Term Strategy

Indiana consulted with neighboring states with Class 1 areas that emissions from Indiana were determined to impact in order to develop reasonable progress goals for those areas; and by means of participation in the MRPO Regional Haze Workgroup calls and other MRPO discussions, Indiana consulted with these and other states and tribes to develop technical information for use in developing coordinated strategies. Indiana also coordinated with CENRAP and MANE-VU to develop a weight of evidence analysis that was used to develop Indiana's long term strategy.

A great deal of technical information must be assembled to determine the causes of impaired visibility in the Class 1 areas. The Regional Haze Rule requires states with Class 1 areas to

establish reasonable progress goals, expressed in deciviews (dv), for visibility improvement at each affected Class 1 area. The goals must provide for reasonable progress toward achieving natural visibility conditions, provide for improvement in visibility for the most impaired days over the period of the implementation plan, and ensure no degradation in visibility for the least impaired days over the same period, (40 CFR 51.308(d)(1)).

An evaluation of the chemical composition of the light extinction for 20% best visibility days and 20% worst visibility days was performed for the northern Class 1 areas. These results were taken from the Indiana Regional Haze SIP, Appendix 9a. For the 20% worst visibility days, the pollutants that contribute to visibility impairment are sulfates, which represent 35-55% impairment, nitrates are 25-30% of the pollutant contribution, and organic carbon contributes 12-22% to visibility impairment. Sulfates represent the highest contributing pollutant to light extinction with nitrates and organic carbon providing seasonal contributions. Nitrates have higher contributions during the late fall, winter and early spring while organic carbon has higher contributions to light extinction during the summer. Elemental carbon and coarse mass are fairly consistent throughout the year at all northern Class 1 areas.

Required in 40 CFR 51.308(d)(4)(v) is a statewide emissions inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any Class 1 area. Through coordination with the MRPO and other states, a base year inventory was prepared for regional-scale modeling. The pollutants inventoried by Indiana for this purpose included SO₂, NO_x, VOCs, fine particulate (PM_{2.5}), and coarse particulate.

The LADCO states reviewed methodologies and assisted in the preparation of key segments of the emissions inventory that was eventually submitted to the MRPO and processed by the Emissions Modeling System. The MRPO document, "Regional Air Quality Analyses for Ozone, PM_{2.5}, and Regional Haze: Final Technical Support Document, April 25, 2008, States of Illinois, Indiana, Michigan, Ohio, and Wisconsin." provides a summary of the inventory results. This document is available at the MRPO website:
http://www.ladco.org/reports/technical_support_document/tsd/tsd_version_iv_april_25_2008_final.pdf.

For on-road, non-road, NH₄, and biogenic sources, the 2005 emissions were estimated by models. For the other sectors, point sources, area sources, and MAR (commercial marine, aircraft, and railroads) sources, the 2005 emissions were prepared using data supplied by the MRPO states and, for non-MRPO states, data developed by other RPOs. In particular, for the non-MRPO states, a contractor obtained the latest base (2002) and future year emission files (2009 and 2018) from the other RPOs. Specifically, the following versions of these emissions files were used in the development of Indiana's Regional Haze SIP; MANE-VU: Version 3.1; WRAP: Pre2002d; CENRAP: Base F; and VISTAS: Base F.

In addition to the base year inventory developed for 2005 emissions, projections of future emissions were made for 2009 and 2018. For on-road, non-road, and EGU sources, the future year emissions were estimated by models. For other sectors (area, commercial marine, aircraft, and railroads, and non-EGU point sources), the future year emissions for the MRPO states were

derived by applying growth and control factors to the base year inventory. For the non-MRPO states, future year emissions were based on data from the other RPOs.

Guidelines for conducting regional-scale modeling to simulate pollutants impairing visibility are provided in 40 CFR Part 51, Appendix W. The U.S. EPA recommends the use of one of three models. The MRPO chose the Comprehensive Air Quality Model with extensions. The air quality analyses conducted by the MRPO included weight of evidence approaches which rely on extensive data analysis and modeling. Modeling included base year analyses for 2005 to evaluate model performance and strategy analyses to assess candidate control strategies. These analyses concluded that EGU control programs to reduce SO₂ and NO_x emissions are the most effective in reducing visibility impacts.

EGUs installed controls early for the NO_x SIP call, implemented in 2004, and later in response to CAIR, implemented in 2009. Projections were made based on megawatts controlled using advanced control devices installed and planned to the Indiana electrical generating system and estimated control efficiencies for the type of control technology. SO₂ and NO_x controls, as identified by IDEM, were compared to assumptions (installed and planned controls) made in the U.S. EPA's Integrated Planning Model runs and LADCO's modeled scenarios for regional haze planning (see Appendix C for U.S. EPA's IPM and LADCO's model runs with projected controls).

The most important of the projections were the comparisons between IDEM and LADCO predicted controls for 2012 and 2018, as these were the years relied upon for the haze modeling used in Indiana's Regional Haze SIP. SO₂ controls, as identified by IDEM, were 3.5% less than anticipated according to LADCO's modeling results in 2012, which would result in slightly less visibility improvement than expected, but 32.9% greater than predicted in 2018, the end of the 10-year planning period. This would result in substantially greater improvement in visibility than anticipated. For NO_x, projected controls were 10.3% greater in 2012 and 1.6% less in 2018, resulting in slightly less improvement at the end of the planning period. Overall, with SO₂ being the most significant pollutant, Indiana's contributions to visibility impairment would be less in 2018 based on advanced control devices installed and planned, as identified by IDEM, than predicted by LADCO's modeling.

In addition to the EGU emission reductions, Indiana anticipated significant reductions from federal programs, such as the Tier 2/low sulfur fuels, 2007 diesel rule, and the non-road mobile source programs. These programs were factored into future year modeling. As previously mentioned, under the BART for EGUs discussion, Indiana had fully adopted CAIR, which was replaced by CSAPR and expected to provide additional reductions. Other programs considered but yet to be implemented at the time were the revised SO₂, PM_{2.5}, and 8-hour ozone National Ambient Air Quality Standards (NAAQS). These programs were expected to further reduce Indiana's contribution to Class 1 areas in other states.

Included as part of Indiana's long-term strategy are sections in the state's rules that apply specifically to visibility in Class 1 areas. These rules were designed to prevent air quality deterioration and support progress towards visibility goals in Class 1 areas. Indiana's Permit Review Rules, 326 IAC 2-2, Prevention of Significant Deterioration Requirements regulate

sources that have the potential to cause an adverse impact on visibility in Class 1 areas. State rules for prescribed burning in Indiana prevent pollution problems from open burning. Under state law, prescribed burning must be conducted in accordance with Indiana Code 13-17-9 and regulations under 326 IAC 4-1. County or local ordinances may also apply in some parts of the state.

2.1.2 On-the-Books Modeled Controls

The following Federal “on-the-books” control measures implemented prior to the submittal of Indiana’s Regional Haze SIP in March 2011 were factored into the future year (2018) emission inventory for regional haze modeling.

Tier 2 Vehicle Emissions and Gasoline Standards Rule

On February 10, 2000, the U.S. EPA published the final rule for the Tier 2 Program, which set federal emission standards for passenger vehicles, including sport utility vehicles, minivans, vans, and pick-up trucks, as well as passenger cars. The program created fleet-averaging emission standards for NO_x, allowing manufacturers to produce vehicles with varying emissions, as long as the fleet of vehicles produced by a manufacturer had average NO_x emissions at or below the federal standards. The Tier 2 Vehicle Emissions and Gasoline Standards Rule reduced new vehicle NO_x emissions to an average of 0.07 grams per mile and was phased in from 2004 to 2009, beginning with the 2005 model year. The program continues to provide emission reductions from mobile sources as older sources in the fleet continue to be replaced with new sources.

