State of Nebraska

Regional Haze
State Implementation Plan (SIP) Revision
For the Second Implementation period
(2018-2028)

NEBRASKA

DEPT. OF ENVIRONMENT AND ENERGY

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(DATE)

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Executive Summary

This state implementation plan (SIP) revision addresses the second Regional Haze (RH) implementation period. Nebraska is currently operating under a Best Available Retrofit Technology (BART) and long-term strategy federal implementation plan (FIP) for Nebraska Public Power District's (NPPD) Gerald Gentleman Station (GGS) Units 1 and 2, established for the first implementation period. Nebraska confirms that, as the Environmental Protection Agency (EPA) found, participation in the Cross-State Air Pollution Rule (CSAPR) satisfies BART for GGS Units 1 and 2. This SIP revision also serves as a progress report pursuant to 40 CFR 51.308(f)(5).

Nebraska used an Area of Influence analysis created by the Ramboll Group, on behalf of the Central States Air Regulatory Agencies (CenSARA), to identify three Class I areas which have the potential for visibility to be affected by Nebraska emission sources. Two sources – GGS and Nebraska City Station (NCS) – were identified for further evaluation and submitted information and Comprehensive Air Quality Model with Extensions (CAMx) photochemical modeling at the request of the State.[1] Based on the more accurate photochemical modeling provided by the sources, Nebraska determined that GGS and NCS are not significant sources of visibility impairment at any Federal Class I area and, as such, do not require a four-factor analysis for additional controls. Moreover, estimated emission reductions from GGS and NCS would not result in significant improvement to visibility and no states have requested additional emission reductions from Nebraska.[2] Therefore, Nebraska found it was unnecessary for either source to implement any additional emission control measures in the long-term strategy for the second RH implementation period. The measures currently included in Nebraska's long-term strategy, including those established by EPA's FIP for the first implementation period, are sufficient to ensure reasonable progress on visibility in the second implementation period. Further reduction of emissions from Nebraska is not necessary to ensure continued reasonable progress in the second implementation period.

Although additional emission reductions from Nebraska are not necessary for reasonable progress to continue, and neither GGS nor NCS represent significant sources of visibility impairment, Nebraska proceeded to evaluate the reasonableness of additional emission control measures for GGS and NCS within the framework of the four-factor analysis to perform a robust and thorough reasonable progress analysis. In so doing, Nebraska concluded that even if further emission reductions by GGS or NCS were necessary to make reasonable progress in

[1] See **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS (Nov. 2, 2020); see **Appendix H-2.2** - NPPD Amended Supplemental Regional Haze Response to NDEE ICR for GGS (February 15, 2021)
[2] See **Appendix D-7** - State Consultation Log.

the second implementation period, none of the controls evaluated would be reasonable. To summarize:

- Neither fuel switching to lower-sulfur coal nor additional fine-tuning the existing nitrogen oxides (NOx) controls would be feasible – either for GGS or NCS.
- Repowering with gas, even if technically feasible, would make the units at both GGS and NCS uneconomic to operate and would be equivalent to shutdown.
- Requiring wet flue gas desulfurization (WFGD) or spray dry absorbers (SDA) (collectively, "scrubbers") would be too costly at both GGS and NCS and, in the case of GGS, unaffordable considering (a) the impact the cost of these controls would have on GGS rates and NPPD's customer base and (b) the fact that the annual cost of these controls far exceed expected annual revenues for these units.
- None of the evaluated additional controls for sulfur dioxide (SO_2) would produce significant improvement in visibility for any Class I area.

Emissions from Nebraska have declined since the first implementation period. So too have emissions from Nebraska's electricity generating unit (EGU) fleet, and they are projected to decline further in the second implementation period. For example, certain coal-fired generating units (North Omaha Station (NOS) Units 4 and 5) will be repowered to burn lower-emitting gas.[3] In addition, emissions from GGS and NCS are projected to decline further by 2028, as generation by coal-fired units in the Southwest Power Pool (SPP) is displaced by renewable resources.[4] With respect to GGS, such projections are backed up by a commitment by NPPD to an annual SO_2 emissions limit that will ensure that progress towards the national visibility goal remains ahead of schedule.[5] Finally, visibility conditions at the Class I areas potentially impacted by Nebraska sources have improved at a rate faster than the applicable (adjusted) uniform rate of progress (URP), and visibility conditions at these areas are projected to be better than the reasonable progress goals (RPGs) set for 2028 without emission reductions from either GGS or NCS. These are significant factors that must be considered in determining whether additional controls on GGS and NCS are "necessary" to make reasonable progress on visibility in the second implementation period.

[3] In August 2022, the OPPD Board of Directors met to address the District's previous resolutions that addressed retirement of coal-fired units at NOS in light of the backlog in the federally-regulated generation interconnection process and related issues; the Board discussed these issues (https://www.oppd.com/media/318397/2022-8-august-board-minutes.pdf) and approved a new resolution (https://www.oppd.com/media/318375/2022-8-august-resolution-6518-nos-current-state-extension.pdf) to address the completion of new natural gas-fired plants and retirement of the NOS Units 4 and 5. See also **Appendices I-3.1** and **3.2**, OPPD Board of Directors Actions.

[4] Data on the inverse correlation between wind generation and coal-fired generation in SPP, the long-term trends in which wind generation is displacing coal-fired generation in SPP, the cost differential driving such displacement, and the expected future addition of wind generation to the SPP market in the second implementation period are set forth in **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS (November 2, 2020) pages 32-36.

[5] Upon renewal of the current Title V permit for GGS, NPPD has committed to include in its application (due October 2024) a request to incorporate this limit and all related conditions into GGS's Title V permit. This Memorandum of Understanding is included as **Appendix H-1.8**.

Nebraska does not consider the fact that visibility is projected to be better than the RPGs set by South Dakota or New Mexico for 2028, or better than the URP glidepath in 2028, as a "safe harbor" that would avoid a rigorous reasonable progress analysis. As described below, Nebraska has performed a rigorous analysis that considers:

- current and projected visibility conditions,
- the default adjusted URP glidepaths presented by EPA and the Western Regional Air Partnership (WRAP),
- the needs identified by neighboring states to achieve their RPGs,
- the emissions reductions by Nebraska achieved and projected as a result of other programs,
- the emissions reductions (at NOS) and limitations (at GGS) that will be implemented in the second implementation period,
- the insignificant impact that Nebraska point sources have on visibility in Class I areas,
- the negligible change in visibility that would occur with any additional controls on Nebraska's coal-fired EGUs,
- the analysis of additional controls (using the factors specified in the RH Rule) to determine whether any would be reasonable, and
- other factors, as set forth in 40 CFR 51.308(f)(2)(iv), which includes measures to mitigate the impacts of construction activities, smoke management techniques, enforceability of emissions limitations and control measures, and the anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy.

On the basis of this comprehensive analysis, and exercising the discretion conferred upon states by both Congress in the Clean Air Act and by EPA in the RH Rule, Nebraska has determined what, if any, revisions to the long-term strategy are necessary for the second implementation period. Nebraska concludes that no additional controls are necessary to include in the long-term strategy for the second implementation period, and that no additional controls on Nebraska sources, including GGS and NCS, would be reasonable. These sources, and others in Nebraska, may be evaluated again in the third implementation period (2028-2038).

Introduction

The RH Rule requires review and revision to SIPs in each implementation period. This revision to Nebraska's RH SIP addresses the requirements of section 169A of the Clean Air Act (CAA) and 40 CFR 51.308 with respect to visibility conditions at Class I areas which may be affected by emissions from Nebraska sources. This revision contains the core federal RH Rule requirements, including:

- a long-term strategy for regional haze;
- a monitoring strategy; and
- a statewide emissions inventory.

The RH Rule, issued by the EPA in 1999 and revised in 2017, was designed to protect visibility in national parks and wilderness areas. These are known as Federal Class I areas[6] ("Class I areas") and consist of national parks larger than 6,000 acres and wilderness areas larger than 5,000 acres. Nebraska does not contain any Class I areas. The RH Rule requires states with Class I areas to apply a 60-year time frame when establishing RPGs. These regulations effectively set a 2064 deadline for states to attain Congress' national visibility goal of achieving natural conditions at all Class I areas. This SIP revision pertains to the second implementation period of the RH Rule, the years 2018 through 2028.

The SIP development steps are described in EPA's 2019 Guidance on RH SIPs for the second implementation period and in additional guidance issued in 2021.[7]

Nebraska first used a screening procedure to identify the Class I areas with the potential for visibility impacts from emissions originating in Nebraska, and to identify those sources with the greatest potential to impact visibility at each such Class I area identified. The Nebraska Department of Environment and Energy (NDEE) is a member of the CenSARA organization, which consists of state, tribal, and local agencies from states[8] in EPA Regions 6 and 7. CenSARA contracted the Ramboll Group to conduct an Area of Influence (AOI) analysis that the states could use in their regional haze planning. This analysis used a back-trajectory model combined with visibility information and emission inventories to identify and rank-order the point

[6] https://www.epa.gov/visibility/list-areas-protected-regional-haze-program

[7] EPA's *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period*, https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf and *Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period*, https://www.epa.gov/system/files/documents/2021-07/clarifications-regarding-regional-haze-state-implementation-plans-for-the-second-implementation-period.pdf

[8] CenSARA states include Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, Oklahoma, and Texas, https://censara.org/content/links-organization-program-information-and-contacts.

sources of emissions by their potential to contribute to anthropogenic visibility impairment at 23 Class I areas in the central United States.

As a first step, Nebraska applied the methodology described in **Section I.F.** to the AOI analysis data to identify the Class I areas with the potential for visibility impacts from emissions originating in Nebraska and identify the sources with the greatest potential to impact visibility at each of the identified Class I areas. Two sources were identified for further evaluation as a result of the state's analysis: GGS in Sutherland, NE, and NCS in Nebraska City, NE.

As a second step, Nebraska requested additional information from NPPD and Omaha Public Power District (OPPD) to further evaluate the sources that were identified.[9] Nebraska also requested that OPPD provide information regarding a planned fuel switch at NOS, set to occur before the end of the second implementation period.[10] The information request asked for information needed for the four-factor analyses of GGS and NCS. Following receipt of the requested information and modeling analyses, Nebraska determined that the identified sources were not significant sources of visibility impairment at Class I areas. However, four-factor analyses were completed to provide as robust and rigorous analysis as possible. Nebraska found that additional controls on GGS and NCS were not reasonable under the CAA and the RH Rule, nor necessary to achieve reasonable progress in the second implementation period. The analysis of source contribution to visibility impairment, and the strategies the state will rely on for the second implementation period, are described in **Section I. Long-Term Strategy**.

For each implementation period, states with Class I areas must evaluate progress towards natural visibility conditions (as defined in **Appendix A**) and develop RPGs at each area for the 20 percent clearest days and 20 percent most impaired days. These goals are designed to demonstrate incremental improvement in visibility to ultimately achieve natural visibility conditions by 2064. Nebraska is not subject to this requirement and does not develop RPGs, as it has no Class I areas. The RPGs set by states with Class I areas most likely to be impacted by Nebraska sources are described in **Appendix A**.

Ambient air quality and visibility monitoring is another key element in regional haze planning. Nebraska's ambient air monitoring network includes a total of 23 monitoring sites for criteria pollutants,[11] all of which demonstrate attainment with the National Ambient Air Quality Standards (NAAQS). State emissions inventories and future projections indicate that compliance with the standards is not at risk. Ambient air monitoring activities, state emissions inventory data and trends, and visibility monitoring in Nebraska and affected states are described in **Section II. Monitoring Strategy** and **Section III. Emissions Inventory**.

[9] **Appendix F** - NDEE Regional Haze Information Requests

[10] At the time of NDEE's request to OPPD, the OPPD Board Resolution No. 6006 (June 19, 2014) specified that NOS Units 4 and 5 were approved to be refueled to operate on natural gas by 2023. See **Appendix I-3.1**.

[11] Pollutants for which EPA has set National Ambient Air Quality Standards (NAAQS) include ground-level ozone, carbon monoxide, lead, sulfur dioxide, nitrogen dioxide, and particulate matter.

Throughout the SIP development process, Nebraska conducted periodic consultation with Federal Land Managers (FLMs) that oversee the Class I areas where visibility is potentially affected by Nebraska emission sources and with the states in which those Class I areas are located. NDEE provides the public an opportunity to review and comment on the SIP prior to its submission to the EPA. Consultative activities and public participation are described in **Section IV. Coordination, Consultation, and Public Participation** and comments received from FLMs and the public are included in **Appendices D** and **E**, respectively.

Because the SIP revision also serves as a progress report, states must address (a) progress towards the RPGs (of other states) at the affected Class I areas since the period addressed in the state's last report, and (b) adequacy of the current SIP. Nebraska's last progress report addressed the period 2010-2014, and the required progress report elements in 40 CFR 51.308(g)(1) through (5) are addressed in **Section V. Progress Report**.

I. Long-Term Strategy

A. Overview

In 1999, EPA promulgated regulations requiring states with Class I areas to apply a 60-year time frame when establishing RPGs. The EPA regulations effectively set a 2064 deadline for states to attain Congress' national visibility goal of achieving natural conditions at all Class I areas.

For the second implementation period, ending in 2028, the RH Rule requires a revision to the Nebraska SIP in the form of a long-term strategy that addresses visibility impairment at the Class I areas outside of the state which may be affected by emissions originating from within the state. In each implementation period, the RH Rule requires a state to revise its long-term strategy to address regional haze by including those measures found by the state to be necessary to make reasonable progress toward natural conditions and may also include existing programs or other measures that limit haze-causing pollutants. States are required to revise their long-term strategy as part of the overall RH SIP revisions required in 2028 and every ten years thereafter. Nebraska developed its long-term strategy in accordance with the requirements found at 40 CFR 51.308(f)(2).

B. Necessity

40 CFR 51.308(f)(2) Long-term strategy for regional haze. *Each State must submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within the State and for each mandatory Class I Federal area located outside the State that may be affected by emissions from the State. The long-term strategy must include the enforceable emissions limitations, compliance schedules, and other measures that are* ***necessary*** *to make reasonable progress, as determined pursuant to (f)(2)(i) through (iv). […] (emphasis added)*

In developing its long-term strategy, Nebraska first looks to the requirement of 40 CFR 51.308(f)(2) to determine what emission limitations, compliance schedules, and other measures are necessary to make reasonable progress on the national visibility goal. Implementation of the RH program is divided into distinct implementation periods; this SIP revision addresses the second implementation period. States are required to submit revisions to their RH SIPs which contain an updated long-term strategy on July 31, 2028, and every 10 years thereafter.[12] Nebraska finds that the determination of necessity should be informed by the fact that another revision to the RH SIP will be required in 2028 and each ten years thereafter until 2064, which is the ultimate date the CAA has identified for achieving the visibility goal of natural conditions.

[12] 40 CFR 51.308(f)

States that contain a Class I area are required to establish RPGs that reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation period as a result of those enforceable emissions limitations, compliance schedules, and other measures required under 40 CFR 51.308(f)(2).[13] The URP[14] is a tool that can be used to evaluate a state's reasonable progress and the adequacy of its reasonable progress goals.[15] The URP is a comparison of the most impaired days at a Class I area to natural conditions, and is used to show the yearly improvements in visibility necessary to reach natural visibility conditions by 2064. A visual representation of the URP creates a straight line commonly referred to as a glidepath. Visibility conditions in all of the Class I areas identified by Nebraska as having the potential to be affected by emissions originating within the state are currently below their glidepath and, accounting for adjustments provided for in 40 CFR 51.308(f)(1)(vi)(B), will be below their glidepath without any additional emission reductions from Nebraska throughout the entire second implementation period. (see **Appendix A**)

Nebraska is relying on the adjusted URP glidepath[16] and natural conditions endpoint (as defined in **Appendix A**) as provided for in the RH Rule when developing its long-term strategy. It is reasonable for NDEE to do so for the following reasons:

First, the CAA does not require states to remedy visibility impairment caused by international emissions. Indeed, states do not have the authority or tools to address international emissions.

