

**Nebraska Department of Environmental Quality  
Regional Haze State Implementation Plan  
Five-Year Progress Report**



**Jim Macy, Director  
Pete Ricketts, Governor  
August XX, 2016**

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Mr. Mark Hague  
Acting Regional Administrator  
U.S. EPA Region VII  
11201 Renner Blvd.  
Lenexa, KS 66219

Dear Mr. Hague:

Enclosed is Nebraska's Five-Year Regional Haze Progress Report, fulfilling requirements listed in 40 CFR 51.308(g) and demonstrating that progress is being achieved by sources within the state of Nebraska that have the potential to impact visibility at Class I areas in other states. In addition, in accordance with 40 CFR 51.308(h)(1), the State is submitting a negative declaration; i.e., revision of the existing state implementation plan (SIP) is not necessary at this time.

On July 13, 2011, the Nebraska Department of Environmental Quality (NDEQ) submitted on behalf of Dave Heineman, Governor of Nebraska, the SIP for Regional Haze and Best Available Retrofit Technology (BART) to EPA Region VII Administrator Karl Brooks, pursuant to requirements of 40 CFR 51.308(a)-(e). This SIP addressed regional planning, State/Tribe and Federal Land Manager coordination, and a commitment to provide future plan revisions and adequacy determinations. The state of Nebraska does not have Class I areas within its borders; therefore, the development process for this SIP involved regional planning with the Central Regional Air Planning Association (CENRAP). This coordination supported efforts to improve visibility at Class I areas in other states, both within CENRAP and in other regions.

The Nebraska Regional Haze SIP was partially approved and partially disapproved by EPA on July 6, 2012 (77 FR 40149). The portions of the SIP that were partially disapproved were those that addressed the BART determination at NPPD Gerald Gentleman Station and the long-term progress strategy that relied on that BART determination. As a result of this partial disapproval, EPA finalized a federal implementation plan relying on the Cross-State Air Pollution Rule as an alternative to BART for SO<sub>2</sub> emissions from Gerald Gentleman Station to address these deficiencies.

In this progress report, the NDEQ is providing documentation that illustrates Nebraska's progress with respect to visibility at Class I areas as per the requirements of 40 CFR 51.308(g). Each element is addressed individually and verifies that the strategy, as presented in the Nebraska Regional Haze SIP, is adequate to ensure that the impact on visibility impairment on Class I areas is minimized.

If you have any questions regarding this submission, please contact Shelley Schneider, Air Division Administrator, at (402) 471-4299 or Carrie Wiese, Grants Planning & Outreach Supervisor, at (402) 471-6624.

Sincerely,

Jim Macy  
Director, Nebraska Department of Environmental Quality

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# Executive Summary

## Regional Haze

Regional haze is defined as visibility impairment caused by the emission of air pollutants from numerous sources located over a wide geographic area. The Clean Air Act of 1990 (Title I, Sections 169A and 169B) declared a national goal to prevent any future - and to remedy any existing - impairment of visibility in 156 mandatory federal Class I areas, the impairment of which is the result of man-made air pollution. In 1999, the U.S. Environmental Protection Agency (EPA) issued regulations for the protection of visibility in Class I National Parks and Wilderness Areas. Revisions to the Regional Haze Rule were promulgated on July 6, 2005 and October 13, 2006. These regulations require states to establish goals for improving visibility by developing long-term strategies for reducing emissions of air pollutants that cause visibility impairment. The overall goal of the regional haze regulations is to achieve natural background visibility conditions in all Class I areas by the year 2064. The first interim goal period will end in 2018.

EPA and other agencies have been monitoring visibility in national parks and wilderness areas since 1988. The Regional Haze Rule requires the states - in coordination with EPA, the National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service, and other interested parties - to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment.

Five multi-state regional planning organizations (RPOs) work together to develop the technical basis for these plans. Nebraska is part of the Central Regional Air Planning Association (CENRAP). CENRAP is an organization of states, tribes, federal agencies and other interested parties that identifies regional haze and visibility issues and develops strategies to address them. CENRAP is one of the five RPOs across the U.S. and includes the states and tribal areas of Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, and Louisiana.

## Nebraska and the Regional Haze Rule

On July 13, 2011 the Nebraska Department of Environmental Quality (NDEQ) submitted to EPA its state implementation plan (SIP) for the initial goal period of the Regional Haze Rule. In developing this SIP, NDEQ worked with CENRAP to coordinate regional efforts to improve visibility at Class I areas within CENRAP and other RPOs. The Causes of Haze Assessment analysis conducted by Sonoma Technologies for CENRAP was referenced in the Nebraska SIP, and NDEQ anticipated that surrounding states may request consultation to address any requirements needed to meet reasonable progress at their Class I areas. These consultations were accomplished and, because of minimal impact from Nebraska sources, the State of Nebraska was not requested by any state - beyond the Best Available Retrofit Technology (BART) determinations - for any additional specific emissions reductions.

Modeling conducted to determine Nebraska's potential impact on Class I areas in other states showed the greatest contributions were to Class I areas in South Dakota, namely Badlands and Wind Cave National Parks. At these areas, nitrates comprised a slightly larger percentage than sulfates in the baseline year (2002). Since that time, mitigation of nitrates has been implemented in the BART permits at the Nebraska source associated with impact on visibility at those areas - NPPD Gerald Gentleman Station (GGS) - which is approximately 300 km away.

On July 6, 2012, EPA issued rulemaking to partially approve and partially disapprove the Nebraska Regional Haze SIP. EPA disapproved the portion of the SIP that addressed BART requirements for SO<sub>2</sub> emissions from GGS and the state's long-term strategy insofar as it relied on the SO<sub>2</sub> BART determination for GGS. This rulemaking also promulgated a federal implementation plan (FIP) relying on the Cross-State Air Pollution Rule (CSAPR) to satisfy BART for SO<sub>2</sub> at GGS. In response to this partial disapproval, the Attorney General for the State of Nebraska filed petition with the 8<sup>th</sup> Circuit Court of Appeals for review. On February 3, 2016, the 8<sup>th</sup> Circuit Court rejected this petition. No additional measures have been required at this time to reduce pollutant emissions.

At this time, no changes to the SIP are being proposed based on the following observations:

1. Analysis and trends presented in this progress report demonstrate reductions in SO<sub>2</sub>, NO<sub>x</sub>, and particulate matter (PM) emissions from major sources in Nebraska that were previously identified as potential contributors to visibility impairment at Class I areas in other states.
2. Nebraska is in attainment with respect to all National Ambient Air Quality Standards (NAAQS) for pollutants that contribute to regional haze and visibility impairment.
3. To date, regional haze five-year progress reports from states with Class I areas that have the potential to be impacted by emissions from Nebraska sources have made no mention of any impact from these sources.
4. States having Class I areas with the potential to be impacted by emissions from Nebraska sources have made no requests, to date, for emission reductions from sources within the state of Nebraska to meet reasonable progress goals for visibility at Class I areas within their borders.

The regional haze implementation process requires the submittal of a progress report five years following submittal of the initial regional haze implementation plan. Progress reports are also due five years following all subsequent comprehensive regional haze SIP revisions. This document constitutes NDEQ's five-year progress report on the initial regional haze SIP and fulfills all applicable obligations required by 40 CFR 51.308(g) and 51.308(h). The first comprehensive revision to the regional haze SIP is due July 31, 2018.

## **Regional Haze Rule and BART**

Per the Guidelines for BART Determinations Under the Regional Haze Rule (40 CFR Part 51, Appendix Y), BART determinations were conducted by NDEQ for three pollutants: PM, NO<sub>x</sub>, and SO<sub>2</sub>. Two facilities in the state were determined to be subject to BART: GGS and OPPD Nebraska City Station (NCS). These determinations were detailed in the state's regional haze SIP in submitted in July 2011.

EPA ruled that Nebraska's determination of BART for GGS was insufficient, as was the long-term strategy proposed insofar as it was based upon the BART determination deemed insufficient by EPA. EPA also determined that reliance on CSAPR was sufficient to address reasonable progress, and a FIP was promulgated on this premise. Because emissions at GGS are below the allotted SO<sub>2</sub> budget under CSAPR, no additional measures were required.

## **BART Permitting**

On February 16, 2008, the Nebraska Air Quality Regulations (Title 129 of the Nebraska State Code) were revised to incorporate numerous changes, included the establishment of Chapter 43: *Visibility Protection*. This chapter incorporates the Regional Haze Rule by reference and required owners or operators of stationary sources subject to BART to prepare and submit a BART determination in accordance with the Regional Haze Rule.