Heavy-Duty Diesel Engine and Highway Diesel Fuel Rule

The U.S. EPA finalized the Heavy-Duty Diesel Engine and Highway Diesel Fuel Rule, a program to reduce emissions from heavy-duty trucks and buses by more than 90%, on January 18, 2001. The program set emission standards for PM, NO_x, and non-methane hydrocarbons, for new heavy-duty diesel engines and required a 97% reduction in the sulfur content of highway diesel fuel to enable the use of more modern pollution-control technology on heavy-duty vehicles. The Heavy-Duty Diesel Engine and Highway Diesel Fuel Rule was phased in between 2007 and 2010.

Non-road Engine and Diesel Fuel Rule (Tier 4)

On June 29, 2004, the U.S. EPA published the final Non-road Diesel Engine and Diesel Fuel Rule for diesel engines used in most construction, agricultural, industrial, and airport equipment. The program established NO_x and PM emission standards for non-road diesel engines and mandated the reduction of sulfur levels in diesel fuel for non-road diesel engines by more than 99%. Implementation of the Non-road Diesel Engine and Diesel Fuel Rule began in 2008 and was fully phased in by 2014.

MACT Programs

Regional Haze SIP modeling also included controls on future year emissions resulting from certain MACT regulations for VOC, SO₂, NO_x, and PM. MACT standards modeled include the VOC 2-, 4-, 7-, and 10-year MACT; Combustion Turbines MACT; Industrial/Commercial/Institutional Boilers and Process Heaters MACT (Boiler MACT); and Reciprocating Internal Combustion Engines MACT.

2.1.3 Additional Control Measures

Federal control measures to be implemented during the first regional haze planning period (the time period between the 2011 SIP submittal and the end of 2018) that are expected to result in emission reductions of visibility-impairing pollutants, but were not relied upon in Indiana's Regional Haze SIP are described below.

2010 SO₂ NAAQS

On June 2, 2010, the U.S. EPA promulgated a new primary NAAQS for SO₂, replacing the two primary standards of 140 parts per billion (ppb) evaluated over 24-hours and 30 ppb evaluated over an entire year with the 1-hour standard of 75 ppb. The primary SO₂ NAAQS is met when the 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentration at any ambient air quality monitor in an area does not exceed 75 ppb.

The U.S. EPA published a notice announcing designated nonattainment areas under the 1-hour SO₂ standard on August 5, 2013. Designations were made based on monitored air quality data measured during 2009, 2010, and 2011. Parts of Daviess, Marion, Morgan, Pike, and Vigo counties in Indiana were designated nonattainment under subpart 1 of Section 107 of the CAA. Emission limitations for individual units were adopted and made permanent and enforceable in Indiana's revised Sulfur Dioxide Rules, 326 IAC 7, on September 30, 2015. The compliance deadline is January 1, 2017.

Implementation of the revised SO₂ NAAQS was delayed for areas not monitoring violations of the standard while the U.S. EPA reconsidered its approach to the designation process. Following the initial August 2013 designations (Round 1 Designations), three lawsuits were filed against the U.S. EPA in different U.S. Court Districts, alleging that the agency had failed to perform a nondiscretionary duty under the CAA by not designating all portions of the country by the June 2013 deadline.

In an effort intended to resolve the litigation in one of those cases, the plaintiffs (Sierra Club and the Natural Resources Defense Council) and the U.S. EPA filed with the U.S. District Court of the Northern District of California a proposed consent decree that specified a schedule for the U.S. EPA to complete the remaining designations for the rest of the country in three additional rounds. On March 2, 2015, the Court entered the consent decree and issued an enforceable order for the U.S. EPA to complete the area designations according to the consent decree schedule.

Pursuant to the consent decree order, the U.S. EPA must complete the remaining designations on a schedule that contains three specific deadlines. By no later than July 2, 2016, the U.S. EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO₂ standard and (2) areas that contain any stationary source that according to the U.S. EPA's Air Markets Database either emitted more than 16,000 tons of SO₂ in 2012 or emitted more than 2,600 tons of SO₂ and had an annual average emission rate of at least 0.45 of SO₂/MMBtu in 2012 and has not announced retirement as of March 2, 2015 (Round 2 Designations).

There are five EGUs in Indiana that meet the criteria established in the court order for the July 2016 deadline. IDEM is working with these sources to provide the U.S. EPA the most recent information available for making designation and boundary decisions. The last two deadlines for completing remaining designations are December 31, 2017 (Round 3 Designations) and December 31, 2020 (Round 4 Designations). The designations completed by these later deadlines are expected to be informed by information provided by the states pursuant to the U.S. EPA's Data Requirements Rule (DRR).

On August 10, 2015, the U.S. EPA finalized the DRR which sets forth the requirements for each state air agency to monitor or model ambient SO₂ levels in areas with large sources of SO₂ emissions to help implement the 1-hour primary SO₂ NAAQS. This final rule establishes that, at a minimum, each state air agency must characterize air quality around sources that emit 2,000 tons per year or more of SO₂.

By January 15, 2016, the DRR required each air agency to submit a list to U.S. EPA that identified all sources within its jurisdiction around which SO₂ air quality must be characterized. On January 7, 2016, based on annual SO₂ emissions data for the year 2014, IDEM identified eleven facilities in Indiana as being subject to air quality characterization under Round 3 Designations. By July 1, 2016, each air agency is required to notify U.S. EPA, for each source area identified on its list, the approach (ambient monitoring or air quality modeling) it will use to characterize air quality. In lieu of characterizing areas around listed sources, air agencies may indicate by July 1, 2016, that they will adopt permanent and enforceable emission limitations that will limit those source(s) emissions below the DRR 2,000 tons per year threshold.

Mercury and Air Toxics Standard Rule

On December 16, 2012, the U.S. EPA published a rule to reduce emissions of toxic air pollutants from power plants. The National Emission Standards for Hazardous Air Pollutants (NESHAP) from Coal- and Oil-Fired Electric Utility Steam Generating Units, also referred to as the Mercury and Air Toxics Standards (MATS) rule for power plants, will reduce toxic air pollutants from new and existing electric utility steam generating units larger than 25 MWe that burn coal or oil for the purpose of generating electricity for sale and distribution through the national electric grid to the public.

The MATS rule establishes numeric emission limits for mercury, PM, and hydrochloric acid (HCl) emissions from coal-fired EGUs, and PM, HCl, and hydrofluoric acid emissions from oil-fired EGUs. This includes numeric emission limits for SO₂ (as an alternative to HCl), individual non-mercury metal air toxics and total non-mercury metal air toxics (as alternatives to PM), and

work practice standards, instead of numeric limits, to limit organic air toxics. Though the standards target toxic air pollutants, the controls needed for compliance are expected to provide significant SO₂ emission reductions.

The New Source Performance Standards for fossil-fuel-fired EGUs, also signed under the MATS rule, revises the standards new coal- and oil-fired power plants must meet for PM, SO₂, and NO_x. Existing sources generally will have up to 4 years to comply with MATS, if needed. Therefore, the compliance deadline is March 15, 2016. This includes the 3 years provided to new and existing sources by the CAA and an additional year state permitting authorities can grant under the CAA to existing sources as needed for technology installation.

Tier 3 Vehicle Emission and Fuel Standards Program

On April 28, 2014, the U.S. EPA published the final rule for the Tier 3 Vehicle Emission and Fuel Standards Program. The Tier 3 program is part of a comprehensive approach to reducing the impacts of motor vehicles on air quality. The program considers the vehicle and its fuel as an integrated system, setting more stringent vehicle emissions standards and lowering the sulfur content of gasoline beginning in 2017. The vehicle emission standards will reduce tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The fuel standards will enable more stringent vehicle emission standards and make emission control systems more effective.

2.2 EMISSION REDUCTIONS FROM REGIONAL HAZE SIP STRATEGIES

Section 51.308(g)(2) and 51.309(d)(10)(i)(B) of the Regional Haze Rule requires a summary of the emission reductions achieved throughout the state through implementation of the measures described in Section 2.1. These controls vary with respect to their known or expected compliance deadlines and some of the relied-upon strategies have not yet been implemented. For this reason, it is difficult to describe specific emission reductions associated with each measure. Therefore, this section focuses on emission reductions from control measures designed to reduce SO₂ and NO_x emissions from certain source categories as they relate to Indiana's Regional Haze SIP strategies.