Second, South Dakota and New Mexico, like many other states, are proposing adoption of the adjusted URP glidepath that accounts for the visibility impact of international emissions and wild fires. It is therefore reasonable for NDEE to use the adjusted URP glidepath as well.

Third, the adjusted URPs on which NDEE is relying for the Class I areas in South Dakota have been presented by EPA.[17] Although EPA did not establish a default adjusted URP glidepath for Wheeler Peak Wilderness, one has been calculated by WRAP for use by participating states, and its use is reasonable here as well.[18]

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[13] 40 CFR 51.308(f)(3)

[14] 40 CFR 51.308(f)(1)(vi)

[15] 40 CFR 51.308(f)(3)(ii)(A)

[16] EPA's *Availability of Modeling Data and Associated Technical Support Document for the EPA's Updated 2028 Visibility Air Quality Modeling* (Appendix B), https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf and WRAP Adjustment Options for End of URP Glidepath (Product #5), https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx

[17] EPA's *Technical Support Document for EPA's Updated 2028 Regional Haze Modeling* – Appendix B (September 19, 2019), https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf

[18] WRAP Adjustment Options for End of URP Glidepath (Product #5), https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx. NDEE notes that the results of its analysis for Wheeler Peak Wilderness would be the same if using the unadjusted URP glidepath: current and projected visibility conditions for the second implementation period are below both the adjusted URP and the unadjusted URP. See **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS (Nov. 2, 2020), page 29 (Figure 2-5: Observations and Modeled Predictions Compared to URP Glidepath for Wheeler Peak Wilderness).

The RPGs established by a state are considered by the Administrator in evaluating the adequacy of the measures in the implementation plan in providing for reasonable progress towards achieving natural visibility conditions at that area.[19] In determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions, the Administrator will also evaluate the demonstrations developed by other states pursuant to 40 CFR 51.308(f)(2).[20]

Nebraska does not establish RPGs as this is not required for states without Class I areas. The RPGs established by states which may be affected by Nebraska emissions are relevant to evaluating the long-term strategy submitted by Nebraska. In accordance with 40 CFR 51.308(f)(2)(ii), Nebraska consulted with the states projected by Ramboll's AOI analysis for CenSARA to potentially be affected by emissions originating from within Nebraska: South Dakota and New Mexico. Nebraska also consulted with Colorado, Minnesota, and Oklahoma. None of the states consulted indicated that Nebraska would need to implement any emission reduction measures in accordance with 40 CFR 51.308(f)(2)(ii)(B) or to take any other action to ensure that RPGs were met at their respective Class I areas. (see **Section IV**.)

Nebraska finds that there are no emission reduction measures which would be necessary to make reasonable progress at this time. As discussed below, based on CAMx modeling, no source located in Nebraska has a significant impact on visibility in any Class I area, and additional emission reductions at GGS and NCS would not result in any real improvement in visibility in any Class I area. As discussed in this section and documented in **Section I.F.**, this conclusion is confirmed by the fact that the states with Class I areas in which visibility may potentially be affected by emissions originating from Nebraska are on track to meet their RPGs for this implementation period, and that no state with a Class I area has asked for any further emission reductions from sources in Nebraska. Emissions from Nebraska sources are not expected to interfere with reasonable progress in visibility at any Class I area in the second implementation period. Emissions of SO_2 and nitrogen oxides (NOx) from Nebraska sources have declined significantly since 2008.[21] Moreover, emissions of SO_2 and NOx from Nebraska's coal-fired EGUs have declined significantly, and are expected to decline further as renewable generation continues to displace coal-fired generation in the SPP and OPPD repowers NOS Units 4 and 5 from coal-fired to natural gas-fired.[22] NPPD has committed[23] to NDEE to maintain SO_2 emissions from GGS below 27,739 tons per year (tpy), starting in 2027, and modeling demonstrates that doing so will keep visibility improvement ahead of schedule, when compared to the adjusted URP glidepaths for Badlands NP, Wind Cave NP, and Wheeler Peak

[19] 40 CFR 51.308(f)(3)(iii).

[20] 40 CFR 51.308(f)(3)(iv).

[21] See Section III. Emissions Inventory.

[22] *Id.* For a description of how and why wind generation is expected to displace coal-fired generation in SPP, see **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS (Nov. 2, 2020), pages 32-36.

[23] **Appendix H-1.8** – NPPD Memorandum of Understanding (GGS).

Wilderness.[24] Because reasonable progress is already being made – in part because of the factors discussed in **Section I.G**. – and because Nebraska will revise its long-term strategy again in 2028 and each ten years thereafter until 2064, it is not necessary for Nebraska to impose further emission limitations, compliance schedules, or other measures during this second implementation period. Finally, as discussed below and in **Appendices H** and **I**, this result is also confirmed by four-factor analyses which demonstrates that further controls at Nebraska sources would be unreasonable under the RH program.

C. Enforceable Emission Limitations

Enforceable emission limitations are presently included in existing operating and construction permits for emission sources in Nebraska that meet the criteria prescribed in Title 129, Chapters 3 through 8, including those for facilities addressed in this SIP. These permits are available on NDEE's public records database at http://dee.ne.gov/NDEQProg.nsf/OnWeb/PRS.

For the second implementation period, no additional emission limits are proposed because: they are not necessary to make reasonable progress; no states have requested additional emissions reductions from Nebraska to meet RPGs; and no additional controls would be reasonable for the sources for which NDEE conducted a four-factor analysis.

D. Compliance Schedules

Compliance schedules for current construction projects are included in existing construction permits for emission sources in Nebraska that meet the criteria prescribed in Title 129, Chapter 3, Construction Permits and Chapter 4, Prevention of Significant Deterioration (PSD). Construction permits are available on NDEE's public records database at http://dee.ne.gov/NDEQProg.nsf/OnWeb/PRS.

For the second implementation period, no additional compliance schedules are proposed because additional emission reduction or control measures are not necessary to make reasonable progress and no states have requested additional emissions reductions from Nebraska to meet RPGs.

E. Other Measures to Ensure Reasonable Progress

[24] **Appendix H-2.2** - NPPD Amended Supplemental Regional Haze Modeling Response to NDEE ICR for GGS (February 15, 2021) & **Appendix H-2.9** - CAMx Air Dispersion Modeling Report – Visibility Impairment Sensitivity Analysis – 2018 GGS Emissions (Jan. 18, 2022).

These measures include those specified in current construction and operating permits for emission sources in Nebraska, including those facilities addressed in this SIP. These permits are available on NDEE's public records database at http://dee.ne.gov/NDEQProg.nsf/OnWeb/PRS.

Upon renewal of the current Title V operating permit for GGS, NPPD has committed to include in its application (due October 2024) a request to incorporate an annual SO_2 emission limit of 27,739 tpy and all related conditions (starting in 2027) into the facility's Title V permit to ensure continued reasonable progress at Class I areas. The Memorandum of Understanding addressing this emissions cap is included as **Appendix H-1.8**.

For the second implementation period, no additional measures are proposed. Emission reduction or control measures beyond those currently in place are not necessary to make reasonable progress, no states have requested additional emissions reductions from Nebraska to meet RPGs, and none of the potential controls evaluated under the four-factor analyses would be reasonable.

F. Identification of Potentially Affected Class I Areas and Sources for Further Evaluation

The first step in Nebraska's development of a long-term strategy for this implementation period was the identification of Class I areas where visibility is potentially affected by Nebraska emissions, and the identification of point sources which have the potential to contribute to visibility impairment in those areas. Sulfur dioxide (SO_2) and nitrogen oxides (NOx) are gaseous pollutants emitted by sources such as industrial facilities, motor vehicles, and power plants. Dependent on ambient conditions, a portion of SO_2 and NOx can undergo chemical reactions in the atmosphere to form ammonium sulfate ("SO_4", "sulfate") and ammonium nitrate ("NO_3", "nitrate"), respectively. When sunlight hits the sulfate and nitrate particles, the light scatters to form haze.

Nebraska is a member of the CenSARA organization which contracted the Ramboll Group to conduct an AOI analysis for the second RH implementation period. Nebraska used the analysis as a tool to make the initial identification of potentially affected Class I areas and point sources for which further evaluation of emission impacts would be required.

Ramboll utilized the Hybrid-Single Particle Lagrangian Integrated Trajectory (HYSPLIT) back-trajectory model to develop back trajectories for the 20% most anthropogenically impaired days for the years 2012-2016. The most anthropogenically impaired days for this time period were determined using visibility data collected at monitoring sites located in the 23 Class I areas

examined in the analysis. Visibility monitors collect particles in the air onto filters; these filters are analyzed for particle composition and concentration to determine what particulate pollutants are responsible for the haze at a given Class I area. These visibility monitors are part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.

A residence time analysis was completed using the back-trajectory modeling and was expanded by using a weighting approach that incorporated emissions, visibility extinction, and distance between the emission source and the monitoring site (Class I area). Metrics used to characterize areas and emission sources with the potential to contribute to visibility impairment included:

- residence time (the cumulative amount of time back-trajectories are present in a specific geographical area);
- distance-weighted residence time (incorporation of distance between sources and visibility monitors in Class I areas);
- extinction-weighted residence time, or EWRT (the use of extinction coefficients attributed to the particulate species, specifically sulfates (SO_4) or nitrates (NO_3)); and
- EWRT plots combined with distance-weighted emissions.

The data files generated from the analysis allowed states to estimate the potential impact (as a percentage of total impact) attributable to specific sources within their states based on emissions and back trajectories. These are surrogate visibility impacts, not actual visibility impacts, because they do not account for dispersion and chemical transformations. The surrogate, potential impacts could be calculated with respect to both particulate species (SO_4 and NO_3) combined or the individual species and allow states to rank their state sources by potential impact. States could also use this information to identify those Class I areas with the greatest potential for visibility impacts from point sources within their states.

When screening sources for potential analysis of control measures, a state may focus on the particulate species that dominate visibility impairment at the Class I areas affected by emissions from the state and then focus on sources with emissions of those dominant pollutants and their precursors.[25] Pollutants selected for analysis in this step included SO_2 and NOx, as these pollutants are precursors of SO_4 and NO_3 particulate matter that predominantly contribute to anthropogenic visibility impairment at the Class I areas examined in Ramboll's AOI analysis.[26] Sulfate and nitrate light extinction is calculated from measurements made at IMPROVE monitors generally located within these areas. Nebraska's screening process focused on these species and performed additional calculations using emissions inventory data from 2016 to

[25] EPA's *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period* (August 20, 2019), page 11.
[26] *Id*.

determine the percentage of impairment attributed to state point sources and rank those sources in terms of contribution.

The Ramboll analysis *Determining Areas of Influence – CenSARA Round Two Regional Haze* final report and products generated from the Ramboll analysis are available at https://censara.org/ftpfiles/Ramboll/. One of these products, an Excel spreadsheet titled *facilityemis.ewrt.qd2016.alltraj.xlsx*, was used to identify Nebraska sources with potential visibility impacts at the 23 Class I areas examined in the analysis. The Summary tab in the spreadsheets allows the user to filter data by selecting a specific Class I area and thresholds for EWRT based values to focus on specific parameters of the analysis. The key components of the analysis – emissions, distance, and extinction-weighted residence time – are discussed below.

Emissions (Q)

Facility level emissions data for SO_2 and NOx were acquired from EPA's 2016 modeling platform, which contains actual 2016 emissions and projected 2028 emissions. The AOI analysis was based on 2012-2016 visibility monitoring data and actual 2016 emissions to correspond to visibility data. Data for 612 Nebraska point sources were included in the Ramboll analysis; these facilities included electric generating units (EGU), oil and gas (O&G), and other industrial point (non-EGU) sources. The list of Nebraska sources is found in the *2016_2028_point_sources_summary_26nov18.xlsb*file at https://censara.org/ftpfiles/Ramboll/.

Distance (D)

This is the distance (in kilometers) between the emission source and the selected Class I area.

Extinction Weighted Residence Time (EWRT)

This is the cumulative amount of time that trajectories reside in a specific geographical area, weighted by visibility extinction. EWRT values for both SO_4 and NO_3 were included.

To further describe point source contributions to Class I areas, the EWRT was matched with facility-level emissions over distance (Q/D) for the 2016 and 2028 emission inventories. These data were provided in excel spreadsheets as described above. Graphic products were also produced to show colorimetric (qualitative) distribution of residence times, emissions, and contour boundaries.

Nebraska's decision to use the *facilityemis.ewrt.qd2016.alltraj.xlsx* file in its screening process was based on two key factors:

- Actual emissions data from 2016 were believed to be a more accurate basis for screening Nebraska sources for evaluation than the projected emissions for 2028 presented by EPA. For example, EPA projected 2028 SO_2 emissions of 2,839 tpy for NCS (highlighted yellow in **Table 1**): this value was calculated based on an assumption that a Dry Sorbent Injection (DSI) system installed on Unit 1 (which began operation in 2016) would significantly decrease SO_2 emissions. While these controls were expected to lower SO_2 emissions slightly, they were installed to comply with the Mercury and Air Toxics Standard (MATS) rather than for the purpose of SO_2 emission reduction. Likewise, EPA's 2028 projected SO_2 emissions for GGS (28,399 tpy) were based upon CSAPR SO_2 trading program allowances for 2028. This projection is significantly greater than the most recent year emissions of 19,403 (2021); annual emissions at this facility have not equaled or surpassed the 2028 projected emissions since 2013 and the possibility of future emissions reaching this level is unlikely given the rapid development of alternative energy sources in SPP. The conclusion that EPA's 2028 emissions projections for GGS are unreasonably high is also supported by data showing a long-term decrease in SO_2 emissions, NPPD's projections[27] showing that this trend is expected to continue in the future, and NPPD's commitment to comply with an annual SO_2 emissions limit of 27,739 tpy starting in 2027 to ensure that progress towards the national visibility goal remains ahead of schedule. Actual and projected SO_2 emissions for GGS and NCS are outlined in **Table 1**.

[27] **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS, pages 3-4 and Table 2-1.

TABLE 1. Actual and Projected SO_2 Emissions (GGS and NCS)

Year	GGS	NCS	Source	Notes
2014	24,482	16,134	Clean Air Markets Program Data (CAMPD)	Actual emissions totals - acquired from continuous emission monitors (CEMS) installed at the facility
2016	22,768	14,722	CAMPD	Actual emissions totals - acquired from continuous emission monitors (CEMS) installed at the facility; these are the same totals used in EPA's 2016 modeling platform on which the Ramboll analysis is based
2021	19,403	9,465	CAMPD	Actual emissions totals - acquired from continuous emission monitors (CEMS) installed at the facility
2028 (projected) - EPA	28,399	2,839	EPA 2011v6.3 modeling platform	Based on the 2011NEI version 2 and includes projected future years of 2017, 2023, and 2028. EPA projections for NCS are flawed, based on erroneous assumption of SO_2 controls (which are actually MATS controls).
2028 (projected) - Sargent & Lundy for NPPD	20,993		NPPD Cost Analysis submittal, Appendix H-1.1, Section 2 - Table 2-1 (p4) Baseline SO_2 Emission Rate/**Annual Emissions**	Based on NPPD Portfolio Optimization Software model (Base case = without controls)
2028 (projected) - Trinity for OPPD		14,136	OPPD Supplemental Response submittal, CAMx Air Dispersion Modeling Report, Section 3 – Table 3-1 (p 11) Summary of NCS Emission Rates Used in CAMx Modeling/**Modeled 2028 Base Case (SO_2)**	Trinity used 2016 actual emissions in place of EPA 2028 projected emissions for Unit 1 in its 2028 Modeled Base Case, due to flawed EPA 2028 projected emissions for Unit 1 (Base case = without controls).
Emissions totals for GGS are for the facility (individual totals are listed by unit in the submittal)				
Emissions totals for NCS are for both units (although only Unit 1 was selected for the four-factor analysis)				

- The *facilityemis.ewrt.qd2016.alltraj.xlsx* file included EWRT values aggregated across all trajectory ending elevations, providing a more comprehensive analysis than focusing on specific elevations. Examining residence time over all trajectories allows assessment of potential transport of pollutants over a variety of distances between facilities and Class I areas.