Per Title 129 Chapter 43 and the Regional Haze Rule, the Department is required to issue a permit to the source in accordance with Title 129 Chapter 17, which details the requirements for construction permits. Because BART determinations were required, the BART decisions (i.e. the BART permits) were included in Nebraska's Regional Haze SIP.

At present, two facilities in Nebraska have been issued BART permits: GGS and NCS. Details of these permits (conditions, limits, etc.) are discussed further in this report under item 1, *Status of Measures in SIP*.

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# Introduction

## **Summary of Progress Report Elements**

This report was assembled using the EPA guidance, *General Principles for the Five-year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and USEPA Regional Offices in Development and Review of the Progress Reports)* (EPA OAQPS, April 2013). The sections of this report follow the required elements listed in the guidance and 40 CFR 51.308(g)(1)-(7) and 51.308(h).

A summary of each of the elements in the five-year progress report follows.

## **Status of Control Strategies in the Regional Haze SIP, 40 CFR 51.308(g)(1)**

This element of the report is intended to give a qualitative description of the status of each of the emission reduction strategies in the Nebraska Regional Haze SIP. To summarize, controls identified in the Nebraska Regional Haze SIP have either been implemented or are expected to be implemented by 2018. Emission reductions are also being achieved by implementation of CSAPR.

## **Emissions Reductions from Regional Haze SIP Strategies, 40 CFR 51.308(g)(2)**

This element of the report is intended to give a quantitative description of the emission reductions being achieved by sources addressed in the Nebraska Regional Haze SIP. Emissions of the pollutants in the state that contribute to visibility impairment are consistently decreasing.

## **Visibility Progress, 40 CFR 51.308(g)(3)**

This element is not applicable to Nebraska, as there are no Class I areas within state borders.

## **Emissions Progress, 40 CFR 51.308(g)(4)**

This element of the report presents a description of the overall reduction in emissions for pollutants affecting visibility impairment at Class I areas from sources within the state. Analysis of the data further demonstrates that sources within the state are achieving progress in emission reductions, thus diminishing the potential to impact visibility in Class I areas in surrounding states.

## **Assessment of Changes Impeding Visibility Progress, 40 CFR 51.308(g)(5)**

This element of the report presents an assessment of any anticipated changes in conditions that would impede the progress currently being made. The State does not anticipate any significant changes that would impede its ability to contribute to visibility progress.

## **Assessment of Current Strategy, 40 CFR 51.308(g)(6)**

This element of the report presents an assessment of the ability of existing control measures as described in the Nebraska Regional Haze SIP and related control programs to achieve the 2018 visibility goals for Class I areas potentially impacted by sources in the state. Based on the emission reductions achieved to date, and the anticipation of continuing reductions and their positive effect on the reasonable progress goals in place, NDEQ asserts that the current Regional Haze SIP strategy is sufficient.

**Review of Visibility Monitoring Strategy, 40 CFR 51.308(g)(7)**

This element of the report presents a brief description of the monitoring strategy employed by the State, despite having no Class I areas within state boundaries. Nebraska continues to participate in the Interagency Monitoring of Protected Visual Environments (IMPROVE) program and meet its monitoring strategy requirements. Additionally, a new monitoring site is proposed to monitor SO<sub>2</sub> emissions at NPPD Sheldon Station to meet requirements of the 2010 1-hour SO<sub>2</sub> NAAQS Data Requirements Rule (DRR).

**Determination of Adequacy, 40 CFR 51.308(h)**

The NDEQ has determined that the Nebraska Regional Haze SIP is sufficient based on evidence presented in this report; thus the State makes the following negative declaration, per 40 CFR 51.308(h):

*Further revision of the existing Nebraska Regional Haze State Implementation Plan is not needed at this time.*

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# REGIONAL HAZE PROGRESS REPORT ELEMENTS

## I. 40 CFR 51.308(g)(1): Status of Control Strategies in the Regional Haze SIP

40 CFR 51.308(g)(1) requires that the five-year periodic report contain “a description of the status of implementation of all measures included in the implementation plan for achieving reasonable progress goals for mandatory Class I Federal areas both within and outside the State.”

There are a number of measures in place to meet the State’s obligations in support of reasonable progress goals for visibility at Class I areas in other states impacted by Nebraska sources. Because the state has no Class I areas within its borders, reasonable progress goals were not required to be developed.

### A. Clean Air Interstate Rule (CAIR)/CSAPR

When the regional haze consultation process began, states relied on CAIR to address the transport of air pollutants to downwind states. CAIR covered 28 eastern states plus the District of Columbia, and was designed to reduce SO<sub>2</sub> emissions by an estimated 5.4 million tons and NO<sub>x</sub> emissions by an estimated 2 million tons by 2015. In 2008, CAIR was remanded without vacatur so that EPA could remedy flaws in the rule. In 2010, EPA proposed CSAPR to replace CAIR. This rule would reduce emissions that contribute to ozone and/or fine particle pollution in other states.

Although Nebraska was not included in the final CAIR rulemaking, the state was subject to CSAPR, finalized in 2011, for control of fine particles (SO<sub>2</sub> and NO<sub>x</sub>). Emission reductions required by the rule would result in reductions of 71% in SO<sub>2</sub> and 52% in NO<sub>x</sub> over 2005 levels.

To address visibility at Class I areas affected by Nebraska sources covered by CSAPR, the State will continue to participate in consultation with other CENRAP states as necessary to address reasonable progress goals at Class I areas.

Currently, one source in Nebraska (GGS) is subject to CSAPR, and SO<sub>2</sub> emissions from this source to date have been below the allotted budget under the Group 2 Trading Program.

### B. Mobile Source Related Emissions and Standards

A significant number of mobile sources contribute to Nebraska’s overall emissions; thus, reducing emissions from these sources has contributed to improvement in visibility in the region. The mobile source rules discussed in the Nebraska Regional Haze SIP are addressed below, along with additional rules and programs.

#### 1) Tier 2 Vehicle Emissions Standards and Gasoline Sulfur Control Requirements

EPA set standards for tailpipe emissions for all passenger vehicles, including SUVs, minivans, vans, and pick-up trucks beginning in 2004. This rule also requires reduced levels of sulfur in gasoline. The new tailpipe standards were set at an average of 0.07 grams per mile for NO<sub>x</sub>. Vehicles weighing less than 6000 pounds were to be phased-in to this standard between 2004 and 2007, with medium-duty vehicles phased in in 2008.

During the period 2010-2014, Nebraska experienced a 6.3% reduction in NO<sub>x</sub> emissions and a 57.4% reduction in SO<sub>2</sub> emissions from on-road sources.

## 2) Tier 3 Motor Vehicle Emission and Fuels Standards

This rule was promulgated in April 2014 and final technical amendments were issued on April 22, 2016. The rule was designed to reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. Starting in 2017, Tier 3 sets new vehicle emissions standards and lowers the sulfur content of gasoline, considering the vehicle and its fuel as an integrated system, and will make emission control systems more effective for both existing and new vehicles and enable more stringent vehicle emissions standards. The tailpipe standards include different phase-in schedules that vary by vehicle class, but generally phase in between model years 2017 and 2025.

During 2010-2014, Nebraska experienced reductions in SO<sub>2</sub> and NO<sub>x</sub> (as noted in item 1 above), and an 11.4% reduction in PM<sub>2.5</sub> emissions from on-road sources.

## 3) Locomotives and Marine Engines

In June 2008, EPA finalized a rule to reduce emissions from diesel locomotives and marine propulsion engines. This rule included requirements to dramatically cut PM emissions from these types of engines. Amendments were issued in 2011 that revised and further clarified portions of the rule.

During the period of 2010-2014, Nebraska experienced reductions in PM emissions from non-road sources by approximately 25%.

## 4) Small Engines (Personal Watercraft; Lawn and Garden Equipment)

In 2008, EPA adopted new emission standards for marine spark-ignition engines and small land-based non-road engines, such as those in lawn and garden equipment. This rulemaking also adopted new evaporative emission standards for the equipment and vessels powered by these types of engines. These standards were designed to reduce volatile organic compound (VOC) and NO<sub>x</sub> emissions by approximately 35%, and applied starting with the 2011 model year for Class II engines (above 225 cc) and in the 2012 model year for Class I engines (less than 225 cc, used in non-handheld applications). Amendments to this rule were issued in 2010, 2011, and 2015.

During the period of 2010-2014, Nebraska experienced reductions of 19.7% in VOC emissions and 27.6% in NO<sub>x</sub> emissions from non-road sources.

## C. National Emission Standards for Hazardous Air Pollutants (NESHAP) Maximum Achievable Control Technology (MACT) Standards

NESHAPs promulgated by EPA have been incorporated into Title 129. These standards are designed to achieve reductions in HAPs as well as SO<sub>2</sub>, NO<sub>x</sub>, and PM.