2.2.1 BART Emission Reductions

Indiana's EGUs have made considerable progress toward reducing SO₂ and NO_x emissions. Several EGUs had already installed controls to comply with the requirements of the NO_x SIP Call and CAIR, CSAPR's predecessor, when Indiana's Regional Haze SIP was submitted in March 2011. Based on emissions data from EGUs reporting to the U.S. EPA's Clean Air Markets Division (CAMD), Indiana's EGU emissions fell below the state's SO₂ and annual NO_x emission budgets for 2013 in the final CSAPR published on August 8, 2011.

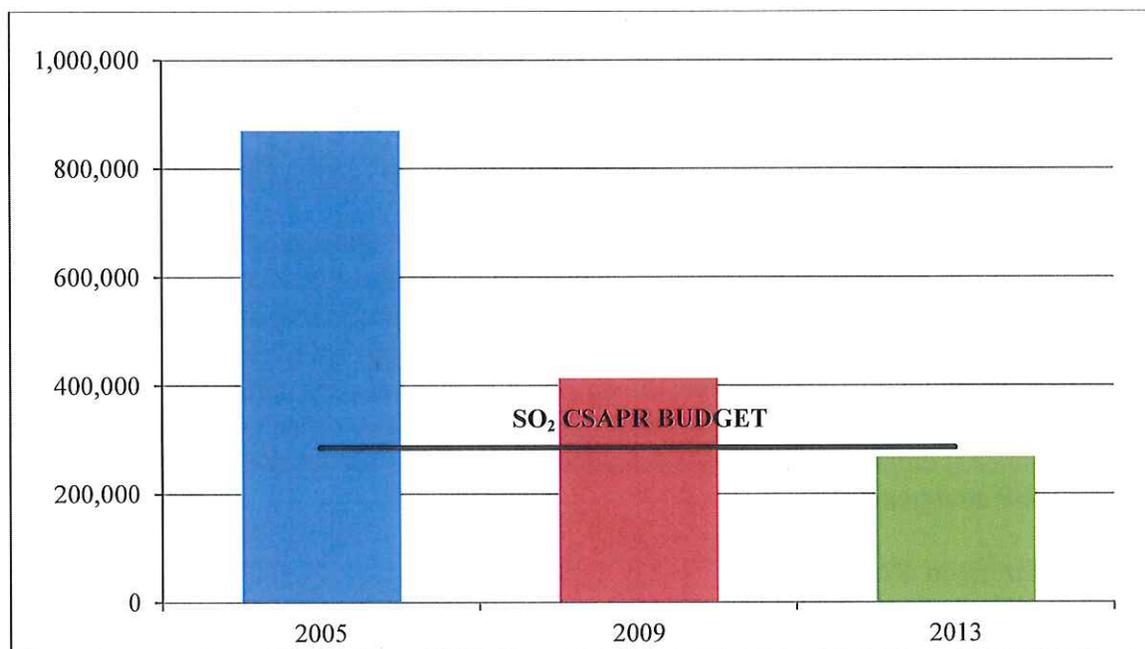
Graphs 2.1 and 2.2 illustrate Indiana's SO₂ and NO_x progress towards achieving this goal. The SO₂ CSAPR budget for 2013 was 285,424 tons for EGUs compared to Indiana's reported SO₂ emissions from EGUs, which was 268,217 tons in 2013 as shown in Table 2.3. The annual NO_x CSAPR budget for 2013 was 109,726 tons for EGUs, while reported NO_x emissions from the

state's EGUs was 103,048 tons in 2013. Therefore, Indiana achieved the emission levels required by its EGU BART strategy by 2013 according to CSAPR SO₂ and annual NO_x emission budgets. In fact, Indiana's SO₂ and NO_x EGU emissions for 2013 were 6% lower than the 2013 CSAPR budgets for both pollutants.

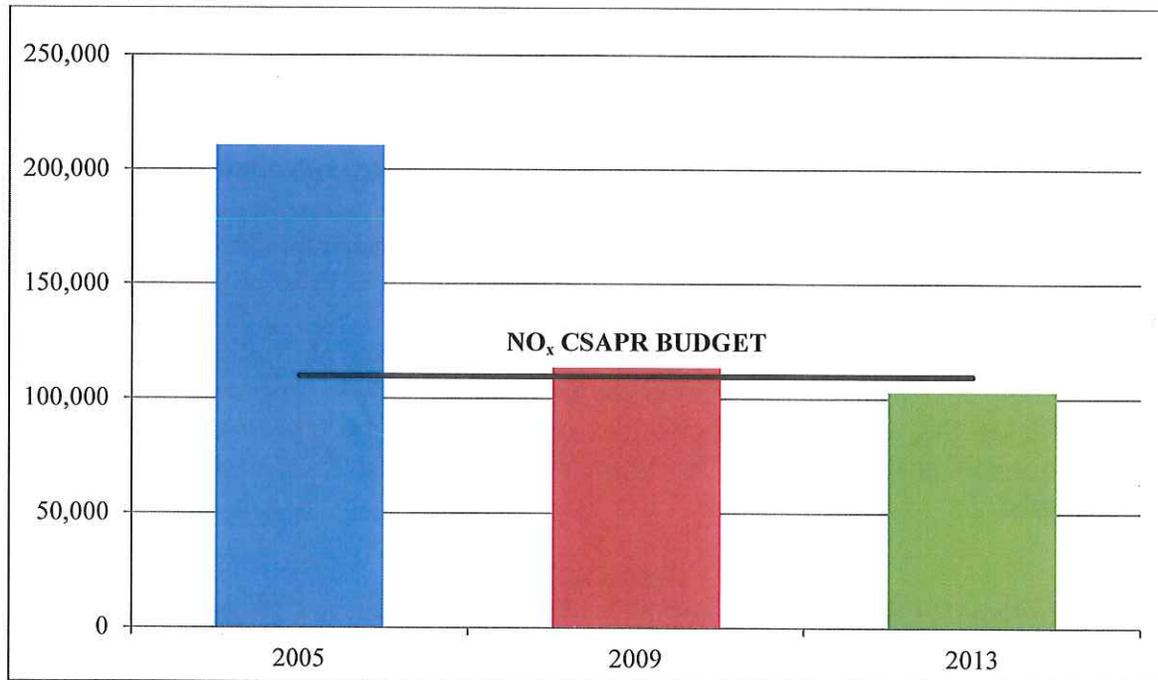
Table 2.3
Indiana EGU Emissions Reported to CAMD

Year	NO _x (tons)	NO _x Budget (tons)	SO ₂ (tons)	SO ₂ Budget (tons)
2005	210,646		870,812	
2009	113,601		413,726	
2013	103,048	109,726	268,217	285,424

Graph 2.1
Indiana EGU SO₂ Emissions Reported to CAMD
(tons/year)



Graph 2.2
Indiana EGU NO_x Emissions Reported to CAMD
(tons/year)