Nebraska's method to initially identify point sources for further evaluation is summarized as follows (detailed step-by-step instructions and data tables are included in **Appendix G**):

- Select parameters for each Class I area examined in the Ramboll analysis using the *facilityemis.ewrt.qd2016.alltraj.xlsx* spreadsheet, with no thresholds (0%) for EWRT, EWRT*Q, and EWRT*Q/D.
- Sort each spreadsheet for Nebraska sources (sort by state, select Nebraska); no further actions are taken for spreadsheets without Nebraska sources listed.
- Copy the spreadsheets containing Nebraska sources to a new Excel file – annotate tab with four-letter acronym for the Class I area selected.
- Calculate combined (SO_4 + NO_3) EWRT*Q/D values for each source by adding the EWRT*Q/D (SO_4) + EWRT*Q/D (NO_3) values.
- Sort combined EWRT*Q/D values largest to smallest.
- Calculate the percent of source impact (% of AOI source impact) for each source by dividing the combined EWRT*Q/D value for the source by the sum of all EWRT*Q/D values (for sources in all states included in the AOI analysis).
- Calculate the cumulative combined EWRT*Q/D (cumulative % of AOI source impact) for each source by adding these values cumulatively.
- Calculate the cumulative percent of source impact for each source by dividing the cumulative combined EWRT*Q/D value by the sum of all EWRT*Q/D values.

These steps produced an Excel file, with a tab for each Class I area, compiled of sources ranked by percent of impact (% of AOI source impact). Additional methodology was applied to calculate the percent of impact (% of AOI source impact) on visibility impairment due to SO_4 and NO_3, individually, as follows:

- Calculate the percent of source impact for sulfates (% of AOI source impact (SO_4)) for each source by dividing the EWRT*Q/D (SO_4) value by the sum of all EWRT*Q/D (SO_4) values
- Calculate the percent of source impact for nitrates (% of AOI source impact (NO_3)) for each source by dividing the EWRT*Q/D (NO_3) value by the sum of all EWRT*Q/D (NO_3) values

The Ramboll point source dataset[28] included 612 Nebraska point sources. A screening threshold of 2% (% of AOI all-source impact – combined SO_4 + NO_3, and for individual species SO_4 and NO_3) was then applied to the list of sources to identify those with the greatest potential for visibility impacts.[29] Use of the 2% threshold identified two point sources and three affected

[28] Filename: *2016_2028_point_sources_summary_26nov18.xlsb*, available at https://censara.org/ftpfiles/Ramboll/

[29] In the context of regional haze planning, 2% has generally been considered a negligible amount and employed by states for screening sources from further analysis. See **Appendix H-1.4** - NPPD Memo: Source selection and analysis of control measures in reasonable progress determinations (July 8, 2021), page 8 n.8 (collecting sources); **Appendix H-3.11** - NPPD Response to

Class I areas; these sources, according to the Ramboll dataset, account for over 80% of the emissions originating from point sources in Nebraska (2016) which had the potential to affect visibility at the identified areas and approximately 58% of Nebraska's annual SO_2 and NOx emissions (2016) from the 612 Nebraska point sources included in the Ramboll AOI analysis.[30] The two sources identified and the Class I areas which they were determined to potentially impact are:

GGS
Badlands National Park, SD
Wind Cave National Park, SD
Wheeler Peak Wilderness Area, NM

NCS
Wind Cave National Park, SD

Though Nebraska did not use a source screening or selection methodology based strictly on emissions (Q) and distance (D), in the form of Q/D,[31] it did conduct an exercise applying a threshold of Q/D greater than or equal to 5 to the Ramboll data for each Class I area for both SO_2 and NOx. This exercise was undertaken to determine if Nebraska's methodology had excluded additional potential source impacts. One additional point source (NOS) was identified using the Q/D methodology; this source is briefly addressed in this SIP revision but was not identified for four-factor analysis.

Nebraska informed NPPD and OPPD of its initial identification of GGS and NCS as sources with the potential to impact visibility in Class I areas, and requested additional information that the State deemed necessary for the development of a technically robust SIP revision.[32] To prepare for consultation with the State of Colorado, Nebraska asked that NPPD evaluate potential visibility impacts of GGS emissions on Rocky Mountain National Park, CO and Great Sand Dunes National Park, CO, in addition to the three Class I areas identified using the screening methodology; this analysis would address any request for emissions control measures that

NDEE Questions on Connecticut's Regional Haze SIP (Oct. 22, 2021), discussing Connecticut's use of a 2% threshold to screen its sources out of four-factor analysis.

[30] "While there is no requirement for states to select a certain number of sources or percentage of visibility impairing pollutants emitted for four-factor analysis in any given implementation period. It may be helpful, however, for states to provide an assessment of the portion of sources and/or emissions selected in order to demonstrate that the source selection process employed has achieved a reasonable result." From EPA's *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period* (August 20, 2019), pages 27-28.

[31] "This metric is a less reliable indicator of actual visibility impact because it does not consider transport direction/pathway, dispersion and photochemical processes, or the particular days that have the most anthropogenic impairment due to all sources. Therefore, it is recommended that use of this technique be limited to source selection for the purpose of developing a list of sources for which a state may conduct a four-factor analysis." From EPA's *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period* (August 20, 2019), page 13, https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf.

[32] **Appendix F** - NDEE Regional Haze Information Requests.

might have been made by the State of Colorado. Nebraska also requested that OPPD provide information regarding a planned fuel switch at NOS.

As a part of their response to Nebraska's information collection request, both NPPD and OPPD provided the State with CAMx photochemical modeling to assess the potential for visibility impairment resulting from GGS and NCS emissions at the Class I areas identified by Nebraska. The Ramboll AOI analysis was limited in its application to an initial screening because it does not account for the photochemical reactions necessary to estimate visibility impact and was designed to consider only the portion of the impacts from larger SO_2 and NOx point sources, which may be a small portion of the overall visibility impact. The Ramboll AOI also does not consider the effects of area source emissions such as urban areas, on-road and nonroad engine emissions, prescribed and natural wildfires, fugitive dust, etc., or international emissions that may account for a large share of the total impacts. Moreover, as stated previously, the AOI results are surrogate visibility impacts (essentially a screening procedure) whereas CAMx modeling provides actual modeled visibility impacts. The CAMx modeling provided by NPPD and OPPD allowed Nebraska to evaluate the portion of potential impact from specific Nebraska emission sources. Additionally, the CAMx modeling accounted for updated information on source retirements, source parameters, and other technical assumptions. In sum, the CAMx modeling provided by NPPD and OPPD is much more sophisticated than the Ramboll AOI analysis, and its use is necessary for a comprehensive evaluation of source visibility impact or evaluation of the visibility benefit of potential control strategies.

Visibility impairment is defined as "any humanly perceptible difference due to air pollution from anthropogenic sources between actual visibility and natural visibility on one or more days."[33] An impact of less than 1 deciview (dv) is not generally perceptible by the human eye.[34] CAMx modeling (the 2028 base case) demonstrated that no more than 0.21 dv of impact was attributed to GGS at any of the potentially impacted Class I areas on the most impaired days in 2028, and that most impacts on these days were below 0.1 dv.[35] The same CAMx modeling analysis demonstrated that no more than 0.05 dv of impact was attributed to NCS at the Class I area with the most potential for impact from this source (Wind Cave NP) on the most impaired days.

[33] 40 CFR 51.301.

[34] 64 FR 35714, 35725 (July 1, 1999).

[35] The source contribution for GGS at Wind Cave NP in the 2028 base case is 0.21 dv. Notably, however, this includes two daily values that are clear statistical outliers. Under EPA's modeling guidance, such outliers can be excluded. See EPA's *Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze* (November 29, 2018), page 179. https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf. When these two outlier values are excluded, the source contribution for GGS at Wind Cave NP in the 2028 base case is only 0.07 dv, which is in line with the source contribution for GGS nearby at Badlands NP (0.1 dv). Presenting the GGS impact at Wind Cave NP as 0.21 dv therefore reflects very conservative modeling assumptions and bolsters the conclusion that the GGS impact on Wind Cave NP is not significant.

EPA allowed sources with less than 0.5 dv impact to be screened out of further analysis for reasonable progress under the long-term strategy requirement during the first implementation period.[36] This threshold was not the result of CALPUFF modeling used to assess individual source impacts in the first implementation period. Rather, EPA based it upon the relationship between deciviews and perceptibility. "If 'causing' visibility impairment means causing a humanly perceptible change in visibility in virtually all situations (i.e., a 1.0 deciview change), then 'contributing' to visibility impairment must mean having some lesser impact on the conditions affecting visibility that need not rise to the level of human perception."[37] The "contribution" threshold of 0.5 deciviews "represents one half of the 1.0 deciview level that we are equating with a single source 'causing' visibility degradation."[38] EPA specifically approved Nebraska's use of the 0.5 dv threshold to screen sources out of reasonable progress analysis in developing a long-term strategy.[39] EPA's use of the 0.5 dv threshold for source impact was not tied to any specific model (i.e., CALPUFF) or limited to BART analyses.[40]

Nebraska finds that a 0.5 dv threshold for visibility impact is appropriate for the second implementation period as well. First, there is no reason in the second implementation period to tighten the 0.5 dv threshold established by EPA to determine a significant visibility impact. Visibility improvement is ahead of schedule for all the Class I areas NDEE considered in developing this SIP revision. There is therefore no reason to develop a more stringent threshold for defining visibility impact than the existing 0.5 dv threshold, and EPA's decision to define 0.5 dv impact as the minimum for when a source contributes to visibility impairment[41] remains appropriate today. Second, other states are using similar thresholds for screening out sources with insignificant visibility impact. For example, Connecticut and other states in the Mid-Atlantic/Northeast Visibility Union (MANE-VU) regional planning organization are using a light extinction value of 3.0 Mm^{-1} (inverse megameters) as a source impact screening threshold, and 3.0 Mm^{-1} equates to 0.5 dv in those areas.[42] It is therefore reasonable for NDEE to continue to employ the established 0.5 dv threshold for defining a significant visibility impact from a source.

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[36] **Appendix H-3.9** - NPPD's Reply to Sierra Club-NPCA Comments (Aug. 3, 2021), pages 15-18 and Appendix G thereto.

[37] *Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations* Final Rule, 70 FR 39104 (Footnote 32), https://www.govinfo.gov/content/pkg/FR-2005-07-06/pdf/05-12526.pdf#page=58

[38] *Id.,* page 39121.

[39] *Id*., page 39121.

[40] In addition to Nebraska, EPA has also used the 0.5-deciview threshold for other states in concluding that "reasonable progress controls" are not warranted. *See, e.g.*, *Approval and Promulgation of Implementation Plans; State of Oregon; Regional Haze State Implementation Plan* Proposed Rule 77 FR 30454 (page 30464), (May 23, 2012), "EPA believes that [these sources'] impacts on nearby Class I areas are expected to be less than 0.5 dv," and "agrees with Oregon's conclusion that additional controls of non-BART point sources for reasonable progress purposes are not reasonable in the first planning period, because even though there are cost-effective controls identified, visibility improvement is anticipated to be relatively small". EPA final approval of the portions of Oregon's Regional Haze SIP addressed in the proposed rule were published on August 22, 2012 (77 FR 50611).

[41] 70 FR 39104 (page 39120).

[42] Connecticut Regional Haze SIP Revision (Final), November 2021 (page 50), https://portal.ct.gov/-/media/DEEP/air/comments/Regional-Haze-Sip-Comments/Connecticut-2nd-Regional-Haze-Plan---FINAL.pdf

Both GGS and NCS contributions calculated by the CAMx model are well below this threshold of 0.5 dv visibility impact.

In fact, GGS and NCS have less impact than other sources EPA has found to be insignificant. For example, in approving Idaho's reasonable progress goals, EPA "independently evaluated whether there are reasonable control measures available for sources located within Idaho" and concluded that facilities with visibility impacts of 0.5 deciview or less at the nearest Class I area were "relatively small."[43] As a result, EPA agreed with Idaho and stated that additional controls were "not reasonable at th[e] time, because even though there are cost-effective controls identified, visibility improvement is anticipated to be relatively small" and therefore not necessary for making reasonable progress. In its final approval[44] of the Idaho SIP and responding to comments,[45] EPA confirmed that, even though "several of the Idaho stationary sources ha[d] visibility impacts between 0.3-1.3 deciviews (dv)," those impacts were not a "significant contribution to visibility impairment" that warranted additional controls. ("no additional controls…are reasonable…because any visibility improvement expected from additional controls would likely be minimal").[46]

NDEE does not rely solely on the fact that GGS and NCS have less than 0.5 dv visibility impact to conclude that neither is a significant source of visibility impairment in any Class I area. In addition to calculating source impact in deciviews, NPPD presented the CAMx modeling results in inverse megameters. Results from that analysis, which estimated visibility improvement with emission controls, is shown in **Tables 2** through **6**, indicating that GGS and NCS contribute less than 2% of the light extinction at any Class I area. This is a negligible amount. Consideration of source apportionment using inverse megameters therefore confirms that neither GGS nor NCS has significant visibility impact on Class I areas.

Comparison of the 2028 base case to 2028 control case modeling submitted by NPPD and OPPD supports the conclusion that neither GGS nor NCS is a significant source of visibility impairment. The 2028 control case modeling represents the most aggressive form of SO_2 controls on both GGS and NCS (in addition to the repowering of NOS Units 4 and 5). This control case therefore models the greatest possible visibility improvement that one could expect by installing the most aggressive form of SO_2 controls, regardless of whether such controls are feasible or cost-effective, on the units at issue. Comparison of the 2028 control case to the 2028

[43] *Approval and Promulgation of Implementation Plans; State of Idaho; Regional Haze State Implementation Plan* Proposed Rule, 77 FR 30248 (pages 30255-56), (May 22, 2012). EPA final approval of the portions of Idaho's Regional Haze SIP addressed in the proposed rule were published on November 8, 2012 (77 FR 66929).

[44] *Approval and Promulgation of Implementation Plans; State of Idaho; Regional Haze State Implementation Plan* Final Rule, 77 FR 66929 (November 8, 2012), page 66931, https://www.govinfo.gov/content/pkg/FR-2012-11-08/pdf/2012-27216.pdf

[45] *Approval and Promulgation of Implementation Plans; State of Idaho; Regional Haze State Implementation Plan* Final Rule, 77 FR 66929 (November 8, 2012).

[46] **Appendix H-2.2** - NPPD Amended Supplemental Regional Haze Modeling Response To NDEE ICR for GGS (February 15, 2021)

base case (**Tables 2** and **3**) shows that the difference in visibility is insignificant. This is true for both the 20% most impaired days and clearest days.