A number of sources within the state are subject to the MACT standards and in 2012, EPA promulgated the NESHAP for Coal- and Oil-Fired Electric Utility Steam Generating Units-Subpart UUUUU. This rule has been incorporated by reference into Title 129 Chapter 28

*Hazardous Air Pollutants; Emissions Standards.* These standards were designed to reduce emissions from power plants and result in benefits to visibility.

Nebraska has sources subject to each of these standards, and the State has and will continue to incorporate these rules into Title 129 as they are promulgated by EPA.

During 2010-2014, Nebraska experienced reductions by 4.2% in SO<sub>2</sub> emissions and 20.9% in NO<sub>x</sub> from point sources; among electricity generating units (EGUs), emissions reductions were 4.7% for SO<sub>2</sub> and 32.5% for NO<sub>x</sub>.

D. Visibility Requirements under the New Source Review and Prevention of Significant Deterioration (PSD) Program

Because the entire state of Nebraska is currently in attainment with the NAAQS, the provisions of the PSD program as described in 40 CFR 52.21(o), apply.

The following subsections of 40 CFR 52.21, published July 1, 2009, have been incorporated by reference into Title 129 Chapter 19 *Prevention of Significant Deterioration of Air Quality (PSD)*:

- (b) (34), (35), (36), (37), and (38) Definitions related to clean coal technology demonstration projects;
- (e) Restrictions on area classifications; and
- (g) Re-designation.

40 CFR 52.21(o) *Additional Impact Analyses* (1) and (2) have been incorporated into Title 129 Chapter 19 § 022.

40 CFR 52.21(p) *Sources Impacting Federal Class I Areas* has also been incorporated by reference into Title 129 Chapter 19.

E. Measures to Mitigate the Impacts of Construction Activities

- 1) Nebraska has set forth criteria by which construction permits are issued to sources in the state. These criteria are outlined in Title 129 Chapter 17 *Construction Permits – When Required*. This information, as well as required forms, is also available on the NDEQ website.
- 2) Fugitive dust is addressed in Title 129 Chapter 32 *Dust; Duty to Prevent Escape Of*. Section 002 of this chapter specifically addresses construction activities and prevention of visibility impairment.
- 3) PM and other residual deposits not regulated under an air quality control permit are addressed in Nebraska Title 119 *Rules and Regulations Pertaining to the Issuance of Permits under the National Pollutant Discharge Elimination System (NPDES)*. Although these regulations address storm water discharges, NPDES permits require entities to develop a pollution prevention plan containing best management practices to control erosion and runoff, and many of the best management practices employed to prevent erosion and runoff are also effective for preventing windblown dust.

F. Agricultural and Forestry Smoke Management

Nebraska is required by 40 CFR 51.308(d)(3)(v)(E) to consider smoke management techniques for the purposes of agricultural and forestry management in developing a long term strategy for regional haze. Title 129 Chapter 30 *Open Fires* addresses this topic. Emissions estimates for fires within Nebraska remain unchanged since 2011 and comprise only a small portion of emissions of the pollutants of concern.

G. Enforceability of Emission Limitations and Control Measures

Nebraska is required by 40 CFR 51.308(d)(3)(v)(F) to ensure that emission limitations and control measures used to meet reasonable progress goals are enforceable. NDEQ has ensured that all emission limitations and control measures are enforceable by adopting the appropriate rules into Title 129.

Other measures include the BART limits. Guidelines for BART determination under the Regional Haze Rule are contained in 40 CFR 51, Appendix Y, and have been incorporated into Title 129 Chapter 43 *Visibility Protection*.

BART permits issued by NDEQ contain the applicable emission limits and compliance schedules, which are federally enforceable. Emissions limits and compliance verification requirements were incorporated into construction permits for two sources in Nebraska (see Table 1) and will be incorporated into each facility's Title V operating permit when they are reopened or renewed.

The BART determination for SO<sub>2</sub> at GGS was disapproved July 6, 2012 (77 FR 40149) and a FIP was promulgated. Details of the FIP are noted in Table 1.

**Table 1: BART Sources, Limits, and Progress In Nebraska**

Sources Subject to BART	Pollutant	Effective Date of Permit or Action	Determination/limit	Completion Date	Date Resumed Operation
NCS Unit #1	PM		Existing controls and requirements. Electrostatic precipitator subject to existing permit limit of 0.1 lb/MMBtu		
	NO <sub>x</sub>	February 26, 2009	Install low NO <sub>x</sub> burners with over-fired air. Meet presumptive level of 0.23 lb/MMBtu	April 14, 2011	April 14, 2011
	SO <sub>2</sub>		No additional controls. Source currently uses low-sulfur coal.		

**Table 1: BART Sources, Limits, and Progress In Nebraska**

Sources Subject to BART	Pollutant	Effective Date of Permit or Action	Determination/limit	Completion Date	Date Resumed Operation
GGS Units #1 & #2	PM		Existing controls and requirements. Baghouses subject to existing permit limit of 0.1 lb/MMBtu		
	NO <sub>x</sub>	May 11, 2010	Install low NO <sub>x</sub> burners with over-fired air. <sup>1</sup> Meet presumptive level of 0.23 lb/MMBtu.	July 9, 2012	December 30, 2012
	SO <sub>2</sub>		No additional controls. Source currently uses low-sulfur coal.		
		July 6, 2012 77 FR 40149	FIP promulgated. GGS was included in the CSAPR Group 2 Trading Program for SO <sub>2</sub> (40 CFR 52.39 part 97, Subpart DDDDD.) SO <sub>2</sub> Trading Budget Allotment is 65,052 tons/year (tpy) <sup>2</sup>		

<sup>1</sup> Unit #1 installation was completed and unit resumed operation on May 12, 2006; unit #2 installation was completed and unit resumed operation on July 9, 2012. Testing completed on December 30, 2012 demonstrated compliance with emissions limits.

Emissions at these facilities have decreased since implementation of the BART limits. Annual emissions of NO<sub>x</sub> have decreased by about 36% at NCS (8,830 tons in 2010 to 5,630 tons in 2014) and by about 38% at GGS (13,164 tons in 2010 to 8,155 tons in 2014), according to EPA Clean Air Markets Division (CAMD) data. Likewise, annual emissions of SO<sub>2</sub> at GGS have decreased by about 18% during this period (29,741 tons in 2010 to 24,484 tons in 2014) according to CAMD data. According to Nebraska emissions inventory data, PM reductions have also occurred at both facilities, with PM<sub>10</sub> reductions of about 7% and 20%, respectively, at GGS and NCS, and PM<sub>2.5</sub> reductions of about 9% at GGS.

**H. Nebraska Clean Diesel Grant Program**

In 2008, NDEQ established the Nebraska Clean Diesel Grant Program to distribute funding received by the EPA for the purpose of reducing diesel emissions. This funding was authorized by Congress in the Diesel Emissions Reduction Act, which was created as part of the Energy Policy Act of 2005.

Since its inception, the state's Clean Diesel Grant Program has received and awarded over \$1 million and achieved estimated reductions of 1,225 tons per year of diesel pollutants and 115,995 gallons of diesel fuel usage.

During the period of 2010-2014, Nebraska experienced reductions in SO<sub>2</sub>, NO<sub>x</sub>, and PM emissions from on-road sources (specific reductions are noted in item B.2).

I. Source Retirement and Replacement Schedules

Some sources in the state have been retired, announced retirement, and/or been modified since the regional haze SIP was submitted in 2011. The following retirement and replacement activities have occurred or are in currently in progress:

1) OPPD – North Omaha Station

As part of the utility's future generation plan, OPPD shut down three of its five coal-fired units at the North Omaha Station as of March 2016. OPPD received a one-year extension to meet the Mercury and Air Toxics Standards (MATS) Rule, as did the majority of other utilities nationwide.

The first of three units that make up OPPD's oldest main baseload plants, Unit 1, was retired on March 17, 2016. Unit 2 was retired on March 18, 2016, and Unit 3 was taken offline for coal-burning operation on March 25, 2016 but remains available to operate on natural gas until October 31, 2016, at which time it will be retired. The unit retirements are being staggered to ensure the safe cleanup of the highly-combustible residual coal and coal dust from the coal storage bunkers. Each bunker holds about a half-day's supply of coal, which will be used in the remaining units until the bunkers are empty; natural gas will also be used to stabilize the shut-down process and burn as much of the coal from the bunkers as possible.

The remaining Units 4 and 5 have been fitted with emissions control measures; dry sorbent and activated carbon will be injected into the plant's flue gas streams. In 2023, Units 4 and 5 will be refueled with natural gas. MATS compliance testing was accomplished for these units by late April 2016 and documentation is currently under review by NDEQ.