2.2.2 Long Term Strategy Emission Reductions

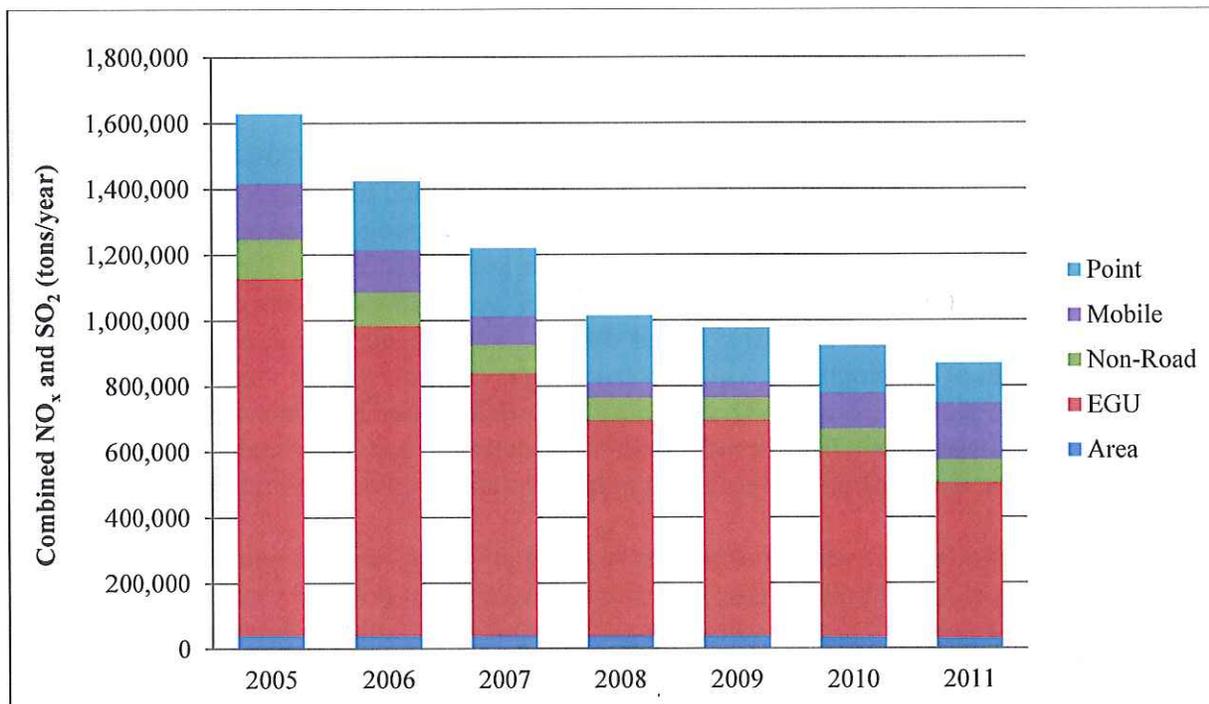
As shown in Graph 2.3, Indiana's EGUs have made considerable progress toward reducing SO₂ and NO_x emissions as a result of advanced control devices installed to comply with the requirements of CSAPR and in anticipation of other federal programs aimed at reducing SO₂ emissions from fossil fuel-fired EGUs to be phased in or implemented over the course of the next few years. In addition, coal-fired EGUs have less overall generating capacity due to shutdowns, and there is less pollution from coal-fired EGUs due to the conversion of existing units to natural gas and replacement of existing units with new natural gas combined cycle units. Since EGUs control programs to reduce SO₂ and NO_x emissions were determined to be most effective in reducing visibility impacts, significant reductions were expected and have been achieved. Other source categories have contributed to emission reductions achieved throughout the state, as well.

Emissions from large facilities that emit pollutants through stacks, or point sources, are estimated every year. The most recent point source emissions are available up to the year 2015. However, emissions from on-road and off-road vehicle (mobile) sources and other sources not emitted through stacks, or non-point sources, are calculated on a three-year cycle. The most recent complete mobile and non-point emissions are available through the U.S. Environmental Protection Agency's National Emission Inventory Database (NEI), Tier 1 emission data, up to the year 2011. The inventories for the intervening years were interpolated using the available years to show the trend emissions are following over time.

As demonstrated in Graph 2.3, point, mobile, non-road, and area sources have shown steady annual decreases in SO₂ emissions since the 2005 base year for Indiana’s Regional Haze SIP (see Appendix B for emissions inventory data). Steady decreases in NO_x emissions are illustrated for each of these source categories as well, until 2010 when emissions from non-road, mobile, and point sources began to creep back up. Not enough, however, to impact the overall progress toward reducing the visibility impacts of SO₂ and NO_x emissions combined for the source categories included in developing Indiana’s Long Term Strategy.

Control measures to be phased in or implemented over the course of the next few years that were not included in the modeling will result in ever greater reductions in future SO₂ emissions. For example; MATS, the 2010 SO₂ NAAQS, and other regulations focused on reducing SO₂ emissions from fossil fuel-fired EGUs and other large sources, such as various types of boilers and incinerators, which are the largest emitters of SO₂; and the Tier 3 Vehicle Emission and Fuel Standards Program aimed at reducing the impacts of motor vehicles on air quality. The control strategies that companies with affected sources use to comply with these federal programs will provide for sufficient SO₂ and NO_x emission reductions to not only meet, but exceed the 2018 visibility improvement goals for Indiana. See Appendix A for Indiana EGUs existing and projected controls.

Graph 2.3
Indiana’s Combined SO₂ and NO_x Emissions by Source Category



Note: Emission information obtained from the U.S. Environmental Protection Agency’s National Emission Inventory Database (emission information available through 2011).

2.3 EMISSIONS PROGRESS

Section 51.308(g)(2) and 51.309(d)(10)(i)(B) of the Regional Haze Rule requires an analysis tracking the change over the past five years in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. This section identifies emission changes by type of source or activity and is based on the most recent updated emission inventory, with estimates projected forward as necessary and appropriate, to account for emission changes during the applicable five-year period.

The reasonable progress goal is determined using base year and future year emission inventories. Emissions from the “base,” or known, year that represent the baseline period were developed for 2005 and projected using growth and control analyses to estimate emissions in 2012 and 2018. The Regional Haze Rule requires States to measure interim progress toward reaching the projected emissions estimates. The 5-year period evaluated to determine progress made toward reaching Indiana’s reasonable progress goals in this report will be 2007 through 2012.

Emissions progress for SO₂ and NO_x, the primary pollutants contributing to visibility impairment in Indiana, will be discussed separately in this section using actual (reported) emissions information from all major source categories obtained from the NEI database back to the year 2005 to provide a more complete picture of the progress made over the years in improving air quality. Actual (reported) SO₂ and NO_x emission information from the major source categories is available through 2014.

2.3.1 Sulfur Dioxide

Indiana’s inventory of actual emissions reported from contributing sources of SO₂ in 2005 through 2014 shows a definite downward trend as illustrated in Graph 2.4. The SO₂ and NO_x emissions illustrated in this graph represent all the major source categories combined. State and federal control measures phased in and implemented over the course of the last 10 years has resulted in considerable SO₂ emission reductions. The most substantial reductions took place over the first 5-year period following 2005, Indiana’s Regional Haze SIP base year. See Table 2.4 below for actual (reported) SO₂ emissions from the major source categories.

These reductions are due primarily to regulations focused on reducing SO₂ emissions from coal-burning power plants and other large sources, such as various types of boilers and incinerators, which are the largest emitters of SO₂. Federal programs such as the Acid Rain Program, the Regional Haze Rule, and CAIR caused power plants to develop and implement control measures aimed at reducing SO₂ emissions to comply with the requirements set forth in these regulations for this time period. Actual SO₂ emissions reported from the major source categories decreased incrementally over the 5-year timeframe by nearly 50% and emissions were reduced by 64% over the last 10 years.