TABLE 2: Projected Change in Visibility (dv) on 20% Most Impaired Days for 2028 Control Case for GGS, NCS and NOS

Class I Area	Total Visibility for 2028 base case	Total Visibility for 2028 control case	Projected total 2028 visibility improvement
Badlands NP	12.04	11.97	0.07
Wind Cave NP	10.14	10.00	0.14
Wheeler Peak Wilderness Area	5.85	5.83	0.02

SOURCE: Appendix H-2.2 NPPD Amended Supplemental RH Modeling Response to NDEE ICR for GGS, Table (p 31)

TABLE 3: Projected Change in Visibility (dv) on 20% Clearest Days for 2028 Control Case for GGS, NCS and NOS

Class I Area	Total Visibility for 2028 base case	Total Visibility for 2028 control case	Projected total 2028 visibility improvement
Badlands NP	5.30	5.29	0.01
Wind Cave NP	3.55	3.55	0
Wheeler Peak Wilderness Area	0.23	0.23	0

SOURCE: Appendix H-2.5 Trinity Consultants Memo on Supplemental Information and Clarifications

Whether one considers the most impaired days or the clearest days, the projected change in visibility is insignificant. The greatest modeled improvement is only 0.14 dv for Wind Cave NP on the 20% most impaired days, which is less than what EPA has previously found to be insignificant.[47]

[47] In the final rule partially approving Wyoming's regional haze SIP, EPA determined that additional controls projected to achieve visibility improvements of as much as 0.18 dv were not warranted due to their "relatively modest" visibility benefit. (*Approval, Disapproval and Promulgation of Implementation Plans; State of Wyoming; Regional Haze State Implementation Plan; Federal Implementation Plan for Regional Haze*, 79 FR 5032 (January 30, 2014), pages 5044, 5051). Likewise, EPA found that projected visibility improvements from additional controls in Montana of as much as 0.273 dv were "not sufficient for [EPA] to consider it reasonable to impose [additional NOx controls] in this planning period." (*Approval and Promulgation of Implementation Plans; State of Montana; State Implementation Plan and Regional Haze Federal Implementation Plan* Proposed Rule, 77 FR 23988 (proposed April 20, 2012), pages 24064-67; final EPA approval of this SIP was issued September 18, 2012 (77 FR 57864)).
More recently, Texas determined in its 2021 regional haze plan that a 0.56 dv improvement was not sufficient to warrant additional emission controls, finding that the costs outweighed the benefits. (TCEQ, 2021 Regional Haze State Implementation Plan Revision for the Second Planning Period (pages 7-16), https://www.tceq.texas.gov/airquality/sip/bart/haze_sip.html)

The fact that imposing the most aggressive controls (on both GGS and NCS) and the repowering of NOS would produce an insignificant change in visibility (and sometimes no change at all) demonstrates that these sources have only negligible impact on visibility in any Class I area.[48]

For the reasons set forth above, NDEE concludes that neither GGS nor NCS significantly contribute to visibility impairment in a Class I area. The same is true for NOS. Nebraska has therefore determined that a four-factor analysis for these sources is unnecessary. Nevertheless, as discussed below, NDEE performed four-factor analyses of potential controls on GGS and NCS in order to conduct a robust and thorough analysis. These analyses demonstrate that additional controls on GGS and NCS are not reasonable for the second implementation period.[49]

A summary of the sources identified and additional information regarding additional Class I areas and sources as requested by Nebraska are included in the following pages.

[48] This analysis was further bolstered by a sensitivity study performed by Trinity Consultants on GGS. In addition to lowering projected emissions in the 2028 control case, Trinity Consultants increased the projected emissions from GGS above those projected for GGS in the 2028 base case. Doing so showed no significant change to projected visibility conditions in the relevant Class I areas. That visibility conditions do not change significantly when GGS emissions are subsequently raised and lowered in the model, supports the conclusion that GGS emissions are not a significant source of visibility impairment in the Class I areas. See **Appendix H-2.9** - Trinity Consultants Report on Sensitivity Analysis – 2018 GGS Emissions (January 18, 2022).

[49] NDEE did not conduct a four-factor analysis for NOS. As noted above, NOS is not a significant source of visibility impairment and thus no four-factor analysis is required. In addition, OPPD plans to repower NOS Units 4 and 5 from coal to gas, which will significantly lower its emissions. In these circumstances, a four-factor analysis for NOS would not add anything to the reasonable progress analysis.

Gerald Gentleman Station (GGS)

OPERATOR: Nebraska Public Power District (NPPD)

LOCATION: Sutherland, Nebraska (Lincoln County)

LAT/LONG: 41.080833, -101.14306

CHARACTERISTICS: This facility consists of two coal-fired boilers, with a total capacity of 1,365 megawatts (MW). These units came online in 1979 (Unit 1) and 1982 (Unit 2) and both are operated with low NOx burner and overfire air (OFA) technology. Wyoming Powder River Basin (PRB) coal is used at this facility; this is a sub-bituminous, low-sulfur coal.

Facility emissions for 2010 and 2021 are as follows:[50]

Annual emissions (2010)	SO_2: 29,741 tpy	NOx: 13,164 tpy
Annual emissions (2021)	SO_2: 19,403 tpy	NOx: 6,197 tpy
Change	SO_2: -34.8%	NOx: -52.9%

SUMMARY: Emission reductions at this facility since the first implementation period (2008-2018) are significant and are attributed to the use of low NOx burners on both its units and the increased use of renewable energy sources within the SPP, of which NPPD is a member.

At Nebraska's request, NPPD provided photochemical modeling based on 2028 projected emissions developed by NPPD.[51] This CAMx modeling showed that all relevant Class I areas would achieve better than reasonable progress on visibility without additional controls on GGS. CAMx modeling[52] for the Class I areas with the most potential impact from GGS indicates that adding 96% SO_2 control to GGS and 90% SO_2 control to NCS1 (as well as conversion of NOS to natural gas) would result in only a 0.14 dv improvement in visibility at Wind Cave NP, and a 0.07 dv improvement in visibility at Badlands NP. Such a projected change is negligible. An impact of less than 1 dv is not generally perceptible by the human eye.[53]

Emissions of SO_2 and NOx emissions from Nebraska as a whole have significantly decreased since 2010. State emission inventories (2021) of these pollutants, when compared to EPA projected 2028 emission totals for Nebraska, show that state SO_2 and NOx emissions in 2021 have almost reached or are below, respectively, those 2028 projected emission totals.

[50] 2010 emissions totals for GGS were the most recent included in Nebraska's initial RH SIP; 2021 emissions totals for GGS are the most recent verified annual state emissions inventories currently available.

[51] NDEE relied on the projected emissions which were based on the NPPD Portfolio Optimization Software model rather than EPA's 2028 projections. NDEE determined that NPPD's projection more accurately reflected projected 2028 emissions based on the historic numbers and trends.

[52] **Appendix H-2.2** - NPPD Amended Supplemental RH Modeling Response (February 15, 2021), pages 3 and 6.

[53] *Regional Haze Regulations* (64 FR 35714), page 35725 (July 1, 1999).

No states have requested additional emission reductions from Nebraska and/or this source to meet RPGs for Class I areas within their states.

For the reasons set forth above, Nebraska finds that it is unnecessary and unreasonable for NDEE to require GGS to implement any additional emission control measures for the purpose of the second RH implementation period.

Potentially impacted Class I areas identified using the screening methodology as applied to historic emissions include:

Wind Cave National Park (SD)

Wind Cave NP is located approximately 209 miles (337 km) northwest of GGS.

TABLE 4. Gerald Gentleman Station Projected Impacts (Wind Cave NP)*

2028 Base Case Total Extinction (Mm^{-1})	2028 Base Case GGS Contribution (Mm^{-1})	Percent of GGS Contribution to Total Extinction	2028 Base Case Total Haze Index (dv)	2028 Base Case GGS Haze Index (dv)
28.286	0.579*	2.05%	10.14	0.21*

* Includes clear statistical outliers in the calculation of GGS contribution (in Mm^{-1} and deciviews).
SOURCE: Appendix H-2.2 NPPD Amended Supplemental RH Modeling Response – Appendix B , Trinity Consultants Air Dispersion Modeling Supplemental Report (February 15, 2021); Trinity Consultants Supplemental Information and Clarifications Memo (July 2, 2021)

As noted in **Table 4**, the GGS contribution at Wind Cave NP presented (0.579 Mm^{-1} and 0.21 dv) is conservative, and likely overestimates the GGS impact, because it includes two clear statistical outliers among the 24 daily values comprising the 20% most impaired days. These outlier values (for May 21 and August 7, 2016) may be excluded under EPA's guidance on modeling for regional haze. Excluding these outlier values would result in a GGS contribution at Wind Cave NP of 0.214 Mm^{-1} (0.07 dv).[54] A full analysis of the two outlier values is provided by Trinity Consultants in its memorandum on NPPD 2028 Base Case Outliers Analyses (Sept. 16, 2021) and in **Appendix B** to this memo (February 2021 CAMx Air Dispersion Modeling Supplemental Report) at Section 1.3.1.1, pages 8-11 (see **Appendix H-2.2**).

The facts would support exclusion of the May 21 and August 7 values in calculating the GGS source contribution for Wind Cave NP. First, the values are not just outliers, they are "extreme outliers" under the National Institute of Standards and Technology definition.[55] Second, the results for these two days do not correspond to any spike in emissions from GGS in the

[54] **Appendix H-2.5** - Trinity Consultants Memo on Supplemental Information and Clarifications, page 10 (July 2, 2021).
[55] **Appendix H-2.6** - Trinity Consultants Memo on NPPD 2028 Base Case Outliers Analyses (Sept. 16, 2021), page 1.

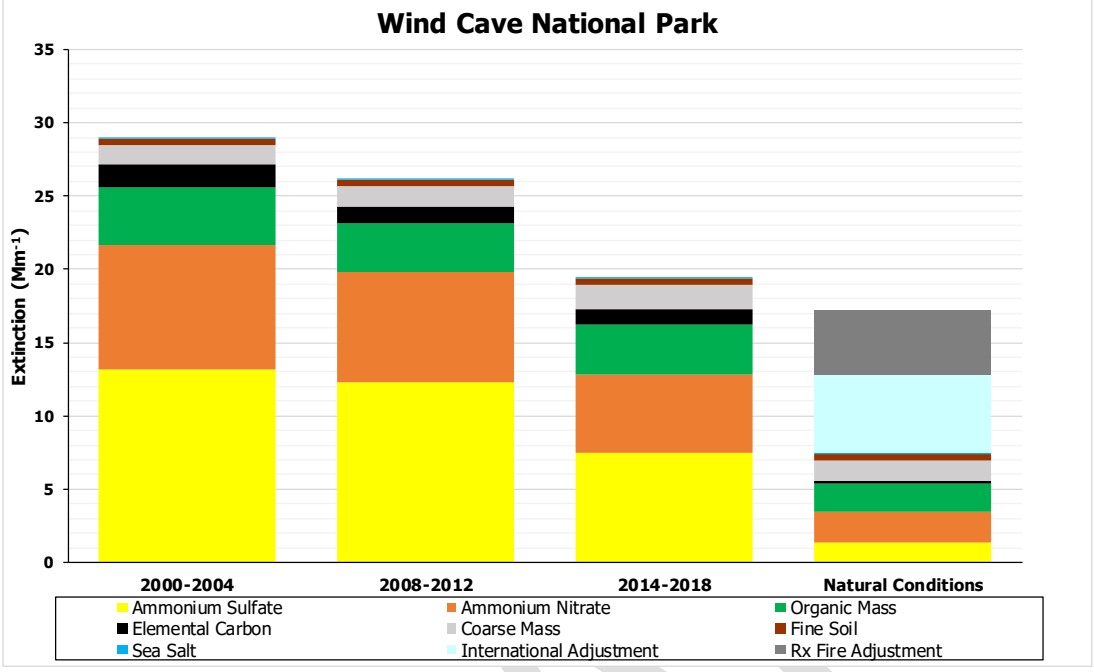
preceding days.[56] Third, the results for these two days at Wind Cave NP do not correspond to any of the results at Badlands NP, which is approximately 56 miles east-northeast of Wind Cave NP, or at any other Class I area for which Trinity Consultants performed modeling for NPPD.[57]

Based on EPA's guidance, it would be a reasonable modeling approach to exclude these values from the calculation of the GGS contribution at Wind Cave NP. However, NDEE relies upon the information provided by Trinity Consultants to conclude that including the two outlier values in calculating the GGS impact at Wind Cave NP represents a conservative modeling approach that likely overstates the source impact at this Class I area.

Visibility impairment at this area is largely attributed to sulfates and nitrates, some of which is contributed by international emission sources; the IMPROVE 5-year averages for light extinction attributed to these pollutants show significant improvement since the first implementation period, as shown in **Figure 1**.

[56] *Id*.
[57] *Id*., pages 3-5.

FIGURE 1. IMPROVE 5-year Averages and 2064 Estimated Natural Conditions (WICA1)



	Extinction (Mm^{-1})			
	2000-2004	2008-2012	2014-2018	Natural Conditions
Ammonium Sulfate	13.1538	12.2555	7.4656	1.3424
Ammonium Nitrate	8.5231	7.5345	5.3607	2.1053
Organic Mass	3.9418	3.3728	3.3731	1.8895
Elemental Carbon	1.5240	1.0753	1.0930	0.2553
Fine Soil	0.3858	0.4765	0.4123	0.4424
Coarse Mass	1.3578	1.4161	1.6624	1.3578
Sea Salt	0.0372	0.0784	0.0797	0.0564

SOURCE: WRAP Visibility Analysis – Express Tools, Chart #1 (Most Impaired Days), https://views.cira.colostate.edu/tssv2/Express/VisTools.aspx

Amended to present Natural Conditions based on the adjusted URP based on WRAP Technical Support System – Modeled Data Analysis - Express Tools (Product 5, Adjustment Options for End of URP Glidepath)
https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx

The potential for impacts on visibility during the second implementation period (2018-2028) at this area is anticipated to be low, based on significant emission reductions at GGS since the first implementation period. CAMx modeling provided by NPPD shows minimal potential impact to visibility resulting from emissions from GGS, and South Dakota has not asked Nebraska for additional emissions reductions to continue the reasonable progress on visibility improvement observed to date and projected for the remainder of the second implementation period at this Class I area.

Badlands National Park (SD)

Badlands NP is located approximately 188 miles (302 km) north-northwest of GGS.

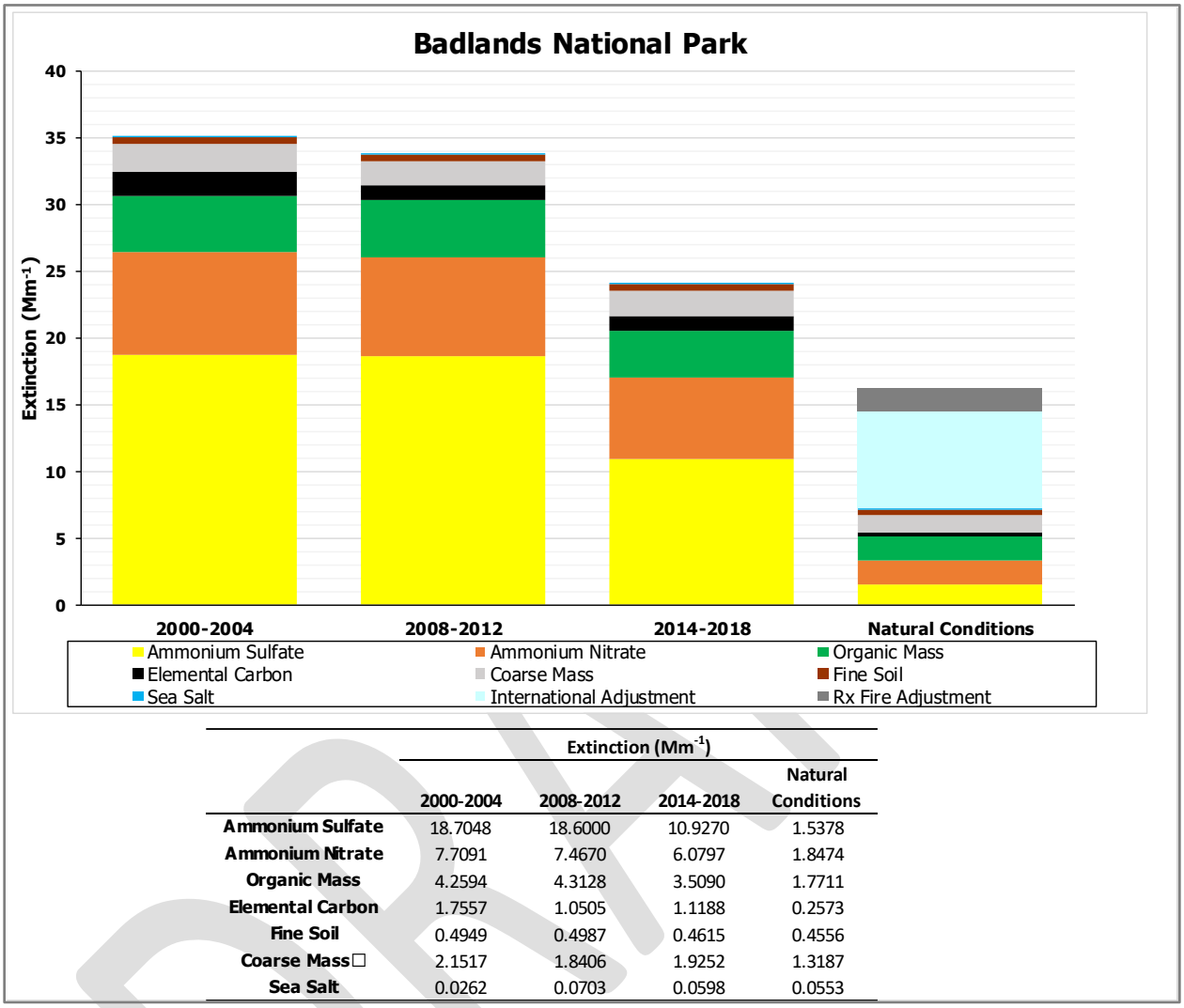
TABLE 5. Gerald Gentleman Station Projected Visibility Impacts (Badlands NP)

2028 Base Case Total Extinction (Mm^{-1})	2028 Base Case GGS Contribution (Mm^{-1})	Percent of GGS Contribution to Total Extinction	2028 Base Case Total Haze Index (dv)	2028 Base Case GGS Haze Index (dv)
34.076	0.352	1.03%	12.04	0.10

SOURCE: Appendix H-2.2, NPPD Amended Supplemental RH Modeling Response to NDEE ICR for GGS – Appendix B, Trinity Consultants Air Dispersion Modeling Supplemental Report (February 15, 2021); Appendix H-2.5, Trinity Consultants Memo on Supplemental Information and Clarifications – Table 2, Assessment of Clearest Days (July 2, 2021)

Visibility impairment at this area is largely attributed to sulfates, some of which is contributed by international emission sources; the IMPROVE 5-year averages for light extinction attributed to this pollutant show significant improvement since the first implementation period, as shown in **Figure 2**.