2) NCS

OPPD has installed stronger emissions controls on NCS Unit 1. Emissions control work, including the installation of three large storage silos, was initiated in October 2015. The silos are part of OPPD's compliance with the MATS rule for 2016, and hold the dry sorbent and the activated carbon that will be injected into the plant's flue gas streams. The dry sorbent, a powdered sodium (either sodium bicarbonate (baking soda) or trona), is injected and chemically reacts with acid gasses present in the flue gas, creating particles that are removed by the plant's electrostatic precipitator.

The activated carbon is used to control mercury emissions; mercury binds to the surface of the injected powdered carbon that is then removed by the electrostatic precipitator. Testing done at both plants has confirmed the injection process will reduce acid gases and mercury emissions below the limits established by the Boiler MATS rule. Performance testing was completed to verify compliance with the MATS, and the injection process was operational in February 2016.

Unit 2, which has been operational since 2009, has emissions controls that include scrubbers, high-efficiency burners, and a carbon injection system to reduce such pollutants as NO<sub>x</sub>, mercury, SO<sub>2</sub>, and ash.

### 3) Sheldon Station

Construction is underway to raise the stack heights of Units 1 and 2 at Sheldon Station in Hallam, NE. According to PSD permit modifications effective April 15, 2016, NPPD ceased operation of both units at this facility on April 18, 2016 until stack construction is completed. The stack modification to Unit 1 is scheduled to be completed by July 2, 2016 per a consent order between NDEQ and NPPD. Modeling was conducted to help determine necessary stack heights to, at a minimum, ensure attainment with the 2010 1-hour SO<sub>2</sub> NAAQS by NPPD's consultant, HDR, Inc.

Additionally, NPPD has entered into partnership with Monolith Materials, which will build a natural gas-based carbon black production facility adjacent to Sheldon Station. Sheldon will utilize hydrogen, a co-product of Monolith's carbon black process, to replace coal as a fuel source for Unit 2, with an expected completion date for the conversion by the end of 2019. Conversion of Unit 2 to hydrogen fuel will essentially eliminate SO<sub>2</sub> and other emissions from this unit. Following assessment of the conversion at Unit 2 and sufficient hydrogen supply from Monolith, NPPD also intends to convert Unit 1 to hydrogen fuel in the following years.

## J. Anticipated Net Effect on Visibility Resulting from Projected Changes to Emissions

In accordance with 40 CFR 51.308(d)(3)(v)(G), NDEQ has addressed the net effect on visibility that will result from changes projected by in emissions from point, area, and mobile sources. It is anticipated that emissions from EGUs will continue to decrease due to projected changes and retirements, and full implementation of new federal rules and standards as discussed here. Likewise, implementation of NO<sub>x</sub> controls at the EGUs subject to BART will result in emission reductions within the state.

## K. Recent Federal Rules

Since the development of the state's initial regional haze SIP, EPA has promulgated standards that are anticipated to yield additional emissions reductions from sources within the state.

### 1) MATS

On December 16, 2011, the EPA signed a rule to reduce emissions of toxic air pollutants from power plants. Specifically, the MATS rule will reduce emissions from new and existing coal and oil-fired electric utility steam generating units. The rule establishes power plant emission standards for mercury, acid gases, and non-mercury metallic toxic pollutants. Since issuance of the final rule, numerous updates have been promulgated containing technical corrections, startup and shutdown procedures, and requirements for electronic reporting. EPA estimates the MATS will reduce acid gas and SO<sub>2</sub> emissions from power plants.

Nine EGUs in Nebraska are subject to the MATS, and requests for one-year extensions were made for five of them, with EPA granting all extensions and allowing an extended

compliance deadline of April 16, 2016. NDEQ has received compliance demonstration and notification and is processing and reviewing the information at this time.

As of September 27, 2013, information about the applicability of the MATS to sources in Nebraska, along with links to fact sheets, EPA documents, and the reporting form, were posted on the NDEQ website as part of the Air Toxics notebook. The MATS standard is planned for incorporation into Title 129.

## 2) Portland Cement Air Toxics Standards

On February 12, 2013, EPA promulgated the NESHAP for Portland cement manufacturing. The rule will maintain dramatic reductions of acid gases, PM, and total hydrocarbons from existing cement kilns across the country, while ensuring that emissions from new kilns remain low. Existing kilns must have complied with the standards by September 9, 2015 and, if needed, may have requested an additional year for compliance. Nationwide, EPA anticipates the rule will reduce hydrochloric acid emissions by 96%, PM by 91%, and total hydrocarbons by 82%.

The *Standards of Performance for Portland Cement Plants*, 40 CFR 60 Subpart F, has been incorporated in Title 129, Chapter 18 *New Source Performance Standards and Emission Limits for Existing Sources*.

## 3) NAAQS

### **NO<sub>2</sub>**

On January 22, 2010, EPA strengthened the health-based NAAQS for NO<sub>2</sub>, establishing a new 1-hour standard at a level of 100 ppb. On February 29, 2012 EPA designated all areas of the country as “unclassifiable/attainment” for the 2010 NO<sub>2</sub> NAAQS.

### **SO<sub>2</sub>**

On June 22, 2010, the EPA revised the 1-hour SO<sub>2</sub> NAAQS to a level of 75 ppb. In March 2015, the U.S. District Court for the Northern District of California approved a consent decree to settle a lawsuit filed by the Sierra Club and Natural Resource Defense Council against EPA for failure to make additional attainment and nonattainment designations under the 1-hour SO<sub>2</sub> NAAQS. Under the consent decree, EPA agreed to promulgate rules making area designations in three “rounds” beginning in July 2016. Under the consent decree, EPA issued its 120-day letter denoting initial designations in Nebraska on February 16, 2016, indicating the intention to designate affected source areas as “unclassifiable/attainment” with the exception of the area around Sheldon Station, for which EPA has indicated an intended designation as “unclassifiable.”

On August, 2015, EPA issued the DRR for the 2010 1-hour SO<sub>2</sub> standard, which applies to sources emitting more than 2,000 tpy of SO<sub>2</sub> not already designated in attainment with the 1-hour NAAQS; in Nebraska, this includes Sheldon Station, North Omaha Station, and Whelan Energy Center. NDEQ is currently in the process of determining the characterization method and compiling required documentation for the air quality in these areas for submission to the EPA by July 1, 2016.

### **PM<sub>2.5</sub>**

On January 15, 2013, EPA strengthened the PM<sub>2.5</sub> NAAQS, reducing the level of the annual standard from 15 µg/m<sup>3</sup> to 12 µg/m<sup>3</sup>. On January 15, 2015, EPA designated the



entire state of Nebraska as “unclassifiable/attainment” (80 FR 2205). On April 22, 2016, the PM2.5 Infrastructure SIP was submitted to EPA.

## II. 40 CFR 51.308(g)(2): Emissions Reductions from Regional Haze SIP Strategies

40 CFR 51.308(g)(2) requires “a summary of the emissions reductions achieved throughout the State through implementation of the measures described in paragraph (g)(1) of this section.”

Emissions of NO<sub>x</sub> and SO<sub>2</sub> from point sources in Nebraska were demonstrated to have the most contributions to visibility impairment at two Class I areas in South Dakota - Badlands and Wind Cave National Parks - as detailed in the Nebraska Regional Haze SIP. Reductions in these two pollutants are demonstrated here with data from the state and local emissions inventories. These inventories have been utilized as opposed to the National Emissions Inventory (NEI) because they include smaller sources (e.g. those contributing less than what the Air Emissions Reporting Rule (AERR) requires) and, therefore, represent a more comprehensive emissions estimate for the state; additionally, data are available for the entire progress period through these inventories.

The inventory data show that SO<sub>2</sub> emissions decreased by 3.6% over the five-year period (2010-2014), all sources combined.

**Table 2: State Emissions Inventory - SO<sub>2</sub> (tons)**

Source	2002	2010	2014	% change 2010-2014
Point	105,086	67,963	65,081	
On-Road	2761	476	203	
Non-Road	8879	1142	607	
Wild Fires	0.3	0	110	
Prescribed Fires	7	0	1054	
<b>TOTALS</b>	<b>116,733.3</b>	<b>69,581</b>	<b>67,055</b>	<b>-3.6%</b>

Reductions in NO<sub>x</sub> emissions were also observed, with a 19.3% decrease for all sources combined.