SO₂ emissions continued to decrease gradually over the next five years (2010 - 2014). Although SO₂ controls were in place by 2009 when CAIR became effective, emissions decreased by approximately 28% during this time period with the most significant SO₂ emission reductions taking place between 2010 and 2012 when the U.S. EPA strengthened the federal SO₂ standards,

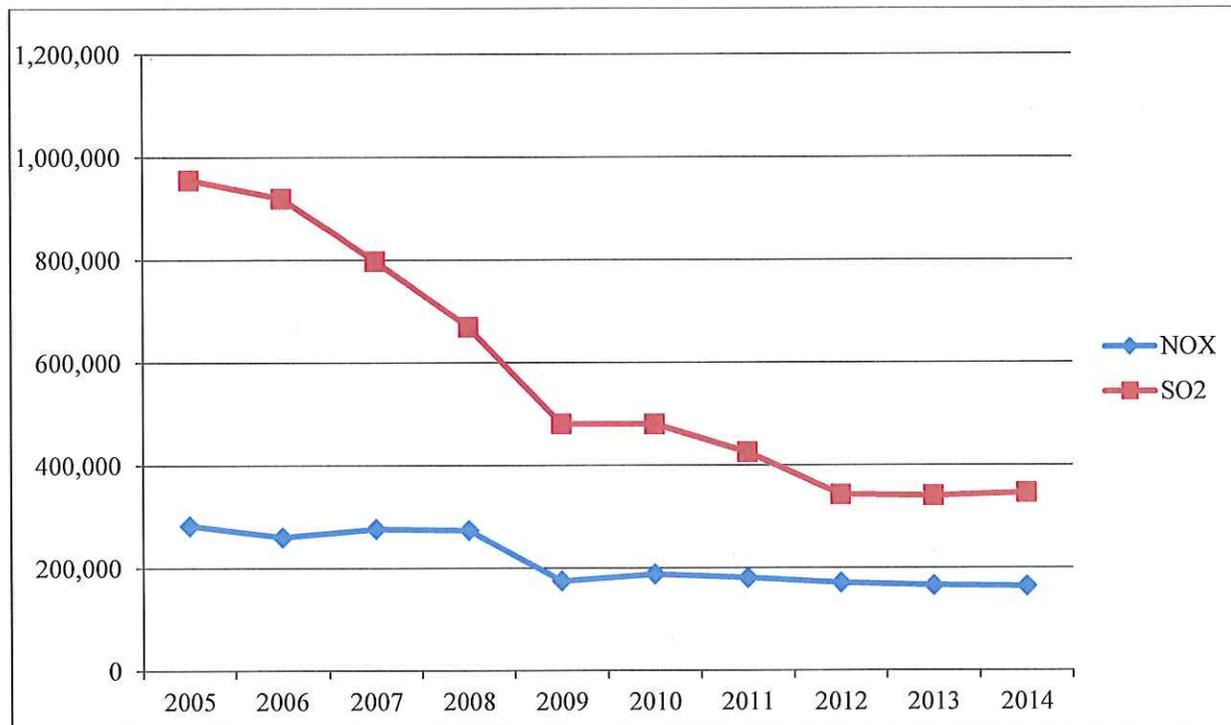
establishing a new one-hour primary standard. This resulted in better visibility improvement than anticipated. SO₂ emissions have leveled off since then; however, additional reductions are expected as a result of federal regulations to be implemented over the course of the next few years (2015 - 2018), which will result in an even greater improvement in visibility than anticipated by 2018.

Table 2.4
Actual (Reported) SO₂ and NO_x Emissions from Contributing Sources in Indiana

Pollutant	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SO ₂ (tons)	956,031	920,251	797,900	669,936	480,884	480,628	425,786	343,124	340,786	346,429
NO _x (tons)	283,059	260,810	276,402	273,903	174,828	187,988	180,674	171,136	165,778	164,520

Note: SO₂ and NO_x emissions include point, mobile, non-road, EGU, and area sources.

Graph 2.4
Actual (Reported) SO₂ and NO_x Emissions from Contributing Sources in Indiana (tons/year)



Note: SO₂ and NO_x emissions include point, mobile, non-road, EGU, and area sources.

Companies with affected EGUs have developed control strategies to comply with CSAPR, the 2010 SO₂ NAAQS, and MATS. These strategies consist of one or a combination of two or more of the following types of control measures; the conversion of an existing EGU from coal to natural gas; the installation of a single SO₂ emission control device or combination of more than one control device on an existing EGU; and the complete shutdown of an EGU and removal of

the unit from the facility's Title V Operating permit. Of the EGUs listed as BART-eligible covered by CAIR in Indiana's Regional Haze SIP, five EGUs will be converted to natural gas, 30 EGUs will be retrofitted with add-on controls, and 25 EGUs will be shut down by the end of the 10-year planning period, 2018. See Appendix A for Indiana EGUs existing and projected controls.

Table 2.5 shows 2005 and 2011 actual emission estimates and 2018 projections. Emission projections for 2018 were taken from the Indiana Regional Haze SIP, Table 5. A comparison of the 2011 actual emission estimates to the 2018 projections illustrates that Indiana has achieved much of the needed SO₂ reductions already. In fact, EGU, non-road, and point source emissions have exceeded the projected emissions for 2018. As of 2011, mobile source emissions have achieved 89% of the 2018 goal and area source emissions have achieved 99% of the 2018 projected emissions.

Table 2.5
Indiana's Reasonable Progress Towards 2018 Goal by Pollutant and Source Category
(tons/year)

Source Category	SO ₂			NO _x		
	2005	2011	2018	2005	2011	2018
Point	133,768	59,603	65,700	78,242	61,750	85,775
Mobile	3,978	818	730	165,899	171,439	63,145
Non-Road	9,489	502	2,190	110,667	70,546	56,210
EGU	875,880	352,337	378,140	210,819	119,632	93,075
Area	16,965	11,717	11,680	22,992	19,734	64,970

2.3.2 Nitrogen Oxides

NO_x emissions from the major source categories in Indiana show a definite downward trend from 2005 to 2014 as illustrated in Graph 2.4. However, the actual decrease in NO_x emissions was not as substantial as the decrease in SO₂ emissions for the same timeframe as the NO_x SIP call took effect and large NO_x emission reductions occurred in 2004. State and federal control measures phased in and implemented over the course of the last 10 years has resulted in NO_x emission reductions that are fairly consistent with the SO₂ trend line pattern, but at a lower level of emissions with a less drastic decrease during the first 5-year period. This is due to the fact that EGUs emit more SO₂ than point, area, mobile, and non-road sources combined, while NO_x emissions from sources other than EGUs combined is much higher than NO_x emissions from EGUs alone. See Appendix B for State wide SO₂ and NO_x emission trends by category and year.

As shown in the trend line for NO_x emissions in Graph 2.4, the most significant reductions took place over the first 5-year period following the 2005 base year. See Table 2.4 on the previous page for actual (reported) NO_x emissions from the major source categories. This is due primarily to regulations focused on reducing NO_x emissions from coal-burning power plants and other large sources, such as various types of boilers and incinerators, which were the largest emitters

of NO_x. Federal programs such as the NO_x SIP Call, the Regional Haze Rule, and CAIR caused power plants to develop and implement control measures aimed at reducing NO_x emissions to comply with the requirements set forth in these regulations for this time period.

In addition, a series of federal programs adopted as comprehensive national programs to reduce emissions from vehicle, heavy duty diesel, and non-road diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions were phased in from 2004 to 2014. Actual NO_x emissions reported from the major source categories decreased incrementally over the first 5-year timeframe (2005 - 2009) by 38%. Then NO_x emissions in 2010 from point, mobile, and non-road sources caused total NO_x emissions to increase through 2011 with mobile source emissions increasing in 2011 to a level higher than emissions for that source category in 2005 according to the State Wide NO_x Emission Trends by Category and Year table in Appendix B. However, progress made in reducing NO_x emissions over the next five years, 2010 - 2014, still resulted in a 13% decrease in total NO_x emissions and emissions were decreased by 42% over the last 10 years. It should be noted that the mobile emission calculation methods changed from the Mobile 6 model that was used in the 2005 inventory to the MOVES model that was used in the 2008 and 2011 inventories and the NONROAD model was updated after the 2005 inventory. These changes complicate interpreting the emission trends, particularly for NO_x and PM.