FIGURE 2. IMPROVE 5-year Averages and 2064 Estimated Natural Conditions (BADL1)



	Extinction (Mm^{-1})			
	2000-2004	2008-2012	2014-2018	Natural Conditions
Ammonium Sulfate	18.7048	18.6000	10.9270	1.5378
Ammonium Nitrate	7.7091	7.4670	6.0797	1.8474
Organic Mass	4.2594	4.3128	3.5090	1.7711
Elemental Carbon	1.7557	1.0505	1.1188	0.2573
Fine Soil	0.4949	0.4987	0.4615	0.4556
Coarse Mass	2.1517	1.8406	1.9252	1.3187
Sea Salt	0.0262	0.0703	0.0598	0.0553

SOURCE: WRAP Ambient Data Analysis – Express Tools, Chart #1 (Most Impaired Days), https://views.cira.colostate.edu/tssv2/Express/AmbientDataAnalysisTools.aspx. *Amended to present Natural Conditions based on the adjusted URP based on WRAP Technical Support System – Modeled Data Analysis - Express Tools (Product 5, Adjustment Options for End of URP Glidepath) https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx*

This area was identified as the primary Class I area of concern by the FLMs during consultation with Nebraska. However, this area is expected to remain ahead of schedule for visibility improvement during the second implementation period (2018-2028), and South Dakota has not asked Nebraska for additional emissions reductions to continue the reasonable progress on visibility improvement observed to date and projected for the rest of the second implementation period at this Class I area. The potential for impacts on visibility during the second implementation period at this area is anticipated to be low, based on the significant emission reductions at GGS during the first implementation period. Modeling provided by NPPD shows minimal potential impact to visibility resulting from emissions from GGS.

Wheeler Peak Wilderness Area (NM)

Wheeler Peak Wilderness Area is located approximately 386 miles (620 km) southwest of GGS.

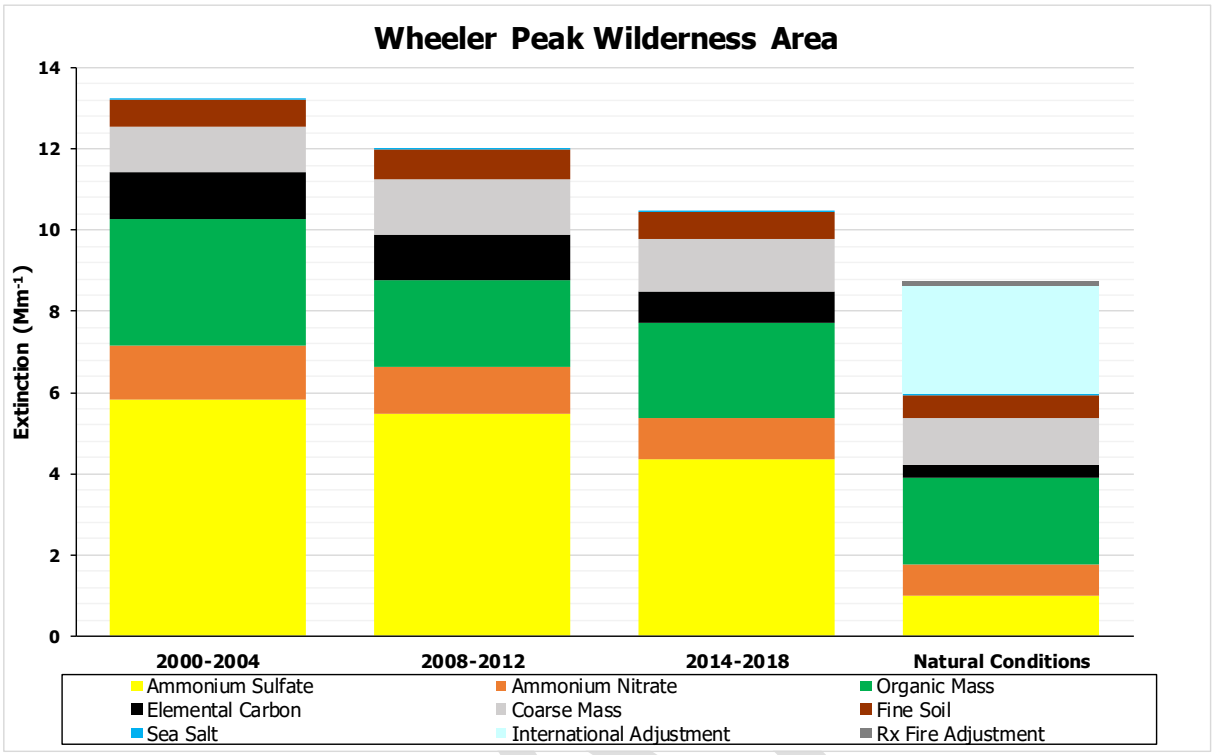
TABLE 6. Gerald Gentleman Station Projected Visibility Impacts (Wheeler Peak Wilderness)

2028 Base Case Total Extinction (Mm^{-1})	2028 Base Case GGS Contribution (Mm^{-1})	Percent of GGS Contribution to Total Extinction	2028 Base Case Total Haze Index (dv)	2028 Base Case GGS Haze Index (dv)
18.293	0.070	0.39%	5.85	0.04

SOURCE: Appendix H-2.2 NPPD Amended Supplemental RH Modeling Response to NDEE ICR for GGS– Appendix B, Trinity Consultants Air Dispersion Modeling Supplemental Report (February 15, 2021); Appendix H-2.5 Trinity Consultants Memo on Supplemental Information and Clarifications – Assessment of Clearest Days, Table 2 (July 2, 2021)

Visibility impairment at this area is largely attributed to sulfates and organic mass, some of which is contributed by international emission sources; the IMPROVE 5-year averages for light extinction attributed to sulfates show improvement since the first implementation period, as shown in **Figure 3**.

FIGURE 3. IMPROVE 5-year Averages and 2064 Estimated Natural Conditions (WHPE1)

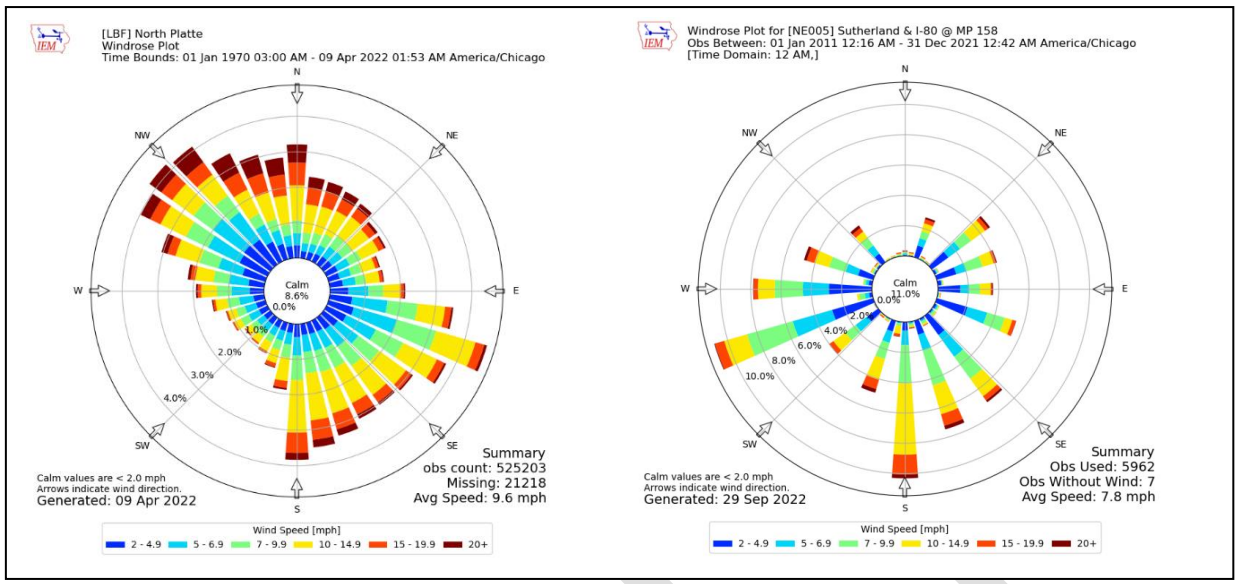


	Extinction (Mm^{-1})			
	2000-2004	2008-2012	2014-2018	Natural Conditions
Ammonium Sulfate	5.8243	5.4633	4.3630	0.9987
Ammonium Nitrate	1.3447	1.1846	1.0171	0.7847
Organic Mass	3.0879	2.1240	2.3356	2.1187
Elemental Carbon	1.1670	1.1252	0.7587	0.3083
Fine Soil	0.6591	0.7240	0.6575	0.5534
Coarse Mass	1.1117	1.3496	1.3150	1.1751
Sea Salt	0.0016	0.0365	0.0406	0.0259

SOURCE: WRAP Ambient Data Analysis – Express Tools, Chart #1 (Most Impaired Days), https://views.cira.colostate.edu/tssv2/Express/AmbientDataAnalysisTools.aspx. *Amended to present Natural Conditions based on the adjusted URP based on WRAP Technical Support System – Modeled Data Analysis - Express Tools (Product 5, Adjustment Options for End of URP Glidepath)* *https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx*

Windroses for weather stations in North Platte, NE (approximately 40 km east-northeast of GGS) and Sutherland, NE (approximately 7 km north-northeast of GGS) are shown in **Figure 4a**. The North Platte windrose shows predominantly northwest and southeast winds; the Sutherland windrose shows predominantly south-southeast and west-southwest winds.

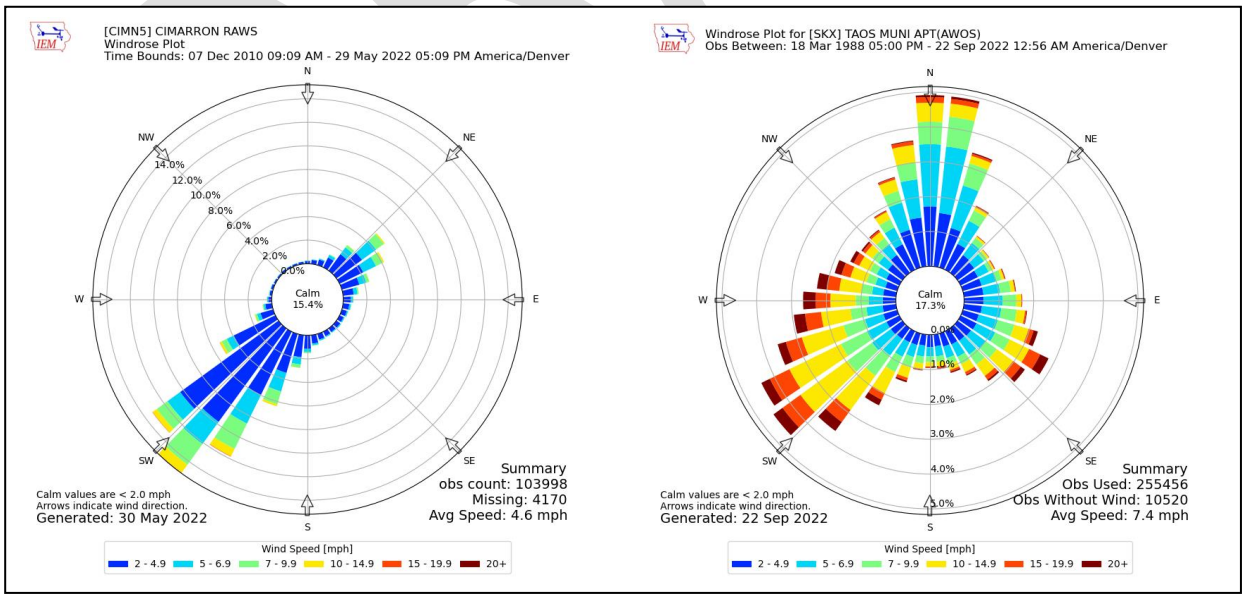
FIGURE 4a. Wind roses – Nebraska Weather Stations Near GGS



SOURCE: Iowa Environment Mesonet, https://mesonet.agron.iastate.edu/sites/locate.php?network=NE_ASOS ([LBF] North Platte) and https://mesonet.agron.iastate.edu/sites/locate.php?network=NE_RWIS ([NE005] Sutherland)

Windroses for weather stations near Wheeler Peak are shown in **Figure 4b**. The Cimarron Raws monitor is located approximately 30 km to the east-northeast of this area, and the Taos Municipal Airport monitor is approximately 24 km southwest of Wheeler Peak. Though the Taos monitor shows predominant north and southwest winds, this area is to the west of Wheeler Peak Wilderness; both windroses show predominant southwest winds.

FIGURE 4b. Wind roses – New Mexico Weather Stations Near Wheeler Peak Wilderness



SOURCE: Iowa Environment Mesonet, https://mesonet.agron.iastate.edu/sites/locate.php?network=NM_DCP ([CIMN5] Cimmarron RAWS), https://mesonet.agron.iastate.edu/sites/locate.php?network=NM_ASOS ([SKX] Taos Muni Apt (AWOS))

Given the significant distance between Wheeler Peak Wilderness and GGS and predominant winds in their respective areas, the likelihood of potential visibility impacts from GGS at this Class I area is low. Moreover, the modeling analysis provided by NPPD indicates that future projected visibility impacts from GGS emissions are insignificant as well.

Nebraska City Station (NCS)

OPERATOR: Omaha Public Power District (OPPD)

LOCATION: Nebraska City, Nebraska (Otoe County)

LAT/LONG: 40.620731, -95.775311

CHARACTERISTICS: This facility consists of two coal-fired boilers, with a total capacity of 1,320 megawatts (MW). These units came online in 1979 (Unit 1) and 2009 (Unit 2). Control equipment for SO_2, NOx, and particulate emissions currently in operation includes:

Unit 1

- low NOx burner technology with overfire air, for NOx control
- electrostatic precipitator for PM control

Unit 2

- dry lime flue gas desulfurization (FGD) for SO_2 control
- selective catalytic reduction for NOx control
- baghouse for PM control

The sub-bituminous coal used at this facility comes from Wyoming Powder River Basin (PRB), which is a low-sulfur coal.