**Table 3: State Emissions Inventory - NO<sub>x</sub> (tons)**

Source	2002	2010	2014	% change 2010-2014
Point	101,620	48,066	37,998	
On-Road	94,045	52,841	49,532	
Non-Road	108,281	105,406	76,336	
Wild Fires	0.4	0	245	
Prescribed Fires	3	0	2284	
<b>TOTALS</b>	<b>303,949.4</b>	<b>206,313</b>	<b>166,395</b>	<b>-19.3%</b>

In 2002, the continuous emission monitors (CEMs) from the 13 units reporting to CAMD averaged between 5,000 and 6,000 tons of SO<sub>2</sub> per month (60,000-72,000 tpy) and about 4,000

tons of NO<sub>x</sub> per month (48,000 tpy). Data from 2010 and 2014 show a reduction in emissions for both pollutants over the five-year period and are shown in Tables 4 and 5.

Reductions in EGU emissions over the progress period were 4.9% for SO<sub>2</sub> and 34.3% for NO<sub>x</sub>. BART construction permits for installation of low NO<sub>x</sub> burner equipment, including an overfire air port system, were issued to NCS in February 2009 and GGS in May 2010. Installation was completed at NCS, Unit 1, and the unit resumed operation on April 14, 2011. At GGS Units 1 and 2, installation was completed on July 9, 2012 and the units resumed operation on December 30, 2012.

**Table 4: Emissions Data - CAMD SO<sub>2</sub> (tons)**

Facility	2010	2014	% change 2010-2014
Gerald Gentleman Station	29,741	24,484	
Whelan Energy Center	2301	2899	
Lon D Wright Power Plant	1206	1595	
Nebraska City Station	14,296	16,134	
North Omaha Station	10,515	11,245	
Platte Generating Station	2365	1452	
Sheldon Station	3758	3242	
<b>Totals</b>	<b>64,182</b>	<b>61,051</b>	<b>-4.9%</b>

**Table 5: Emissions Data - CAMD NO<sub>x</sub> (tons)**

Facility	2010	2014	% change 2010-2014
Gerald Gentleman Station	13,164	8155	
Whelan Energy Center	1079	1005	
Lon D Wright Power Plant	449	384	
Nebraska City Station	8830	5630	
North Omaha Station	6765	5779	
Platte Generating Station	1201	710	
Sheldon Station	5824	2850	
<b>Totals</b>	<b>37,312</b>	<b>24,513</b>	<b>-34.3%</b>

### III. 40 CFR 51.308(g)(3): Visibility Progress

40 CFR 51.308(g)(3) requires that “for each mandatory Class I Federal area within the State, the State must assess the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of 5-year averages of these annual values.

- (i) The current visibility conditions for the most impaired and least impaired days;
- (ii) The difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions;
- (iii) The change in visibility impairment for the most impaired and least impaired days over the past 5 years”.

This element does not apply to Nebraska, as there are no Class I areas within state borders.

## IV. 40 CFR 51.308(g)(4): Emissions Progress

40 CFR 51.308(g)(4) requires “an analysis tracking the change over the past 5 years in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.”

In the Nebraska Regional Haze SIP, IMPROVE monitoring data for the 2000-2004 period was used to define baseline, natural, and 2018 conditions for each of the Class I areas potentially impacted by Nebraska sources.

Nebraska also relied upon Particulate Matter Source Apportionment Technology modeling (CAMx PSAT) to determine the state’s contribution to other Class I areas.

In conjunction with CENRAP and EPA Region 7, Nebraska installed one IMPROVE protocol sampler at Nebraska National Forest County near Halsey (in the central part of the state), and another at Crescent Lake National Wild Life Refuge in the Panhandle of the state. Both of these monitors were in operation beginning in 2002.

### A. Emissions Inventory

NDEQ compiles a statewide air emissions inventory and submits the data to EPA’s NEI database. States are required to report their emissions data to the NEI following the guidelines established in the AERR. This rule requires states to submit criteria air pollutant information every year as well as a more comprehensive set of data every three years. Nebraska also compiles a hazardous pollutant emissions inventory and voluntarily submits this data to the NEI.

Each year, NDEQ inventories all Class I major sources and Class II synthetic minor facilities. The provisions of the AERR allow smaller, low-emitting sources to be inventoried once every three years for inclusion in the NEI. The smaller facilities that Nebraska inventories on a triennial basis include those permitted as Low Emitters and No Permit Required sources.

Nebraska is required by 40 CFR 51.308(d)(4)(v) to conduct a statewide emissions inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory federal Class I area. To help evaluate our impact on these Class I areas, a baseline emissions inventory has been established and trends in more recent inventories have been reviewed. The following tables summarize the emission trends in Nebraska by pollutant in specified source categories:

**Table 6: Source Emissions for VOC (tons)**

Source	2002	2010	2011	2012	2013	2014
Point	9592	8373	7470	7511	7279	7053
On-Road	31,845	22,491	27,998	27,195	26,393	25,590
Non-Road	21,919	17,738	17,094	16,145	15,196	14,247
Wild Fires	6	0	2496	2496	2496	2496
Prescribed Fires	105	0	25,302	25,302	25,302	25,302

**Table 7: Source Emissions for NO<sub>x</sub> (tons)**

Source	2002	2010	2011	2012	2013	2014
Point	101,620	48,066	48,841	40,101	40,067	37,998
On-Road	94,045	52,841	57,340	54,737	52,135	49,532
Non-Road	108,281	105,406	104,873	95,361	85,848	76,336
Wild Fires	0.4	0	245	245	245	245
Prescribed Fires	3	0	2284	2284	2284	2284

**Table 8: Source Emissions for SO<sub>2</sub> (tons)**

Source	2002	2010	2011	2012	2013	2014
Point	105,086	67,963	75,048	65,673	69,583	65,081
On-Road	2761	476	206	205	204	203
Non-Road	8879	1142	872	784	695	607
Wild Fires	0.3	0	110	110	110	110
Prescribed Fires	7	0	1054	1054	1054	1054

**Table 9: Source Emissions for PM<sub>10</sub> (tons)**

Source	2002	2010	2011	2012	2013	2014
Point	11,744	7536	8964	9040	8493	8165
On-Road	3467	2216	2891	2817	2744	2671
Non-Road	6541	5570	5421	4992	4563	4135
Wild Fires	4	0	1155	1155	1155	1155
Prescribed Fires	43	0	11,555	11,555	11,555	11,555

**Table 10: Source Emissions for PM<sub>2.5</sub> (tons)**

Source	2002	2010	2011	2012	2013	2014
Point	2393	2529	2320	2660	3246	2921
On-Road	2975	1744	1789	1707	1626	1545
Non-Road	6373	5229	5116	4710	4305	3899
Wild Fires	3	0	979	979	979	979
Prescribed Fires	36	0	9792	9792	9792	9792

The point source data for the state shows a steady decrease in emissions over the last five years. VOC emissions have declined 15.8%, NO<sub>x</sub> emissions are down 20.9%, and SO<sub>2</sub> totals are lower by 4.2%. The particulate (both PM<sub>10</sub> and PM<sub>2.5</sub>) data show increased totals; however, this is attributed to the fact that data gathered from Omaha Air Quality Control (OAQC) has become more complete only for the more recent years.

Mobile source emissions for Nebraska were calculated by EPA for the NEI. The NEI on-road sources include emissions from on-road vehicles that use gasoline, diesel, and other fuels. These include light duty and heavy duty vehicle emissions from operation on roads, highway ramps, and during idling. The emission estimates are calculated by EPA using the Motor Vehicle Emission Simulator (MOVES) model. The NEI non-road sources include off-road mobile sources that use gasoline, diesel, and other fuels. These source types include locomotives, aircraft, marine, construction equipment, off-road vehicles and non-road equipment such as lawn and garden equipment.

The emission estimates calculated for mobile sources in 2002 showed a notable increase when compared to previous years. That increase was due to a change in mobile modeling data. Likewise, starting in 2011, modeling changes again produced much different estimates when compared to 2010. Overall, mobile emissions of the visibility impairing pollutants

(VOCs, NO<sub>x</sub>, SO<sub>2</sub>, and PM<sub>10</sub>) have decreased over the 2010-2014 span. The combined emissions for on- and off-road sources in 2010 were 207,880 tons compared to 173,321 tons in 2014, which represents a 16.6% decrease.

The state of Nebraska has always been largely agricultural; thus, significant emission contributions from that sector have impacted the state's emissions profile. Ammonia emissions are most notable. Table 11 shows the ammonia emission totals and trends for Nebraska. The point ammonia category data was taken from the state and local annual inventory submittals. The other source categories were compiled by EPA for the NEI. For Nebraska, agriculturally related activities - such as livestock waste and fertilizer applications - represent a majority of the ammonia totals. For these categories, estimates have only been calculated for the comprehensive triennial NEI reporting years (including 2011 and 2014; the 2014 totals have not been finalized). Evaluating ammonia emission trends is difficult because the estimation procedures for some of these sectors have been significantly improved in recent years, making comparisons to prior years difficult. In particular, for the largest source of ammonia in Nebraska, the animal waste ammonia emission calculation methodologies were changed and improved for the 2011 NEI.