Table 2.5 shows a comparison of the 2005 and 2011 actual emission estimates and the 2018 projections. The 2011 actual emission estimates compared to the 2018 projections illustrates that Indiana has achieved much of the needed NO_x reductions in each of the source categories, except for the mobile source category. Mobile source emissions for 2011 seem to be significantly over estimated with only 38% of the 2018 projected emission reductions achieved. The upcoming 2014 on-road NO_x NEI emission estimate can be compared to 2011 to determine if the 2011 estimate is reasonable. Area and point source emissions have exceeded 2018 projected emission reductions for NO_x and EGU and non-road sources have achieved 78% and 80%, respectively, of the 2018 emission reduction projections for these source categories. Therefore, Indiana's contributions to visibility impairment in Class 1 areas in other states have been reduced and are in line with improvements predicted by the modeling for 2012 and will result in even more improvement in visibility as anticipated by the end of the Regional Haze 10 year planning period (2018).

2.4 ASSESSMENT OF CHANGES IMPEDING VISIBILITY PROGRESS

Section 51.308(g)(5) and 51.309(d)(10)(i)(E) of the Regional Haze Rule requires an assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past five years that have limited or impeded progress in reducing pollutant emissions and improving visibility. This section acknowledges that over the entire 10-year period (2005 - 2014) analyzed in the Emissions Progress section there was an increase in total NO_x emissions from the major source categories in Indiana in 2010 and 2011.

As mentioned previously in the NO_x discussion, actual NO_x emissions reported from the major source categories decreased incrementally from 2005 to 2009. Then emissions from point, mobile, and non-road sources increased slightly in 2010 and again in 2011 for each of these

source categories and overall NO_x emissions according to the emissions information obtained from the U.S. EPA's National Inventory Database. See the State Wide NO_x Emission Trends by Category and Year table in Appendix B.

While this is an issue that may merit further investigation, Indiana does not consider this a problem that has or will impede visibility progress in the future in states with Class 1 areas identified as being potentially impacted by Indiana sources for two reasons. First of all, total NO_x emissions for the following four years, 2011 - 2014, began to decrease once again beginning in 2012 and has continued to decrease every year since then. Secondly, the decrease in SO₂ and NO_x emissions from 2005 to 2009 was so significant that the slight increase that occurred in 2010 and 2011 had no actual impact on the overall progress made from 2005 to 2014.

2.5 ASSESSMENT OF CURRENT STRATEGY

Section 51.308(g)(6) and 51.309(d)(10)(i)(F) of the Regional Haze Rule requires 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. This section contains a summary of the information used and decisions made to establish reasonable progress goals for each of the areas identified as being potentially impacted by Indiana sources.

2.5.1 **Control Strategies and Emission Reductions**

As described in the Status of Control Strategies section, controls relied upon in Indiana's Regional Haze SIP have either been implemented already, or are expected to be implemented by 2018. IDEM assessed each of the areas identified in the MRPO report as being impacted by Indiana sources using information provided by the MRPO, technical documents from the other RPOs, and letters received from other states indicating their decisions regarding reasonable progress goals.

Since Indiana has no Class 1 areas, the states with Class 1 areas took the lead in establishing reasonable progress goals. Indiana participated in the discussions and provided information to assist states in setting goals. MRPO modeling was used to evaluate areas potentially impacted by Indiana sources and VISTAS modeling results were used to provide additional evidence regarding progress in achieving visibility improvements as detailed in Indiana's Regional Haze SIP.

Voyageurs National Park and Boundary Waters Canoe Area Wilderness Area, MN

The approach taken by Minnesota assessed that reductions for Indiana BART sources (and other states) resulting from new settlements, committed controls, current controls, and the final CSAPR would be sufficient to meet their reasonable progress goals. According to "Minnesota's Five-Year Regional Haze Progress Report State Implementation Plan," dated December 2015, Minnesota has exceeded projected SO₂ emission reductions modeled in establishing the state's reasonable progress goals for its Class I areas. Minnesota's reasonable progress goals relied

upon a projected 34% reduction of SO₂ emissions statewide from the 2002 base case; by 2008, Minnesota achieved (and exceeded) this statewide reduction goal. By 2011, Minnesota had achieved a 61% reduction in statewide SO₂ emissions. Continued implementation of Long Term Strategy controls are expected to provide further reductions. Statewide NO_x emissions in Minnesota have also decreased since the 2002 base case, exceeding modeled reduction targets for point sources, while seeing a less significant decrease in mobile source emissions. By 2011, Minnesota achieved a 38% reduction in statewide NO_x emissions – nearly achieving the 41% reduction relied upon for the 2018 reasonable progress goals.

Mammoth Cave National Park, KY

At the time Kentucky's Regional Haze SIP was developed, EGU sources in Kentucky and Indiana were required to comply with the requirements of the final CSAPR/CAIR. Kentucky determined that these controls were sufficient to address visibility in this area. Further, VISTAS modeling showed that Mammoth Cave was more than meeting its uniform rate of progress and determined that no additional reductions were needed from Indiana. However, an Indiana source, Alcoa, was determined to significantly impact this area and is the subject of the Indiana BART rule. Visibility impacts from Alcoa are anticipated to be reduced further as a result of the announcement that their smelter will be permanently shut down by April of 2016

In addition, six EGUs from Indiana were identified as possibly impacting Kentucky's Class I area, with a 1% or more contribution to the Mammoth Cave area of influence according to the "Kentucky State Implementation Plan (SIP) Revision: Regional Haze 5-Year Periodic Report 2008-2013 For Kentucky's Class I Federal Area," dated September 17, 2014. Two of the six units are located at Indiana Michigan Power Rockport Power Generating Station. The other four are located at the PSI Power Gallagher Power Generating Station. The DSI's proposed for compliance with CSAPR and MATS and accounted for in Kentucky's Regional Haze SIP were installed on four of the six EGUs, two at each facility. The other two units located at Gallagher were shut down, which was also accounted for in Kentucky's Regional Haze SIP. Indiana Michigan Power installed selective catalytic reduction units in addition to the new DSI units on the two EGUs at Rockport. Therefore, potential SO₂ emissions from the six EGUs in Indiana identified as possibly impacting visibility at Mammoth Cave have been reduced as anticipated and potential NO_x emissions will be reduced further than anticipated for these sources in Kentucky's Regional Haze SIP.

Great Smoky Mountains National Park, NC and TN

VISTAS modeling conducted to assist in developing reasonable progress goals showed that the long term strategy developed for this Class 1 area easily met the glidepath through 2018. In the "Technical Analyses Supporting Regional Haze State Implementation Plan," June 8, 2007, North Carolina Department of Environment and Natural Resources stated that contributions from other RPOs are comparatively small and the greatest benefits would likely be from further EGU reductions within the VISTAS states.

The "Regional Haze 5-Year Periodic Review State Implementation Plan for North Carolina Class I areas," dated May 31, 2013 provides a new projection for 2018 emissions from the EGUs

subject to North Carolina's Clean Smokestacks Act (CSA). The CSA is North Carolina's primary control strategy in the state's Regional Haze SIP. SO₂ and NO_x emissions from coal-fired EGUs subject to this act are well below the act's system caps and well below what was modeled in North Carolina's Regional Haze SIP. In fact, statewide SO₂ emissions from coal-fired EGUs decreased by 80% over the 5-year period (2002 to 2011) and statewide NO_x emissions dropped by 32%. Since the EGU sector represents over 50% of statewide SO₂ emissions from stationary sources, this is a clear sign that the Class 1 areas in North Carolina are on track to meet or exceed their 2018 reasonable progress goals and future SO₂ emissions are expected to decline further as a result of federal control measures focused on EGU and other large industrial sources that have yet to be implemented.

Sipsey Wilderness Area, AL

The VISTAS analyses conducted to assist in developing reasonable progress goals showed that the long term strategy developed for this Class 1 area easily meets the glidepath through 2018 as well. The 2011 NEI provides the most current emissions information for haze contributing pollutants from the major source categories inventoried in Alabama's Regional Haze SIP. There have been substantial emission reductions from several control programs currently in place (CSAPR/CAIR, BART, mobile source controls, etc.). The 2011 actual emissions were evaluated against the projected 2018 VISTAS inventory to ensure emissions are on a downward trend to meet the 2018 reasonable progress goals. As demonstrated in the "2013 Alabama Regional Haze Mid-Course Review," dated June 5, 2014, 2011 actual emissions are lower than the 2018 projected emissions for most of the source categories in the original Regional Haze SIP. Additional controls both considered in Alabama's Regional Haze SIP as well as controls not considered (plant shutdowns, MATS) will continue to support progress in reducing emissions and improving visibility. Therefore, Alabama concluded that the emission reductions are on track to meet or exceed the 2018 goals.