Facility emissions for 2010 and 2021 are as follows:[58]

Annual emissions (2010)	SO_2: 14,296 tpy	NOx: 8,830 tpy
Annual emissions (2021)	SO_2: 7,133 tpy	NOx: 4,304 tpy
Change	SO_2: -50.1%	NOx: -51.3%

SUMMARY: Emission reductions at this facility since the first implementation period (2008-2018) are significant and are attributed to increased use of renewable energy sources within the SPP, of which OPPD is a member.

At Nebraska's request, OPPD provided photochemical modeling based on 2028 projected emissions. CAMx modeling[59] for the Class I area with the most potential impact from NCS

[58] 2010 emissions totals for NCS were the most recent included in Nebraska's initial RH SIP; 2021 emissions totals for NCS are the most recent verified annual state emissions inventories currently available.

[59] This modeling analysis included corrections to EPA's modeling related to SO_2 emissions for NCS Unit 1. EPA's 2028 emissions projections for Unit 1 erroneously assumed SO_2 control and emission reductions associated with a Dry Sorbent Injection (DSI) system installed to comply with EPA's Mercury and Air Toxics Standards (MATS) rule.

indicates that adding 90% SO_2 control to NCS would reduce its impact on Wind Cave NP by only 0.03 dv.[60] An impact of less than 1dv is not generally perceptible by the human eye.[61]

Emissions of SO_2 and NOx from Nebraska as a whole have significantly decreased since 2010. State emission inventories (2021) of these pollutants, when compared to Trinity Consultants' projected 2028 emission totals,[62] show that state SO_2 and NOx emissions are below, respectively, those projected emissions totals.

Finally, no states have requested additional emission reductions from Nebraska and/or this source to meet reasonable progress goals for Class I areas within their state.

For the reasons set forth above, Nebraska finds that it is unnecessary and unreasonable for NDEE to require NCS to implement any additional emission control measures for the purpose of the second RH implementation period.

Potentially impacted Class 1 areas identified using the screening methodology as applied to historic emissions:

Wind Cave National Park

Wind Cave NP is located approximately 442 miles (711 km) northwest of NCS.

TABLE 7. Nebraska City Station Projected Visibility Impacts (Wind Cave NP)

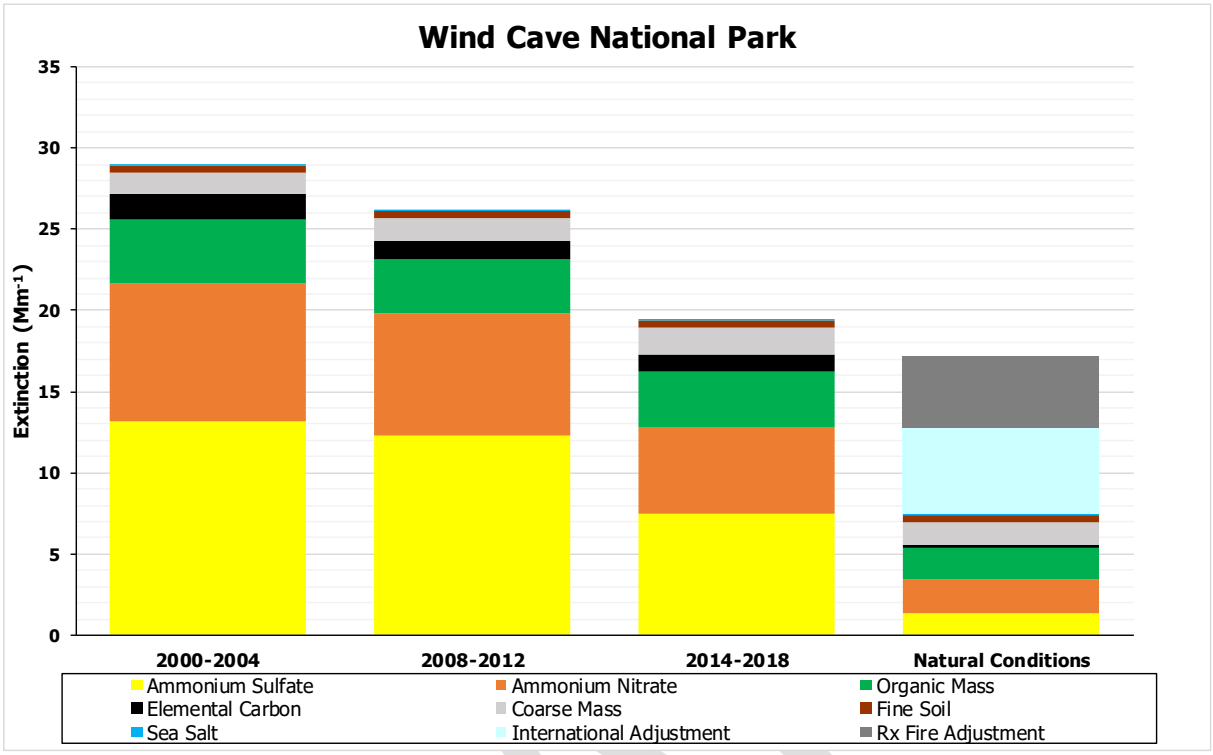
2028 Base Case Total Extinction (Mm^{-1})	2028 Base Case Total Haze Index (dv)	2028 Base Case NCS Haze Index (dv)
28.29	10.14	0.05

SOURCE: Appendix I-2 Supplemental OPPD Response To NDEE RH Information Request for Nebraska City Station Unit 1 – Trinity Consultants Air Dispersion Modeling Report, Table 1-1 (February 17, 2021)

Visibility impairment at this area is largely attributed to sulfates and nitrates, some of which is contributed by international emission sources; the IMPROVE 5-year averages for light extinction attributed to these pollutants show significant improvement since the first implementation period, as shown in **Figure 5**.

[60] **Appendix I-2** - Supplemental OPPD Response to the NDEE Regional Haze Information Request (February 17, 2021), pages 3-4.
[61] *Regional Haze Regulations* (64 FR 35714), page 35725 (July 1, 1999).
[62] **Appendix I-2** - Supplemental OPPD Response to the NDEE Regional Haze Information Request – CAMx Air Dispersion Modeling Report – Visibility Impairment (February 17, 2021), Table 3-1, page 11.

FIGURE 5. IMPROVE 5-year Averages and 2064 Estimated Natural Conditions (WICA1)



	Extinction (Mm^{-1})			
	2000-2004	2008-2012	2014-2018	Natural Conditions
Ammonium Sulfate	13.1538	12.2555	7.4656	1.3424
Ammonium Nitrate	8.5231	7.5345	5.3607	2.1053
Organic Mass	3.9418	3.3728	3.3731	1.8895
Elemental Carbon	1.5240	1.0753	1.0930	0.2553
Fine Soil	0.3858	0.4765	0.4123	0.4424
Coarse Mass	1.3578	1.4161	1.6624	1.3578
Sea Salt	0.0372	0.0784	0.0797	0.0564

SOURCE: WRAP Ambient Data Analysis – Express Tools, Chart #1 (Most Impaired Days), https://views.cira.colostate.edu/tssv2/Express/AmbientDataAnalysisTools.aspx. *Amended to present Natural Conditions based on the adjusted URP based on WRAP Technical Support System – Modeled Data Analysis - Express Tools (Product 5, Adjustment Options for End of URP Glidepath) https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx*

The potential for impacts on visibility during the second implementation period (2018-2028) at this area is anticipated to be low, based on the significant emission reductions at NCS since the first implementation period.

North Omaha Station Units 4 and 5

OPERATOR: Omaha Public Power District (OPPD)

LOCATION: Omaha, Nebraska (Douglas County)

LAT/LONG: 41.328746, -95.949124

CHARACTERISTICS: This facility consists of two coal-fired boilers (Units 4 and 5) and three natural gas boilers (Units 1, 2, and 3), with a total capacity of 645 megawatts (MW). Units 1 through 5 began operation in 1954, 1957, 1959, 1963, and 1968, respectively. Units 1, 2, and 3 were converted from coal to natural gas fuel in 2016. Control equipment in operation includes low NOx burner technology on Units 2, 3, and 5. The sub-bituminous low-sulfur coal used to fuel Units 4 and 5 comes from the Wyoming Powder River Basin (PRB).

Facility emissions for 2010 and 2021 are as follows:[63]

Annual emissions (2010)	SO_2: 10,515 tpy	NOx: 6,765 tpy
Annual emissions (2021)	SO_2: 5,826 tpy	NOx: 2,850 tpy
Change	SO_2: -44.6%	NOx: -57.9%

Emission reductions at this facility since the first implementation period (2008-2018) are significant and are attributed to the conversion of three coal-fired units to natural gas-firing (completed in 2016) and the increased use of renewable energy sources within the SPP, of which OPPD is a member.

Although NOS was not selected for further analysis as a potential contributor to visibility impairment, due in part to the significant reduction in emissions already achieved,[64] additional information regarding the source was requested by Nebraska in order to perform a complete analysis of the projected impact from the planned replacement of the remaining coal-fired units (Units 4 and 5) with natural gas.

On June 17, 2014, the OPPD Board of Directors issued a formal resolution to cease coal operation at this facility by converting coal-fired units to natural gas-firing boilers by December 31, 2023[65] as part of its Future Generation Plan. Units 1, 2, and 3 were converted to natural gas in 2016, resulting in significant emission reductions. On August 16, 2022, the board resolution

[63] 2010 emissions totals for NOS were the most recent included in Nebraska's initial RH SIP; 2021 emissions totals for NOS are the most recent verified annual state emissions inventories currently available.

[64] The 2016 facility emissions showed reductions of 35.9% (SO_2) and 34.6% (NOx) as compared to 2015, and the most recent annual emissions (2022) available from EPA's Clean Air Markets Program Data (CAMPD) show reductions of 38.5% (SO_2) and 23.2% (NOx) since 2016.

[65] **Appendix I-3.1** - OPPD Board of Directors Action – Approval of Future Generation Plan (Resolution 6006), June 17, 2014.

was revised to extend the retirement of the remaining coal-fired units (Units 4 and 5) until completion of two natural gas-fueled power stations currently under construction.[66] Due to significant backlog in the Federal Energy Regulatory Commission (FERC) grid interconnection study and approval process both projects are delayed, prompting concerns of electric service resiliency and reliability for OPPD customers and the SPP. The approved extension allows for completion of the switch before the next RH implementation period (2028). This project is briefly described in the utility's 2021 Integrated Resource Plan (IRP)[67] and is anticipated to result in further significant reductions of SO_2 and NOx emissions from this facility and diminish its potential for future visibility impacts.

[66] **Appendix I-3.2** - OPPD Board of Directors Action – Approval of North Omaha Station Extension (Resolution 6518), August 16, 2022, https://www.oppd.com/media/318375/2022-8-august-resolution-6518-nos-current-state-extension.pdf

[67] 2021 OPPD Integrated Resource Plan, https://www.oppdcommunityconnect.com/irp

Additional Sources

Discussion regarding additional sources identified during Nebraska's consultation with Federal Land Managers (FLMs) can be found in **Section IV**. and **Appendix D**.

G. Four-factor Analyses

40 CFR 51.308(f)(2)(i) *The State must evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment.*

As discussed in **Section B**., Nebraska's long-term strategy will be revised again in 2028 and in successive ten-year periods thereafter until 2064. Moreover, all identified Class I areas potentially impacted by emissions originating in Nebraska are currently making reasonable progress and are projected to meet reasonable progress goals for the second implementation period without additional emission reductions from Nebraska sources. Nebraska has demonstrated progress in reducing SO_2 and NOx emissions since the first implementation period. This includes reductions of SO_2 and NOx from Nebraska's fleet of coal-fired EGUs. These reductions are expected to continue, and, in the case of GGS, is backed up by a commitment to limit annual emissions of SO_2[68]; modeling[69] demonstrates that compliance with that limit will ensure that progress towards the national visibility goal remains ahead of schedule. No state has asked for any additional emission reductions from Nebraska sources in order to protect or ensure reasonable progress on visibility. For all these reasons, as set forth fully above, NDEE concludes that additional emission reduction measures are not necessary for this period.

Additionally, as explained above in **Section F.**, the CAMx modeling analyses made available to NDEE demonstrated that further analysis of both GGS and NCS was not necessary because they have no significant impact on visibility at the identified Class I areas, and because further emission reductions would not result in significant visibility improvement. Nevertheless, in order to provide a robust analysis, Nebraska elected to perform a four-factor analysis on GGS and NCS.

As a part of its initial information collection, Nebraska requested that NPPD and OPPD submit technical analysis and data for the four factors (cost of compliance, time necessary to install controls, energy and non-air quality impacts, and remaining useful life) for a number of emission control options. NDEE requested that the following controls be evaluated:

[68] See **Appendix H-1.8** - Regional Haze MOU – NDEE-NPPD.

[69] See **Appendix H-2.2** - NPPD Amended Supplemental Regional Haze Modeling Response to NDEE ICR for GGS.

- SO_2:
  - Wet Flue Gas Desulfurization (WFGD) at not less than 91% control efficiency (range ~91-94%)
  - Spray Dry Absorption (SDA) at not less than 90% control efficiency
  - Dry Sorbent Injection (DSI) at not less than 40% control efficiency (range ~40-80%)
  - Lower Sulfur Coal, including its use in combination with DSI
  - Fuel switching from subbituminous coal to natural gas
- NOx: Optimization of NOx controls currently installed

NDEE did not request information on additional NOx reduction strategies (e.g., SCR or SNCR) because sulfates rather than nitrates are the dominant form of anthropogenically-sourced light extinction in the three Class I Areas identified as potentially impacted by Nebraska sources. Moreover, the sources identified for further evaluation currently operate NOx control equipment on their emission units. CAMx modeling submitted to NDEE has confirmed that neither GGS nor NCS is a significant source of nitrate concentrations in any of those Class I areas.[70]

NPPD and OPPD submitted the requested information, which is contained in **Appendix H-1.1** (GGS) and **Appendix I-1** (NCS). For the reasons set forth below, the four-factor analysis of additional controls on GGS and NCS shows that additional controls are not necessary or reasonable for the second implementation period.

[70] See **Appendix H-3.9** - NPPD's Reply to Sierra Club-NPCA Comments (August 3, 2021).

1) Cost Of Compliance

Cost analyses for the control measures identified by Nebraska were submitted by NPPD and OPPD for GGS and NCS, respectively. These are contained in **Appendices H** (GGS) and **I** (NCS).

Gerald Gentleman Station, Units 1 and 2

To perform a cost analysis, NPPD first determined the feasibility of the control measures identified by Nebraska and anticipated emission reductions which would result from their implementation. NPPD then performed a cost analysis on those controls determined to be technically feasible.

Feasibility *(see* ***Appendix H-1.1****, NPPD Regional Haze Response - Appendix F, sections 3 and 4)****:***

Optimization of NOx controls currently installed

NPPD's analysis of existing NOx controls in operation (low NOx burners with overfire air) concluded that controls on each unit are currently optimized and further optimization is technically infeasible. NOx control operations at GGS are used to comply with the Mercury Air Toxic Standard (MATS); changing combustion practices could affect the facility's ability to comply with this standard and would likely produce minimal (<5%) reductions in NOx.[71]

Wet Flue Gas Desulfurization (WFGD) at not less than 91% control efficiency

NPPD's analysis assumed a WFGD system designed as a limestone spray tower scrubber with forced oxidation, as the majority of the WFGD systems for high-sulfur utility boilers are designed as such. This type of system is technically feasible as a control option for the boilers (Units 1 and 2) at GGS. However, as noted below, NPPD has presented information to demonstrate that this type of system is not affordable at GGS, considering (a) the impact that the cost of these controls would have on GGS rates and NPPD's customer base and (b) the fact that the annual cost of these controls far exceeds expected annual revenues for these units.