**Table 11: Ammonia (tons)**

Source	2002	2010	2011	2012	2013	2014
Livestock	103,772		111,498			
Fertilizer Application	63,351		69,469			
Point	612	1929	767	542	2447	1366
On-Road	1035	766	841	817	793	769
Non-Road	44	65	65	62	59	56

EGUs emit the majority of the visibility impairing point source emissions in the state. Specifically, for the most recent complete set of emissions data (2014), the top seven (by emissions) power plants in the state have emitted 94.8% of the total SO<sub>2</sub> and 66.3% of the total NO<sub>x</sub> reported from all point sources combined. Tables 12-15 outline the emission trends by pollutant over the last five years for each of these top EGUs.

**Table 12: EGU SO<sub>x</sub> Emissions (tons)**

Facility	2010	2011	2012	2013	2014
Gerald Gentleman Station	29,741	29,113	26,391	28,430	24,482
Whelan Energy Center	2554	2996	2133	2131	2899
Lon D Wright Power Plant	1532	1400	1510	2106	2232
Nebraska City Station	14,296	17,335	16,766	16,911	16,134
North Omaha Station	10,514	14,069	11,377	12,237	11,250
Platte Generating Station	2365	2301	1813	1810	1452
Sheldon Station	3758	4063	2760	2836	3243
Totals	<b>64,760</b>	<b>71,277</b>	<b>62,750</b>	<b>66,461</b>	<b>61,692</b>

**Table 13: EGU NO<sub>x</sub> Emissions (tons)**

Facility	2010	2011	2012	2013	2014
Gerald Gentleman Station	13,165	13,116	9498	8985	8156
Whelan Energy Center	1218	1356	898	983	1017
Lon D Wright Power Plant	866	845	898	1043	1012
Nebraska City Station	8556	6290	6161	6428	5630
North Omaha Station	6701	6742	5572	6258	5778

**Table 13: EGU NO<sub>x</sub> Emissions (tons)**

Facility	2010	2011	2012	2013	2014
Platte Generating Station	1196	1170	918	845	746
Sheldon Station	5652	6294	3082	3500	2863
<b>Totals</b>	<b>37,354</b>	<b>35,813</b>	<b>27,027</b>	<b>28,042</b>	<b>25,202</b>

**Table 14: EGU PM<sub>10</sub> Emissions (tons)**

Facility	2010	2011	2012	2013	2014
Gerald Gentleman Station	234	238	221	244	217
Whelan Energy Center	111	127	92	114	124
Lon D Wright Power Plant	179	167	168	169	165
Nebraska City Station	568	617	350	374	454
North Omaha Station	188	206	191	208	454
Platte Generating Station	34	35	30	32	21
Sheldon Station	15	13	12	12	13
<b>Totals</b>	<b>1329</b>	<b>1403</b>	<b>1064</b>	<b>1153</b>	<b>1448</b>

**Table 15: EGU PM<sub>2.5</sub> Emissions (tons)**

Facility	2010	2011	2012	2013	2014
Gerald Gentleman Station	94	96	90	98	86
Whelan Energy Center	40	54	40	52	56
Lon D Wright Power Plant	105	101	101	100	99
Nebraska City Station	31	34	123	149	199
North Omaha Station	63	75	71	87	296
Platte Generating Station	12	13	11	12	7
Sheldon Station	1	1	1	1	2
<b>Totals</b>	<b>346</b>	<b>374</b>	<b>437</b>	<b>499</b>	<b>745</b>

During the 2010-2014 span, Whelan Energy Center in Hastings added a 220 MW coal-fired unit. This new unit began initial operation on October 26, 2010 and started fully operating in March of 2011.

The predominant emission totals for these top seven EGUs show a decrease in SO<sub>2</sub> emissions of 4.7% and a much larger decrease of 32.5% in the NO<sub>x</sub> totals.

## B. CAMD

The top seven EGUs also report to CAMD, and emissions data shown below illustrate the downward trend in emissions for the progress period:

**Table 16: CAMD SO<sub>2</sub> (tons)**

Facility	2010	2011	2012	2013	2014
Gerald Gentleman Station	29,741	29,113	26,438	28,430	24,484
Whelan Energy Center	2301	2944	2133	2131	2899
Lon D Wright Power Plant	1206	1117	1095	1469	1595
Nebraska City Station	14,296	17,334	16,766	16,911	16,134
North Omaha Station	10,515	14,069	11,377	12,237	11,245
Platte Generating Station	2365	2301	1813	1810	1452
Sheldon Station	3758	4062	2760	2835	3242
<b>Totals</b>	<b>64,182</b>	<b>70,940</b>	<b>62,382</b>	<b>65,823</b>	<b>61,051</b>

**Table 17: CAMD NO<sub>x</sub> (tons)**

<b>Facility</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Gerald Gentleman Station</b>	13,164	13,117	9496	8984	8155
<b>Whelan Energy Center</b>	1079	1343	902	968	1005
<b>Lon D Wright Power Plant</b>	449	449	441	399	384
<b>Nebraska City Station</b>	8830	6289	6161	6427	5630
<b>North Omaha Station</b>	6765	6742	5572	6258	5779
<b>Platte Generating Station</b>	1201	1176	923	803	710
<b>Sheldon Station</b>	5824	6535	3194	3616	2850
<b>Totals</b>	<b>37,312</b>	<b>35,651</b>	<b>26,689</b>	<b>27,455</b>	<b>24,513</b>

## **V. 40 CFR 51.308(g)(5): Assessment of Changes Impeding Progress**

40 CFR 51.308(g)(5) requires “an assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.”

As demonstrated in this report, Nebraska has experienced an overall decrease in emissions from anthropogenic sources within the state over the progress period 2010-2014. In summary, most emissions reductions achieved are generally ahead of schedule or greater than the 2018 projections noted in the Nebraska Regional Haze SIP. No changes in anthropogenic emissions within the state have occurred that have limited or impeded progress in reducing pollutant emissions and improving visibility.

## **VI. 40 CFR 51.308(g)(6): Assessment of Current Strategy**

40 CFR 51.308(g)(6) 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.”

During the Regional Haze SIP planning process, Nebraska worked through CENRAP to coordinate regional efforts to reduce visibility impacts at Class I areas in CENRAP states. For areas outside the CENRAP region, Nebraska consulted directly with other states that may have required emission reductions from Nebraska sources in order to improve visibility at their Class I areas. As part of the CENRAP planning process, regional modeling was performed to show the impact on several surrounding Class I areas from Nebraska emissions sources.

As noted in the Nebraska Regional Haze SIP, the EPA noted in its Proposed Rule on the Nebraska Regional Haze SIP (77 FR 12770) that two Class I areas in South Dakota were identified as having the most impact from Nebraska sources: Badlands National Park and Wind Cave National Park. Other Class I areas identified in the SIP were demonstrated to have negligible impact from the State. As stated in 77 FR 12770,

“Nebraska’s contribution to all other Class I areas was considerably less, and in no case greater than 1.9 percent in 2002 according to the PSAT modeling.”

BART determinations conducted during Nebraska’s regional haze SIP development process resulted in two sources identified as subject to BART: NCS and GGS. Contributions to visibility impairment from these sources were analyzed to determine their impact on Class I areas outside of the state, as illustrated in Table 18.

**Table 18: Contribution to Visibility Impairment at Class I Areas by Nebraska Sources Subject to BART**

Facility Name	Emission Units Subject to BART	Pollutants Evaluated in BART Determination	98th Percentile Contribution (dV)	Class I Area & Year of Impact
NCS	Unit #1	PM, NO <sub>x</sub> , SO <sub>2</sub>	0.933	Hercules Glades, MO (2001)
			0.556	Hercules Glades, MO (2002)
			0.686	Wichita Mtns, OK (2003)
GGS	Units #1 & #2	PM, NO <sub>x</sub> , SO <sub>2</sub>	2.845	Badlands, SD (2001)
			2.828	Badlands, SD (2002)
			3.121	Badlands, SD (2003)

SOURCE: Table 10.3, Nebraska Department of Environmental Quality State Implementation Plan for Regional Haze and BART, June 30, 2011

The remainder of this section will address visibility at Class I areas noted in the table above, as well as other Class I areas, and the contributions to visibility impairment from sources within Nebraska.

**A. South Dakota: Badlands and Wind Cave National Parks**

Badlands and Wind Cave National Parks are approximately 300km away from GGS. Per the 2002 data at these Class I areas, analysis of pollutants affecting visibility demonstrated that nitrates comprised a slightly larger percentage than sulfates; therefore, mitigating nitrates, as has been done in the BART permits, is an appropriate strategy to improve visibility in these areas.