Source Sector James River Face Wilderness Area and Shenandoah National Park, VA and Dolly Sods/Otter Creek Wilderness Areas, WV

In the MRPO summary of Class 1 areas impacted by sources from within the MRPO, Indiana was determined to contribute to visibility impairment in these more distant Class 1 areas. However, the VISTAS analyses conducted showed that the results of the long term strategy developed by the States provided anticipated visibility improvements below the glidepath. In addition, the four factor analyses performed by the VISTAS states indicated that controls closer to the Class 1 areas provided the most effective reductions. Indiana concurred with these conclusions, so no specific requirements were attributed to Indiana.

Virginia reports in that visibility at the James River Face Wilderness Area and Shenandoah National Park has significantly improved since 2000. The more recent data indicates that both Class 1 areas are meeting their RPGs, and expected future reductions in SO₂ emissions as discussed in the "Commonwealth of Virginia State Implementation Plan Revision: Regional Haze Five-Year Periodic Report 2008-2013," dated November 2013 will serve to continue this downward trend in the coming years. Since sulfate was identified as the major contributor to regional haze most emission reduction control strategies have been focused on reducing SO₂

from EGUs and industrial boilers. The “West Virginia State Implementation Plan Revision: Regional Haze 5-Year Periodic Report (Covering 2008-2013) Describing Progress Towards the Reasonable Progress Goals for visibility in Class I Federal Areas and Determination of Adequacy of Existing Implementation Plan,” dated April 2013, reports the same conclusions for the Dolly Sods and Otter Creek Wilderness Areas regarding visibility and progress towards 2018 goals. In 2009 actual EGU emissions were below what was predicted for 2009 and 2010 and 2011 EGU emissions were below what was predicted for 2018.

Caney Creek and Upper Buffalo Wilderness Areas, AR, and Hercules-Glades and Mingo Wilderness Areas, MO

Southwestern Indiana was included in the area of influence found to impact these areas, so the controls in existence in each States’ 2002 inventory, those installed after 2002, and controls planned out to 2018, were analyzed. The results showed that a large majority of these sources would be controlled by 2018, which would aid in the progress toward reaching the States’ reasonable progress goals. Glidpaths resulting from the long term strategies developed by these states showed that all the Class 1 areas were projected to meet their reasonable progress goals in 2018. The States, therefore, concluded that no reductions were necessary from Indiana.

According to the “State of Missouri Regional Haze Plan 5-Year Progress Report: A Missouri State Implementation Plan Revision,” dated May 2014, emissions data reported to the NEI for 2005, 2008, and 2011 from the major source categories for the primary pollutants that affect visibility were compared to evaluate the emissions progress made for Missouri’s 5-year progress report. The results of this analysis demonstrate an overall downward trend in visibility impairment that can be expected to continue in the coming years as more federal regulations are implemented. The visibility and pollutant trends from Missouri’s three monitoring sites also indicate an overall decreasing trend in visibility impairment. The available monitoring data was extrapolated to 2018 to predict whether the RPGs for each area will be met by 2018. These extrapolations do show all areas will exceed the established goals by 2018.

The “State of Arkansas: State Implementation Plan Review for the Five-Year Regional Haze Progress Report,” dated May 2015, reported that the current 5-year average indicate that as of 2011, Caney Creek Wilderness area has achieved 73% of its visibility impairment reduction goal of 3.88 dv and Upper Buffalo Wilderness area has achieved 66% of its visibility impairment reduction goal of 3.75 dv by 2018. Therefore, Arkansas concluded that the emission reductions are on track to meet or exceed the 2018 goals.

Isle Royale National Park and Seney National Wildlife Refuge, MI

Michigan determined that existing and on-the-books controls (those controls scheduled in response to regulatory actions within this time period), combined with reductions necessary to meet the new 24-hour fine particulates standard and possibly the new ozone standard would be sufficient to meet their reasonable progress goals. In the Michigan Regional Haze SIP, three Indiana facilities, Rockport in Spencer County, Gallagher in Floyd County, and Clifty Creek in Jefferson County were included on a list of the top 30 facilities impacting visibility at Isle Royale

and Seney, inside and outside the state of Michigan. There were controls planned for all three of these facilities.

Rockport, which has 2 units, signed a consent decree in October 2007 in which they agreed to install Selective Catalytic Reduction (SCR) systems and Flue Gas Desulfurization (FGD) systems on Unit 1 by December 31, 2017 and SCR and FGD systems on Unit 2 by December 31, 2019. Dry Sorbent Injection (DSI) add-on controls were installed on both units in 2015 and SCR installations are scheduled to be completed by 2016. Gallagher, which has four units, signed a consent decree in December 2009 to reduce SO₂ and NO_x emissions by January 1, 2013. Gallagher chose to retire 2 of the 4 units (units 2 and 4) in 2012. DSI systems were installed on the other two units in 2011. Clifty began construction of FGDs for all five units, but postponed completion when CAIR was vacated, citing economic concerns. The installations of all five FGDs were completed when CSAPR was upheld in 2014.

Finally, in January 2011, NIPSCO signed a consent decree. NIPSCO operates four large EGUs in northern Indiana, Bailly in Porter County, Mitchell in Lake County, Michigan City in LaPorte County, and Schahfer in Jasper County. While these facilities were not listed as among the largest sources impacting Seney and Isle Royale, because of their size and proximity, controls to be installed were expected to result in less visibility impairment. Specifically, Mitchell was to be permanently shut down, two new FGDs at Schahfer and one at Michigan City were to be added, and upgrades were to be made to two FGDs at Schahfer along with two upgrades to FGDs at Bailly. Also, some NO_x controls were to be added and upgraded, along with a system wide cap on overall emissions. These controls were phased in through the end of 2015 as anticipated.

According to Michigan's "Five-Year Regional Haze Report State Implementation Plan," dated October 19, 2015, the 2011 totals for NO_x and SO₂ shows downward trends compared to the 2005 data for almost all categories. Total NO_x emissions were reduced by 21% and SO₂ emissions by 38% over the 2005 to 2011 period. Michigan concluded that the state's current Regional Haze SIP is adequate and requires no further revision at this time to achieve 2018 visibility goals.

Acadia National Park and Moosehorn Wilderness Area, ME, Great Gulf Wilderness Area, NH, Brigantine Wilderness Area, NJ, and Lye Brook Wilderness Area, VT

MANE-VU released "Assessment of Reasonable Progress for Regional Haze in MANE-VU Class 1 Areas - Methodology for Source Selection, Evaluation of Control Options, and Four Factor Analysis, July 2007" which supported requests of states outside that area to examine controls for specific types of sources. This document is available online at the MANE-VU website, <http://www.manevu.org>, under "Consultations - Projects and Work Products." The resulting request is referred to as the "MANE-VU Ask".

MANE-VU Ask: In its "Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Request for a Course of Action by States Outside of MANE-VU Toward Assuring Reasonable Progress" (June 20, 2007), MANE-VU suggested that several control strategies should be pursued for adoption and implementation, including:

- Application of Best Available Retrofit Technology
- 90% (or greater) reduction in SO₂ 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 1 areas
- 28% reduction in non-EGU (point, area, on-road, and off-road) SO₂ emissions relative to on-the-books and on-the-way 2018 projections
- Continued evaluation of other measures, including measures to reduce SO₂ and NO_x emissions from coal-burning facilities and promulgation of new source performance standards for wood combustion
- Further reduction in power plant SO₂ (and NO_x) emissions beyond the current Clean Air Interstate Rule program

Of the 167 stacks, 15 are from 9 sources in Indiana and are identified in Appendix C. Most of these stacks had or were expected to have post-combustion emission controls (i.e., scrubbers). A modeling analysis performed to evaluate these sources, along with the control information listed for them in Appendix C showed that Indiana sources had insignificant impacts on these areas.