The analysis indicates that operation of this WFGD system would enable both units to achieve an outlet SO_2 emission rate of 0.04 lb/MMBtu, which equates to 93% removal efficiency. Anticipated emission reductions resulting from implementation of a WFGD system on Units 1 and 2 are 9,817 tpy and 10,406 tpy, respectively; a portion of the reduction would be attributed to a significant projected decrease in capacity factor, due to increased operating costs that would be imposed by the emissions control equipment. Those increased operating costs would

[71] **Appendix H-1.1** - NPPD Regional Haze Response to NDEE Information Collection Request (ICR) for GGS (November 2, 2020), page 7.

make the GGS units less economical and less competitive in the SPP market and decrease the units' dispatch and operation in the market.

Spray Dry Absorption (SDA) at not less than 90% control efficiency

NPPD's analysis assumed an SDA system with modification and reuse of the existing air heaters, baghouses, and appurtenant ductwork, as it was a more economical approach than installation of a new SDA-type Dry Flue Gas Desulfurization (DFGD) system. This type of system is technically feasible as a control option for Units 1 and 2 at GGS. However, as noted below, NPPD has presented information showing that this type of system is not affordable at GGS, considering (a) the impact the cost of these controls would have on GGS rates and NPPD's customer base and (b) the fact that the annual cost of these controls far exceeds expected annual revenues for these units.

The analysis indicates that operation of this system would enable Units 1 and 2 to achieve 90% removal efficiency. Anticipated SO_2 emission reductions resulting from implementation of an SDA system on Unit 1 and 2 are 9,653 tpy and 10,223 tpy, respectively; a portion of the reduction would be attributed to a significant projected decrease in capacity factor, due to increased operating costs that would be imposed by the emissions control equipment. Those increased operating costs would make the GGS units less economical and less competitive in the SPP market and decrease the units' dispatch and operation in the SPP market.

Dry Sorbent Injection (DSI) at not less than 40% control efficiency

NPPD's analysis assumed a DSI system with a baghouse fabric filter. This type of system is technically feasible as a control option for Units 1 and 2 at GGS.

The analysis indicates that operation of this system would enable Unit 1 and 2 to achieve a 40% removal efficiency. Anticipated SO_2 emission reductions resulting from implementation of a DSI system on Units 1 and 2 are 5,949 tpy and 6,295 tpy, respectively.

Lower Sulfur Coal, including its use in combination with DSI

The sulfur content of the Powder River Basin (PRB) coal currently in use at GGS ranges from 0.21-1.0%,[72] and is defined as low-sulfur coal by the Energy Information Administration (EIA).[73] NPPD has explained why it is not feasible to procure a long-term supply of coal with a lower sulfur content than that which NPPD currently burns.[74] NDEE finds NPPD's explanation

[72] **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR For GGS (November 3, 2020).

[73] Low-sulfur coal generally contains 1 percent or less sulfur by weight. For air quality standards, "low sulfur coal" contains 0.6 pounds or less sulfur per million Btu, which is equivalent to 1.2 pounds of sulfur dioxide per million Btu. SOURCE: Energy Information Administration (EIA) Glossary https://www.eia.gov/tools/glossary/index.php?id=Coal%20grade#:~:text=Low%2Dsulfur%20coal%20generally%20contains,the%20requirements%20for%20making%20coke.

[74] **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR For GGS (November 2, 2020), Appendix F – Sargent & Lundy Report, pages 15-16.

reasonable. The volatility of the PRB mining industry makes it untenable to rely on further lowering of sulfur content in the fuel source as a long-term strategy. This option is not considered feasible for implementation at GGS.

Fuel switching from subbituminous coal to natural gas

Converting Units 1 and/or 2 at GGS to utilize natural gas would require extensive modifications to the existing facility. A detailed description of these modifications and the impacts of such a project are provided in NPPD's submittal (Appendix F, Section 4.2.8.1) found in **Appendix H-1.1**. While conversion of Units 1 and 2 to natural gas would be technically feasible, the costs would be significant and the reduction in capacity factor of the units would be impractical and unreasonable. Converting Units 1 and 2 at GGS would essentially change the units to a very high-cost peaking status due to increased costs of generation and would be tantamount to a required shutdown. NPPD has determined that a conversion of Units 1 and 2 and the associated increase to variable operation and maintenance (O&M) costs is unreasonable. Fuel switching is therefore not practically feasible.

Cost:

NPPD presented information and analyses showing that neither WFGD nor SDA systems on GGS would be affordable, considering (a) the impact the cost of these controls would have on GGS rates and NPPD's customer base and (b) the fact that the annual cost of these controls far exceed expected annual revenues for these units.[75] Because these technologies are not affordable, and requiring them for GGS would be more likely to result in the premature shutdown of the facility than significant visibility improvement for any Class I area, these controls are unreasonable for that reason alone. But even if these technologies were affordable, they would not be reasonable considering the cost in dollars per ton removed. Both inquiries – affordability and reasonableness – must begin with analysis of the cost of controls at issue. NPPD presented information and analysis prepared by Sargent & Lundy on the actual project costs that NPPD would incur to install various SO_2 control technologies. These cost estimates account for site conditions at GGS and are consistent with the methodologies described in EPA's Control Cost Manual (CCM). NDEE therefore finds that the Sargent & Lundy cost estimates are reasonable estimates for the costs NPPD would bear for the installation and operation of WFGD, SDA and DSI at GGS.

The cost estimates provided by NPPD were amortized over an eight-year period (2028-2035) because NPPD's policy is to pay off the capital costs of production and production-related equipment prior to the expiration date of the current wholesale power contracts. A majority of NPPD's revenue comes from wholesale contracts. NPPD's current wholesale contracts expire in

[75] **Appendix H-1.7** - NPPD Supplemental Affordability Analysis, Regional Haze-Second Implementation Period (November 15, 2021), pages 6-9.

2035. NPPD has demonstrated that it has no means to ensure a revenue stream beyond the expiration of its current wholesale contracts,[76] and that funding a capital project beyond the expiration of this guaranteed revenue stream would adversely affect NPPD's credit rating. NDEE has reviewed the information submitted by NPPD and agrees that an application of an 8-year amortization period is appropriate when evaluating capital expenditures by NPPD in the second implementation period. Although OPPD has provided cost estimates using a 30-year amortization period, OPPD has a captive customer base and NPPD does not. NPPD's reliance on its wholesale power contracts and inability to finance costs over a 30-year period would make a similar 30-year amortization assumption unreasonable for NPPD.

NDEE concludes that the most accurate estimates of the control costs that NPPD would actually incur at GGS are set forth in the following table (**Table 8**).

TABLE 8. Sargent & Lundy SO_2 Control Cost Summary – Actual Annual Cost ($/yr) Over 8-Year Period

Control Option	Unit	Actual Annual Cost
WFGD	Unit 1	$109,528,000
	Unit 2	$108,873,000
SDA	Unit 1	$105,452,000
	Unit 2	$107,092,000
DSI	Unit 1	$12,090,000
	Unit 2	$12,105,000

Analysis provided by NPPD shows that if it had to absorb the annual costs of scrubbers (WFGD or SDA), its wholesale costs would then exceed contractual benchmarks.[77] Exceeding these contractual benchmarks triggers the right of wholesale customers to reduce their purchases, which in turn would allocate fixed costs over fewer and fewer customer sales—thereby inflating the wholesale costs further. This analysis demonstrates that neither WFGD nor SDA technology is affordable at GGS,[78] which was confirmed by a use of the cost/sales ratio, a recognized approach to assessing the affordability of controls on specific sources.[79] The expected annual costs of scrubbers on GGS are more than three times the expected annual

[76] **Appendix H-1.2** - NPPD Regional Haze Response to NDEE Additional Cost Questions (March 31, 2021), page 4.
[77] **Appendix H-1.7** - NPPD Supplemental Affordability Analysis (November 15, 2021), pages 6-8.
[78] *Id*.
[79] *Id*., pages 8-9.

revenues that would be generated by the station. This is orders of magnitude above the 3% ratio that EPA has previously identified as the cutoff for affordability.[80]

Even if WFGD or SDA were affordable for GGS, the costs are unreasonable on the basis of dollars per ton of pollutant removed. Using the Sargent & Lundy cost estimates and projected rates of generation and removal associated with each control technology, the following table represents a reasonable estimate of the dollars per ton of SO_2 removed.

TABLE 9. Sargent & Lundy SO_2 Control Cost Summary – Annual Cost-Effectiveness ($/ton of SO_2 removed) for Actual Project Costs over 8-Year Period

Control Option	Unit	Expected SO_2 Emission Reduction (tpy)	$/ton of SO_2 removed
WFGD	Unit 1	9,817	$11,157
	Unit 2	10,406	$10,463
SDA	Unit 1	9,653	$10,924
	Unit 2	10,223	$10,476
DSI	Unit 1	5,949	$2,032
	Unit 2	6,295	$1,923

The costs of WFGD and SDA, on a dollar per ton basis, are more than twice the amount ($5,000/ton) used to define costs as unreasonable in the first implementation period and by some states (e.g., Texas) in the second implementation period. Thus, even if these technologies were affordable at GGS, the costs of installation and operation are not reasonable when weighed against the emission reductions they would produce.[81]

At the request of NDEE, NPPD also produced calculations using formulas set forth in EPA's CCM. The resulting costs are not materially different from the actual project cost estimates provided by Sargent & Lundy (generally less than 1%, when expressed in constant dollars).[82] Thus, NDEE finds that the Sargent & Lundy costs are consistent with those based on the EPA CCM, and are reasonable for use in a four-factor analysis.[83]

[80] NPPD also provided an analysis of the affordability of WFGD and SDA systems at GGS using the assumption of a 30-year amortization period. That analysis showed that even if NDEE used the unreasonable assumption of a 30-year payback period in the affordability analysis, both types of scrubber technologies remain unaffordable at GGS. Thus, the decision of whether to amortize costs over 8 years or 30 years is immaterial to the question of whether the actual project costs would be affordable for NPPD. In either case, requiring scrubbers for SO_2 (of any sort) on GGS would risk the continued viability of GGS.

[81] As discussed below, DSI would not produce enough visibility benefit to justify the costs.

[82] See **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR For GGS (November 3, 2020).

[83] See **Appendix C** - Cost Analysis Comparison.

An additional analysis regarding capital costs of wet and dry scrubber technology was conducted and submitted by NPPD in May 2023. This analysis compared the Sargent & Lundy Actual Project Cost estimates (**Appendix H-1.1**) to cost data for comparable projects at other EGUs (**Appendix H-1.10**), which was obtained from publicly available information submitted to the Energy Information Administration (EIA). This analysis indicates that Sargent & Lundy Actual Project Cost estimates are consistent with cost data from comparable projects at other EGUs. This supports NDEE's conclusion that the Sargent & Lundy Actual Project Cost estimates are reasonable.

Nebraska City Station, Unit 1

Feasibility:

To perform a cost analysis, OPPD first had to determine the feasibility of the control measures identified by Nebraska and anticipated emission reductions which would result from their implementation. OPPD then performed a cost analysis on those controls determined to be technically feasible. Detailed analysis is presented in **Appendix I**-1.

NOx: Optimization of NOx controls currently installed

OPPD's analysis of existing NOx controls in operation (low NOx burners with overfire air) concludes that controls on each unit are currently optimized; with the currently installed controls there are no significant opportunities to achieve further NOx emission reductions on Unit 1.

Wet Flue Gas Desulfurization (WFGD) at not less than 91% control efficiency

OPPD's analysis assumed a typical WFGD system consisting of sorbent storage and preparation equipment, an absorber vessel, a mist eliminator, and waste collection and treatment vessels. This type of system is technically feasible as a control option for Unit 1 at NCS.

The analysis indicates that operation of this system would enable Unit 1 to achieve a 92.5% removal efficiency. Maximum established SO_2 emission reductions resulting from implementation of a WFGD system on Unit 1 are 11,415 tpy. This is a theoretical reduction assuming Unit 1 was still emitting in line with 2010 emissions reported above for the facility (both units). However, as shown above, SO_2 emissions in 2021 from both units had dropped to just over 7,000 tons/year, so it is likely that actual SO_2 reductions for Unit 1 with a WFGD system would be far less than the maximum calculated value of 11,415 tpy.

Spray Dry Absorption (SDA) at not less than 90% control efficiency

OPPD's analysis assumed a once-through SDA system consisting of a gas absorber with a separate absorber vessel and a baghouse. This system does not regenerate and reuse sorbent, nor is any of the system discharge assumed to be sold as a byproduct. This type of system is technically feasible as a control option for Unit 1 at NCS.

The analysis indicates that operation of this system would enable Unit 1 to achieve 90% removal efficiency. Maximum estimated SO_2 emission reductions resulting from implementation of an SDA system on Unit 1 are 11,106 tpy. This is a theoretical reduction assuming Unit 1 was still emitting in line with 2010 emissions reported above for the facility (both units). However, as shown above, SO_2 emissions in 2021 from both units had dropped to just over 7,000 tons/year, so it is likely that actual SO_2 reductions for Unit 1 with an SDA system would be far less than the maximum calculated value of 11,106 tpy.

Dry Sorbent Injection (DSI) at not less than 40% control efficiency

OPPD's analysis assumed a DSI system consisting of storage silos, milling equipment, and blowers. This type of system is technically feasible as a control option for Unit 1 at NCS.

The analysis indicates that operation of this system would enable Unit 1 to achieve a 40% removal efficiency. Maximum SO_2 emission reductions resulting from implementation of a DSI system on Unit 1 are 4,936 tpy. Based on reported facility-total SO_2 emissions in 2021 (see earlier discussion), the actual SO_2 reduction from utilization of DSI on Unit 1 is likely to be substantially less.

Lower Sulfur Coal, including its use in combination with DSI

The sulfur content of the Powder River Basin (PRB) coal currently in use at NCS is typically at the low end of the range of sulfur content of the PRB coal. Average SO_2 emissions (2017-2019) from NCS Unit 1 were approximately 0.6 lb/MMBtu, which is approximately half of the low sulfur coal threshold,[84] as defined by the EIA. OPPD determined that the volatility of the PRB mining industry makes reliance on lower sulfur coal as part of the RH long-term strategy untenable. This option is not considered feasible for implementation at NCS.

Fuel switching from subbituminous coal to natural gas

OPPD found that converting Unit 1 at NCS to use natural gas would essentially change the unit to peaking status due to reduced market demand and be tantamount to a required shutdown.

[84] Low-sulfur coal generally contains 1 percent or less sulfur by weight. For air quality standards, "low sulfur coal" contains 0.6 pounds or less sulfur per million Btu, which is equivalent to 1.2 pounds of sulfur dioxide per million Btu. SOURCE: EIA Glossary: Coal Grade, https://www.eia.gov/tools/glossary/index.php?id=Coal%20grade#:~:text=Low%2Dsulfur%20coal%20generally%20contains,the%20requirements%20for%20making%20coke

OPPD based this determination on observations made when OPPD NOS units converted to natural gas in 2016. It is OPPD's determination that a conversion of Unit 1 and the associated increase to variable operation and maintenance (O&M) costs is unreasonable. Fuel switching is therefore not feasible.

Cost:

Costs estimates for the controls evaluated were calculated using the EPA CCM and assumptions, criteria, and related details of the cost analyses are described in OPPD's submittal.[85]

Cost estimates were provided for a 30-year amortization period.[86] **Tables 10** and **11** contain cost estimates provided for controls deemed to be technically feasible at NCS.