Nebraska consulted directly with the state of South Dakota several times through phone and email correspondence during development of the SIP, and provided copies of the draft BART package for GGS because of its potential to impact visibility at Badlands and Wind Cave. Nebraska’s BART plans were included in the South Dakota SIP (<http://denr.sd.gov/des/aq/publicnotices/RegionalHazeSIPDraft.pdf>) for which EPA issued a final rule of approval on April 26, 2012 (77 FR 24845).



Sources in Nebraska have been successful in achieving emission reductions, as demonstrated and discussed in previous elements of this report. Likewise, South Dakota Class I areas have demonstrated improvements in visibility as shown in Table 19.

**Table 19: Visibility Improvements at Badlands and Wind Cave National Parks, South Dakota**

		Baseline	2009-2013	Improvement (dV)
<b>Badlands</b>	20% most impaired days	17.1	15.7	1.4
	20% least impaired days	6.9	5.8	1.1
<b>Wind Cave</b>	20% most impaired days	15.8	14.1	1.7
	20% least impaired days	5.1	3.9	1.2

SOURCE: Tables 3-9 and 3-11, South Dakota's Regional Haze State Implementation Plan Five-year Progress Report, December 18, 2015; Tables 3-10 and 3-12, South Dakota's Regional Haze State Implementation Plan Five-year Progress Report, December 18, 2015

As noted in South Dakota's Five-year Regional Haze Progress Report, while visibility progress is being made at both Class I areas, events outside of state borders - such as large wildfires and certain prescribed fires in-state - continue to have the largest impact on visibility. There were no requests from South Dakota for additional emissions reductions from sources in Nebraska to support reasonable progress for these Class I areas; neither GGS nor any other sources in Nebraska were mentioned as contributing to visibility concerns.

**B. Other Class I Areas Examined for Potential Impact from Nebraska Sources**

Visibility impairment at Class I areas other than those in South Dakota were determined in EPA-approved portions of the Nebraska Regional Haze SIP to be minimal or negligible. These areas are discussed here in the interest of completeness of the five-year progress report.

CENRAP identified early in its process that Nebraska was in its area of influence for nitrogen oxides. The central states determined whether a state was a contributor based on a combined analysis of four methodologies:

1. Positive Matrix Factorization (PMF)/Trajectories
2. Area of Influence (AOI)
3. PM Source Apportionment (PSA)
4. Q/D (the sum of annualize maximum hourly pollutant emissions (tpy) divided by distance (km) to Class I area)

If a state was found to be a major contributor in at least three of the four approaches, the central states concluded it was appropriate to include that state as a major contributor. Because Nebraska was found to only be a contributor based upon the AOI, and therefore did not meet the criteria of meeting at least three of the four methodologies, it was excluded

as a major contributing state to visibility impairment in Class I areas in Missouri and Arkansas.

1) Missouri: Hercules Glades Wilderness Area

This Class I area is approximately 580 km from NCS. The PSAT modeling tool was used to determine the source of apportionment of light extinction-causing pollutants, and this model indicated that sulfates from elevated point sources was the most significant contributor.

NCS Unit 1 contributed 0.933 dV of visibility impairment at this Class I area, of which only 0.32% could be attributed to PM. This would indicate that the predicted impact is from a pollutant or pollutants other than PM. The modeling confirmed that the direct PM emissions from NCS do not significantly contribute to visibility impairment. As demonstrated in the Nebraska Regional Haze SIP, Nebraska BART sources have an insignificant emission impact potential for the Hercules Glades Class I area. According to the Causes of Haze Assessment analysis conducted by Sonoma for CENRAP, sulfates are coming from the east, south, and south east of Hercules Glades Area, which further support the conclusion that strategies to reduce sulfate emissions from NCS would have insignificant impact on visibility improvement at this Class I area.

In Missouri’s Regional Haze SIP (2009), Nebraska was identified as a member of CENRAP and, in Missouri’s Five-year Progress Report (2014), as one of several states in which there were visibility data voids. However, there were no requests from Missouri for additional emissions reductions from sources in Nebraska to support reasonable progress for their Class I areas.

Improvements in visibility have been demonstrated for the Hercules Glades area as noted in Table 20.

**Table 20: Visibility Improvement at Hercules Glades Wilderness Area, Missouri**

Hercules Glades	Baseline	2008-2012	Improvement (dV)
20% most impaired days	26.7	23.5	3.2
20% least impaired days	12.8	11.3	1.5

SOURCE: Tables 7 and 8, State of Missouri Regional Haze Plan Five-year Progress Report, August 28, 2014

2) Oklahoma: Wichita Mountains Wilderness Area

Wichita Mountains Wilderness Area is the only Class I area within the state of Oklahoma, and is approximately 640 km south of the closest EGU in Nebraska - NPPD Beatrice Power Station - and 805 km south/southwest of NCS.

In 2003, NCS Unit 1 was determined to have contributed 0.686 dV to visibility impairment at this Class I area. As identified in the document *Oklahoma’s Wichita Mountains Wilderness Area Regional Haze Planning* (Appendix 11.3, Nebraska Regional Haze SIP), Oklahoma identified early in its process that Nebraska was in its

area of influence for NO<sub>x</sub>. However, as detailed in Oklahoma's Regional Haze SIP (2010), the total contribution from Nebraska to visibility impairment at this Class I area was minimal and was projected to decrease from 1.11 mm<sup>-1</sup> (2002) to 0.81mm<sup>-1</sup> (a reduction of approximately 27%) by the year 2018.<sup>1</sup>

Only BART controls for NO<sub>x</sub> on the NPPD and OPPD facilities along the eastern border of Nebraska were ultimately identified as requirements. Nebraska provided copies of the draft BART permits packages to the state of Oklahoma while on public notice. Oklahoma did not provide any comment, nor did the State request additional controls for the initial planning period.

As of the date of this report, Oklahoma has not yet released its Regional Haze Five-year Progress Report; visibility values given in Table 21 were acquired from the Oklahoma Regional Haze Implementation Plan and the 2014 IMPROVE Summary Data for the WIMO1 monitoring site in the Wichita Mountains Class I area.

**Table 21: Visibility Improvement at Wichita Mountains Wilderness Area, Oklahoma**

Wichita Mountains	Baseline (2002)	2014 IMPROVE	Improvement (dV)
20% most impaired days	23.8	21.16	2.64
20% least impaired days	9.8	9.26	0.54

SOURCE: Tables II-11 and II-12, Oklahoma Regional Haze Implementation Plan, February 2, 2010; IMPROVE Summary Data for 2014, <http://views.cira.colostate.edu/web/>

### 3) Colorado: Rocky Mountain National Park (RMNP)

During the regional haze SIP planning and consultation and the BART permit development processes, Nebraska shared information on emissions inventories, modeling, and the draft BART package for GGS, due to the facility's potential to contribute to visibility impairment at Class I areas in Colorado. The Colorado Department of Public Health and Environment expressed concern in meeting visibility improvement goals at one specific area, RMNP. This Class I area is approximately 430 km southwest of GGS.

During development of the Nebraska Regional Haze SIP, the State of Colorado was consulted and directed the NDEQ to a website ([www.coha.dri.edu](http://www.coha.dri.edu)) for data on baseline, modeling projections, source apportionment, and meteorological conditions for the region.

Meteorological analysis available on this website described the wind patterns at RMNP as predominantly from the northwest (nighttime), and from the southeast (daytime). This suggests that potential for significant impact to this Class I area from Nebraska sources was not likely.

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<sup>1</sup> Oklahoma Regional Haze SIP, February 2, 2010, Table VIII-10.

In the draft version of Colorado’s Five-year Regional Haze Progress Report available on the Colorado.gov website, Nebraska was not listed as a contributor to visibility impairment in their state, nor did the State request additional emissions reductions from sources in Nebraska to support reasonable progress for their Class I areas. RMNP has demonstrated improvements in visibility during the progress period, as shown in Table 22.

**Table 22: Visibility Improvement at RMNP, Colorado**

Rocky Mountain NP	Baseline	2009-2013	Improvement (dV)
20% most impaired days	13.8	11.84	1.96
20% least impaired days	2.28	1.58	0.7

SOURCE: Table 2, Colorado Regional Haze Plan Five-Year Progress Report, November 19, 2015

The visibility impact from Nebraska sources affecting other Class I areas detailed in the Nebraska Regional Haze SIP was demonstrated to be less than 0.1 dV in the PSAT modeling. States were consulted during the SIP development process and there were no requests for additional emission reductions, other than BART determinations, from Nebraska sources to meet other states’ reasonable progress goals.