The MRPO conducted modeling to evaluate the various levels of controls in place or planned between 2008 and 2018. These results showed that for the northeastern Class 1 areas, controls already implemented and on-the-books may result in achievement of reasonable progress goals. However, these controls along with federal programs yet to be implemented, such as the 2010 SO₂ NAAQS, MATS, Boiler MACT, Tier 3 Program, etc., will meet the requirements for all of the suggested control strategies listed above and, therefore should not impede these areas in meeting their 2018 goals.

2.5.2 Future Activities

Reductions in Indiana emissions from the BART rule and other programs identified as part of Indiana's Long Term Strategy are sufficient to meet the reasonable progress goals in other states. However, to continue to assist those states in meeting their reasonable progress goals and to minimize its contribution to those states, Indiana committed and continues to commit to the following actions in its Regional Haze SIP:

1. Effectively enforce the existing control measures.
2. Work with the U.S. EPA and other states and regional planning organizations to address multipollutant air quality problems in the eastern and northeastern U.S.
3. Continue consultation with states with Class 1 areas to monitor their progress in meeting their reasonable progress goals and develop coordinated strategies, as and when needed, to mitigate visibility impacts in those areas.

2.6 DETERMINATION OF ADEQUACY

Sections 51.308(h) and 51.309(d)(10)(ii) of the Regional Haze Rule requires a determination of the adequacy of the existing implementation plan. At the same time the State is required to submit any five-year progress report to the U.S. 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 analyses presented in previous sections, Indiana has determined that its existing Regional Haze SIP is adequate to meet the requirements of the Regional Haze Rule and to support reasonable progress goals at all Class I areas impacted by emissions from Indiana. Although no specific requirements for emission reductions were established for Indiana sources outside of BART and state and federal on-the-books control measures included in Indiana's Long Term Strategy, Indiana's emission reductions have far exceeded any requests made from other states for emission reductions from Indiana sources. The 5-year period evaluated for the purpose of this progress report was 2007 - 2012. During this time frame, actual SO₂ emissions reported from the major source categories decreased nearly 57%, while NO_x emissions decreased by 38% from 2007 - 2012. As a result, Indiana's contributions to visibility impairment in Class 1 areas in other states were significantly reduced and surpassed improvements predicted by the modeling for 2012.

In addition, the results of this 5-year progress report evaluation proves that air quality in Indiana has improved considerably and that SO₂ and NO_x emissions from contributing sources in Indiana have continued to decrease for both pollutants since 2012. In fact, the downward trend for both SO₂ and NO_x emissions are on target for producing greater visibility improvements than anticipated in 2018, as well. Therefore, Indiana's existing Regional Haze SIP requires no further substantive revision to assist other states with established reasonable progress goals. Indiana will continue to implement the measures of its existing SIP, and begin preparation for the next scheduled Regional Haze SIP revision.

The State submits this negative declaration that further revision of Indiana's Regional Haze State Implementation Plan dated March 11, 2012 is not needed at this time.

3.0 PROCEDURAL REQUIREMENTS

3.1 ADMINISTRATIVE PROCESS

Section 51.308(g) and 51.309(d)(10) of the Regional Haze rule requires the State to provide progress reports in the form of implementation plan revisions that comply with the procedural requirements of §51.102 and §51.103.

IDEM requested a preliminary review of the draft Indiana Regional Haze State Implementation Plan from U.S. EPA Region 5. Written comments were received and incorporated into the draft document prior to posting of the final document for public comment. IDEM's response to comments can be found in Appendix D along with the written comments submitted by Region 5.

Notice of availability of the complete document concerning the final *Indiana Regional Haze State Implementation Plan* and request for a public hearing was made available on IDEM's website at <http://www.in.gov/idem/airquality/2337.htm> on February 19, 2016. No request for a public hearing was received by March 21, 2016; therefore the scheduled public hearing was cancelled.

3.2 CONSULT WITH FEDERAL LAND MANAGERS

Sections 51.308(i)(2) and (3) of the Regional Haze rule requires the State to provide the following for Federal Land Manager:

- (1) An opportunity for consultation, in person and at least 60 days prior to holding any public hearing on an implementation plan (or plan revision) for regional haze required by this subpart. This consultation must include the opportunity for the affected Federal Land Managers to discuss their:
 - (i) Assessment of impairment of visibility in any mandatory Class I Federal area; and

- (ii) Recommendations on the development of the reasonable progress goal and on the development and implementation of strategies to address visibility impairment.
- (2) In developing any implementation plan (or plan revision), the State must include a description of how it addressed any comments provided by the Federal Land Managers.

The draft Indiana Regional Haze Five-Year Progress Report State Implementation Plan was submitted to the FLMs for review. Comments were received from the U.S. Forest Service and U.S. Department of Interior National Parks Service and incorporated into the draft document prior to posting of the final *Indiana Regional Haze Five-Year Progress Report State Implementation Plan* for public comment. IDEM's response to comments can be found in Appendix D along with the written comments submitted by the FLMs.

3.3 DEADLINES FOR SUBMITTING THE FIRST 5-YEAR PROGRESS REPORT

Sections 51.308(g) of the Regional Haze rule requires the first progress report to be due 5 years from submittal of the initial implementation plan.

The state of Indiana initially submitted its regional haze SIP to the United States Environmental Protection Agency (U.S. EPA) on January 14, 2011. The final corrected version was submitted on March 10, 2011. Therefore, the five-year progress report is due March 2016.

3.4 CHECKLIST

Table 3.1
Five-Year Progress Report Submittal Checklist
Submitted under 40 CFR 51.308(g)-(h) and 40 CFR 51.309(d)(10)

Y/N	Regulation Citation	Regulation Summary	Location in Report	Comments
Y	51.308(g)(1) 51.309(d)(10)(i)(A)	Status of Control Strategies in the Regional Haze SIP: Does the report include a list of measures the state relied upon? (<i>all states</i>)	Section 2.1 pages 10-21	
Y	51.308(g)(2) 51.309(d)(10)(i)(B)	Emissions Reductions from Regional Haze SIP Strategies: Does the report include estimated reduction estimates for these measures? (<i>all states</i>)	Section 2.2 pages 21-24	
N	51.308(g)(3) 51.309(d)(10)(i)(C)	Visibility Progress: Does the report include the summaries of monitored visibility data as required by the Regional Haze Rule? (<i>states with Class 1 areas only</i>)	N/A	
Y	51.308(g)(4) 51.309(d)(10)(i)(D)	Emissions Progress: Does the report provide emissions trends across the entire inventory for a 5-year period as required by the Regional Haze Rule? (<i>all states</i>)	Section 2.3 pages 24-27	
Y	51.308(g)(5) 51.309(d)(10)(i)(E)	Assessment of Changes Impeding Progress: Does the report include an explicit statement of whether there are anthropogenic emissions changes impeding progress? (<i>all states</i>)	Section 2.4 page 27	
Y	51.308(g)(6) 51.309(d)(10)(i)(F)	Assessment of Current Strategy: Does the report include an assessment of whether the state's haze plan is on track to meet reasonable progress goals? (<i>all states</i>)	Section 2.5 pages 27-32	
N	51.308(g)(7) 51.309(d)(10)(i)(G)	Review of Monitoring Strategy: Does the report review the monitoring plan including any non-IMPROVE monitors the state is using? (<i>states with Class 1 areas only</i>)	N/A	
Y	51.308(h) 51.309(d)(10)(ii)	Determination of Adequacy: Does the report (or the transmittal materials) provide the explicit determination required by the Regional Haze Rule? (<i>all states</i>)	Section 2.6 page 32-33	