Demonstrated emissions reductions in Nebraska and visibility improvement observed at the Class I areas with stated potential to be impacted by Nebraska sources illustrate that the strategies currently in place in the Nebraska Regional Haze SIP are sufficient to meet the State’s obligations in support of the reasonable progress goals for Class I areas in other states impacted by Nebraska sources.

## VII. 40 CFR 51.308(g)(7): Review of Visibility Monitoring Strategy

40 CFR 51.308(g)(7) requires “a review of the State’s visibility monitoring strategy and any modifications to the strategy as necessary.”

### IMPROVE Monitoring

Although Nebraska has no Class I areas within its borders, visibility monitoring conducted at two IMPROVE monitoring sites, described below and shown in Figure 1, is employed to facilitate regional haze and pollution transport studies. The NDEQ provides administrative oversight of the operation of the IMPROVE sites at Halsey National Forest and, previously, at Crescent Lake National Wildlife Refuge. All monitors described have been operated on a continuous basis for PM<sub>2.5</sub> and differentiate the particles to elucidate the composition. Data summaries for these monitors can be found at <http://views.cira.colostate.edu/web/>.

#### Nebraska National Forest (ID: NEBR1)

The IMPROVE monitoring site at Nebraska National Forest near Halsey has been in operation since 2002, and is located in the Sandhills of central Nebraska. The primary purposes of the site are to evaluate regional haze and the contributions that may impact Class I areas. The Nebraska National Forest IMPROVE site is designed to be regional in scale, and its purpose is to elucidate background and transport of pollution into and out of the state.

Crescent Lake Wild Life National Refuge (ID: CRES1)

(NOTE: This monitoring site was recently taken out of operation; however, data from the site is available through 2015.)

The IMPROVE monitoring site at Crescent Lake Wild Life National Refuge in the panhandle of Nebraska serves as another background and transport site for evaluating background levels in rural Nebraska as well as understanding regional transport patterns. Like the Nebraska National Forest site, it began operation in 2002.

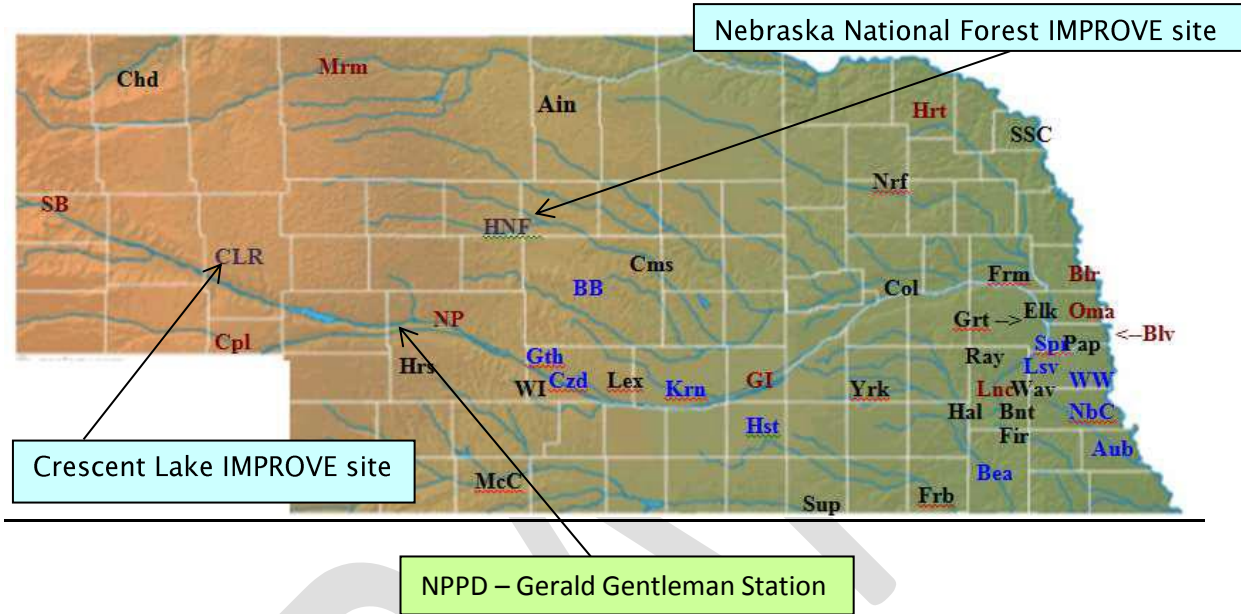


Figure 1: IMPROVE monitor locations in Nebraska. The location of GGS, as the source determined to have impacts on Class I areas in South Dakota (and the only source deemed significant in the Nebraska Regional Haze SIP) is shown for reference.

### Ambient Monitoring

Ambient air monitoring is conducted at sites throughout Nebraska for the following pollutants:

- PM
- ozone
- carbon monoxide
- SO<sub>2</sub>
- total reduced sulfur
- pollutant deposition
- regional haze

These monitoring activities are carried out or administered through the NDEQ with the Douglas County Health Department and the Lincoln Lancaster County Health Department operating the air monitoring sites in the Omaha and Lincoln metropolitan areas, respectively.

Ambient air quality data collected by the Nebraska Ambient Air Monitoring Network is available for use by governmental agencies as well as other public and private parties. Ongoing and potential uses for ambient air monitoring data include:

- Confirmation of attainment with the NAAQS and the Nebraska Air Quality standards set forth in Title 129;
- Local air quality modeling studies to evaluate local pollutant levels, potential emission source impacts, and monitoring needs;
- Regional and larger scale studies of potential pollutant impacts and pollutant precursor formation;
- Local, regional and national public health evaluations;
- Air quality regulation and standard evaluations;
- The calculation of Air Quality Index (AQI) values for the Omaha and Lincoln metropolitan areas; and
- Submittal to the national AIRNow web site, which provides a summary of air quality throughout the United States.

### Class I Areas Impacted by Nebraska Sources

As discussed above in section VI, the Class I areas most potentially impacted by emissions from Nebraska sources are the Badlands and Wind Cave National Parks.

Monitors in these two Class I areas demonstrated improvements in visibility over the progress period noted in South Dakota's progress report (2009-2013) as well as continued improvement, as noted by 2014 values for both Class I areas (Table 23).

**Table 23: Visibility Improvement at Badlands and Wind Cave National Parks**

YEAR	Haze Index View (dV)			
	Badlands 20% most impaired days	Badlands 20% least impaired days	Wind Cave 20% most impaired days	Wind Cave 20% least impaired days
Baseline 2000-2004	17.1	6.9	15.8	5.1
2009-2013	15.7	5.8	14.1	3.9
<b>DIFFERENCE</b>	-1.4	-1.1	-1.7	-1.2
2014 IMPROVE	14.2	5.6	13.7	3.2
<b>DIFFERENCE from baseline</b>	<b>-2.9</b>	<b>-1.3</b>	<b>-2.1</b>	<b>-1.9</b>

SOURCE: Baseline (2000-2004) and progress period (2009-2013) data from South Dakota Regional Haze Five-Year Progress Report, Dec 2015; 2014 (IMPROVE) data from the Visibility Information Exchange Web System (VIEWS) IMPROVE Aerosol Data, <http://views.cira.colostate.edu/web/>

IMPROVE monitors in Nebraska, likewise, showed reductions in concentrations of pollutants contributing to light extinction at Badlands and Wind Cave National Parks, as well as improvements in haze index values during the progress period 2010-2014 (Table 24).

**Table 24: Visibility Improvement at IMPROVE Monitor Sites in Nebraska**

YEAR	Haze Index View (dV)			
	Crescent Lake 20% most impaired days	Crescent Lake 20% least impaired days	NE Natl Forest 20% most impaired days	NE Natl Forest 20% least impaired days
2010	17.6	5.9	19.7	5.9
2014	16.4	4.6	17	5.8
<b>DIFFERENCE</b>	<b>-1.2</b>	<b>-1.3</b>	<b>-2.7</b>	<b>-0.1</b>

SOURCE: IMPROVE data from the Visibility Information Exchange Web System (VIEWS) IMPROVE Aerosol Data, <http://views.cira.colostate.edu/web/>

In conclusion, improvements in visibility within the state of Nebraska and at Class I areas in South Dakota demonstrate that the current strategies in place in the Nebraska Regional Haze SIP are sufficient to support reasonable progress.

### **VIII. 40 CFR 51.308(h): Determination of Adequacy**

40 CFR 51.308(h) requires: "...At the same time the State is required to submit any 5-year progress report to 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 data and analysis presented in this report, NDEQ has determined that the current strategy, as established in the Nebraska Regional Haze SIP, continues to be adequate to achieve visibility improvement and emissions reductions goals set forth by the Regional Haze Rule. **Therefore, Nebraska submits a negative declaration, i.e., no revisions of the 2011 SIP are necessary at this time.**