TABLE 10. OPPD-NCS Unit 1 SO_2 Control Cost Summary – Total Annual Cost ($/yr)

Control Option	Annual Cost
WFGD	$35,815,446
SDA	$36,500,224
DSI	$16,281,318

TABLE 11. OPPD-NCS Unit 1 SO_2 Control Cost Summary – Annual Cost-Effectiveness ($/ton of SO_2 removed)

Control Option	Expected Emission Reduction (tpy)	Cost-Effectiveness
WFGD	11,415	$3,138
SDA	11,106	$3,287
DSI	4,936	$3,298

[85] **Appendix I-1** - OPPD Response to NDEE RH Information Request for Nebraska City Station Unit 1 (November 4, 2020), Section 2. Control Strategy Evaluation – NCS1-SO_2.

[86] In contrast to NPPD, OPPD has a captive customer base. Unlike NPPD, OPPD could therefore reasonably secure long-term financing for capital projects without the constraint of expiring wholesale power contracts and without the risk of losing wholesale customers. It is therefore reasonable for NDEE to evaluate costs for NPPD over an 8-year period and to evaluate costs for OPPD over a 30-year period. The NPPD wholesale power contracts and the ability of NPPD's customers to leave justifies the different period for cost estimates between the two utilities.

These costs are unrealistically low. As identified by OPPD,[87] the cost analysis created using EPA's cost control manual does not account for any associated decrease in utilization. Both NPPD and OPPD are members of the SPP, and an increase in the O&M costs resulting from the implementation of SO_2 controls would decrease the rate at which the identified units would be dispatched within the SPP. An increase in O&M costs would result in decreased revenue due to lower utilization and render controls less economic than indicated by the $/ton removed calculated using formulas set forth in the CCM.[88] Furthermore, as explained earlier, SO_2 emission reductions are likely to be far less than the reductions estimated in **Table 11**, given that 2021 facility total emissions have already dropped much lower than the projected reductions listed in **Table 11** for WFGD or SDA installation on Unit 1. The resulting cost-effectiveness values would be far higher than the values shown. This is in addition to the higher $/ton of SO_2 removed costs due to reduction in utilization of Unit 1 as a result of the increase in O&M costs for WFGD or SDA implementation as explained above.

Additional Considerations

- Nebraska is served by a unique public power system.[89] The Power Review Board, created in 1963, regulates Nebraska's electric utility industry. Its duties and responsibilities include creation and certification of retail and wholesale service area agreements between electric utilities in the state, approval of construction of new electric generating facilities, and construction or acquisition of transmission lines or related facilities carrying more than 700 volts (unless within a supplier's own certified service area). Locally elected utility boards have governing authority within utility entities, which include full authority for directing the construction of new generation facilities, retirement and decommission of older facilities, and determining rates.
- According to the Climate and Economic Justice Screening Tool (CEJST), developed by the Council on Environmental Quality in accordance with Executive Order 14008, there are twenty counties in Nebraska that contain at least one community that is disadvantaged because it is greater than or equal to the 90th percentile for energy burden and is low income.[90] The service areas of both NPPD and OPPD contain disadvantaged communities.
- Supply chain interruptions and rising inflation are currently contributing to an increased cost for the construction of large projects. These issues are not enough to preclude the

[87] **Appendix I-1** - OPPD Response to NDEE RH Information Request for Nebraska City Station Unit 1 (November 4, 2020), cover letter, page 4.
[88] The same is true for NPPD, and represents another reason that the Sargent & Lundy Actual Project Costs are the most reasonable estimates for GGS.
[89] A Legislative Review Office Backgrounder on public power in Nebraska is available at https://nebraskalegislature.gov/pdf/reports/research/public_power_2018.pdf
[90] Climate and Economic Justice Screening Tool (CEJST) https://screeningtool.geoplatform.gov/en/. These are communities where the average annual energy costs divided by household income are above the 90th percentile.

implementation of emission reduction measures on their own. However, Nebraska finds that the uncertainty in future costs for large construction projects is relevant to an evaluation of emission control measures for this implementation period and makes large capital expenditures for projects with no perceptible visibility impact particularly unreasonable. In this regard, all potentially affected Class I areas are currently projected to be at or below their adjusted URP glidepath[91] and meet reasonable progress goals without additional emission reductions until 2028, when the State's long-term strategy will require revision once again; moreover, no state with Class I areas is requesting any further emission reductions from Nebraska in this planning period.

- Nebraska has the discretion to consider the anticipated visibility benefits of an emission control measure along with cost when determining whether a measure is necessary to make reasonable progress.[92] According to the photochemical modeling submitted by NPPD and OPPD, none of the emission reduction measures analyzed, if implemented, would result in a significant or meaningful improvement in visibility at any of the potentially affected Class I areas. Even with the addition of scrubbers on GGS and NCS and the conversion of NOS to gas – the most aggressive emissions control strategy modeled – there would be only a negligible benefit on visibility in any Class I area (see **Tables 2** and **3** above). Requiring less aggressive controls (i.e., DSI) would naturally produce even less visibility improvement. Any cost incurred as a result of an emission reduction measure is not reasonable when the reduction will not result in a perceptible improvement to visibility. This is especially true because, even without additional controls, neither source was significantly contributing to visibility impairment at the Class I areas. The conclusion that the cost of imperceptible visibility benefit is not reasonable is confirmed by the dollars per deciview analysis. Imposing the most aggressive SO_2 control strategies on GGS and NCS (and repowering NOS) would produce no more than a 0.14 deciview improvement at Wind Cave NP (less at other Class I areas). A combined annual cost of over $254.8 million to NPPD and OPPD amounts to over $1.8 billion per deciview per year—a cost that is patently unreasonable, particularly when one considers that visibility improvement in Wind Cave NP (like the other Class I areas) is already projected to be ahead of schedule, in comparison to the glidepath, in 2028.[93]

[91] EPA's *Availability of Modeling Data and Associated Technical Support Document for the EPA's Updated 2028 Visibility Air Quality Modeling* (September 19, 2019), https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf

[92] EPA's *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period* (August 20, 2019) - page 37, https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

[93] The cost of DSI in terms of dollars per deciview is also unreasonable. DSI would produce less visibility improvement than the scrubber modeled on GGS and NCS. The combined annual cost of DSI on GGS and NCS combined would be over $40 million. That amounts to over $285 million dollars per deciview per year at Wind Cave NP. That $/dv number is very conservative, because the visibility change produced by DSI would be less than that of the scrubbers used to calculate the 0.14 dv improvement in the CAMx modeling.

Summary

Because the state of Nebraska is served entirely by publicly owned utilities, which are locally controlled not-for-profit entities, cost of compliance is a key consideration when evaluating the reasonableness of emission reduction measures under the RH Rule. The costs identified in this section represent too great a burden to be placed on Nebraska EGUs and represent an unreasonable risk to Nebraska's unique public power structure given the uncertainty in the construction and financing of projects due to current economic conditions. Additionally, the Class I areas which are potentially affected by emissions from GGS and NCS are projected to meet RPGs for the second implementation period without additional emission reductions from Nebraska sources, and no states have requested emission reductions from Nebraska.[94] These facts make it unreasonable for Nebraska to require additional reductions during the second implementation period. Based on the information provided by NPPD and OPPD and for the reasons detailed in this section, Nebraska finds the implementation of any of the identified emission reduction measures would not be reasonable for the second implementation period.

[94] South Dakota, New Mexico, Colorado, and Oklahoma project that visibility conditions at their respective Class I areas will be at or below their respective URP glidepaths in 2028 without any further emission reductions. See **Appendix A** - Visibility at Class I Areas.

2) Time Necessary For Compliance

The time required to install controls and begin operation at GGS and NCS are described as follows:

Gerald Gentleman Station

Project start dates: Not later than 2025

Implementation period: Fifty-six (56) months (WFGD), 50 months (SDA) and 18 months (DSI), for controls to be in place and operational for the second implementation period.

Nebraska City Station

Project start dates: Not later than 2025

Implementation period: 4 years, or 48 months (WFGD, SDA, and DSI), for controls to be in place and operational for the second implementation period.

3) Energy and Non-Air Quality Impacts

Detailed information regarding energy and non-air impacts associated with implementation of the evaluated control measures are described in each source's submittal documents. The following is a brief a summary of these impacts:

Gerald Gentleman Station

WFGD

- Increased waste to landfill (new landfill may be required)
- Increased consumptive water use and potential offsets from retired irrigated land
- Increased auxiliary power requirements and heat rate penalty
- Decrease in dispatch due to increased costs of operation (discussed below)

SDA

- Increased waste to landfill
- Increased consumptive water use and potential offsets from retired irrigated land
- Increased auxiliary power requirements and heat rate penalty
- Decrease in dispatch due to increased costs of operation (discussed below)

DSI

- Increased waste to landfill
- Increased consumptive water use and potential offsets from retired irrigated land
- Increased auxiliary power requirements

Nebraska City Station

WFGD

- Increased solid waste (spent reagent) to landfill
- Increased liquid waste (slurry water) that will require treatment
- Increased auxiliary power requirements

SDA

- Increased solid waste (spent reagent) to landfill
- Increased auxiliary power requirements

DSI

- Increased solid waste (spent reagent) to landfill
- Increased auxiliary power requirements

Capacity

In evaluating energy and non-air impacts, Nebraska gives strong consideration to the projected effect of emission control measures on generation capacity. Both GGS and NCS are members of the SPP. In February of 2021, a polar vortex put incredible strain on the electric grid and both GGS and NCS were instrumental in meeting energy demands and providing lifesaving electricity to the grid when other EGUs were failing. It is important, not just to the citizens of Nebraska but to everyone who depends on electricity distributed within the SPP, that the capacity provided by GGS and NCS not be endangered by implementing unnecessary and unreasonable emission reduction measures.

An increase in O&M costs results in a lower rate of dispatch within the SPP.[95] A lower rate of dispatch would tend to negatively impact the economic viability of both GGS and NCS within Nebraska's non-profit public power system. If NPPD or OPPD were forced to retire one of these sources because they were no longer economically viable, then their generation capacity would no longer be available to the SPP. Nebraska considers any emission control measure implemented under the RH Rule unreasonable if it would threaten the viability of, and ultimately the generation capacity provided by, GGS and NCS. NPPD has presented analyses showing that scrubbers on GGS would not be affordable, considering (a) the impact the cost of these controls would have on GGS rates and NPPD's customer base and (b) the fact that the annual cost of these controls far exceeds expected annual revenues for these units. NDEE concludes that requiring retrofit of GGS with scrubbers would threaten the viability of this essential generation asset and would therefore be unreasonable for that reason alone.

[95] **Appendix I-1** - OPPD Response to NDEE RH Information Request for Nebraska City Station Unit 1 (November 4, 2020), page 3.

4) Remaining Useful Life

Economic factors will determine the remaining useful life of these electric generating units.[96] NDEE estimates the "remaining useful life" for each of the facilities evaluated (GGS and NCS) are greater than 20 years.[97]

[96] **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS (November 2, 2020), Section 9. Remaining Useful Life, page 46.

[97] As noted above, NDEE is using an 8-year amortization period to estimate costs for GGS, due to specific economic and contractual factors unique to NPPD. These factors make the use of a 30-year amortization period an unreasonable assumption with respect to NPPD. NDEE is not required to use a 30-year amortization period in evaluating costs, and may not use unreasonable assumptions in such an evaluation.

H. Additional Five Factors

40 CFR 51.308(f)(2)(iv) *The State must consider the following additional factors in developing its long-term strategy:*

(A) *Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment;*

(B) *Measures to mitigate the impacts of construction activities;*

(C) *Source retirement and replacement schedules;*

(D) *Basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs; and*

(E) *The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy.*

1) Emission Reductions due to Ongoing Air Pollution Control Programs

a) Cross-State Air Pollution Rule (CSAPR)

EPA finalized CSAPR on July 6, 2011, to address air pollution that crosses state lines and affects air quality in downwind states; it replaced the 2005 Clean Air Interstate Rule (CAIR), and implementation began in January 2015. This rule resulted in the creation of trading programs for both SO_2 and NOx emissions. These pollutants react in the atmosphere and contribute to the formation of fine particle (soot) pollution and ground-level ozone (smog) formation. Soot and smog can affect visibility in local and regional areas but can also travel downwind for hundreds of miles.

CSAPR requires 27 states to improve air quality by reducing emissions from power plants that contribute to air pollution in downwind states. EPA established pollution limits for each state and allowances are allocated to sources to help limit emissions. Sources can buy and sell allowances and bank them for future use, provided they hold an adequate amount to cover facility emissions by the end of the compliance period. Nebraska participates in the Group 2 SO_2 Trading program and Annual NOx program, which consists of allowances allocated to each of 19 electricity generating units (EGUs) within the state. To date, SO_2 and NOx emissions have typically been below the annual emissions allowances, based on data acquired from the CAMD program database.

During the first RH planning period, the Best Available Retrofit Technology (BART) determination for SO_2 at GGS was disapproved July 6, 2012 (77 FR 40149) and a FIP was promulgated, relying on CSAPR to meet BART for SO_2. GGS continues to participate in the CSAPR Group 2 Trading program and is allotted 28,896 tpy in allowances. In March 2018, the United States Court of Appeals for the District of Columbia Circuit (the D.C. Circuit) upheld the EPA Rule that CSAPR is an alternative to application of source-specific BART.

Consistent with EPA's finding regarding BART for SO_2 at GGS for the first planning period, Nebraska confirms that CSAPR will provide for greater reasonable progress than BART, and a source which complies with requirements of the CSAPR SO_2 Group 2 Trading Program in subpart DDDDD of 40 CFR Part 97 will satisfy BART. Information on the CSAPR program is available at https://www.epa.gov/csapr/overview-cross-state-air-pollution-rule-csapr.

b) Mobile Source Related Emissions and Standards

Tier 2 Vehicle Emissions Standards and Gasoline Sulfur Control Requirements

EPA set Tier 2 standards for tailpipe emissions for all passenger vehicles, including sport utility vehicles (SUVs), minivans, vans, and pick-up trucks beginning in 2004. This rule required reduced levels of sulfur in gasoline and included new tailpipe standards set at an average of 0.07 grams per mile for NOx. Vehicles weighing less than 6,000 pounds were to be phased-in to this standard between 2004 and 2007, with medium-duty vehicles phased in for 2008.

Since 2008,[98] Nebraska on-road emissions decreased by 79.2% (SO_2) and 62.2% (NOx). Onroad emissions[99] accounted for 26.4% of Nebraska's total NOx emissions in 2020.

Tier 3 Motor Vehicle Emission and Fuels Standards

The Tier 3 standards were promulgated in April 2014 with final technical amendments issued in April 2016. This rule set new vehicle emissions standards and required a lower sulfur content of gasoline, considering the vehicle and its fuel as an integrated system. The more stringent vehicle emissions standards were designed to make emissions control systems more effective and reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles.

The tailpipe standards include different phase-in schedules that vary by vehicle class, but generally phase in between model years 2017 and 2025.

Since 2017,[100] Nebraska on-road emissions decreased by 42.1% (SO_2) and 28.1% (NOx). As noted above, onroad emissions accounted for 26.4% of Nebraska's total NOx emissions in 2020.

Locomotive 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

[98] EPA's 2008 National Emissions Inventory (NEI) data – NOx, Highway Vehicles and Off Highway, https://www.epa.gov/air-emissions-inventories/2008-national-emissions-inventory-nei-data#datas
[99] The onroad NOx emissions total from Table 27 were used in this calculation.
[100] EPA's 2017 National Emissions Inventory (NEI) data – NOx, Highway Vehicles and Off Highway, https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data

these types of engines. Amendments were issued in 2011 that revised and further clarified portions of the rule.

Since 2008,[101] Nebraska non-road PM and NOx emission reductions decreased by 56.8% and 51.5%, respectively. Nonroad emissions[102] accounted for 49.8% of Nebraska's total NOx emissions in 2020.

Small Engine (personal watercraft; lawn and garden equipment)

EPA adopted standards for emissions from nonroad spark-ignition engines and equipment, typically found in personal watercraft and lawn and garden equipment in 2008. The standards were designed to substantially reduce Volatile Organic Compound (VOC) and NOx emissions from these types of engines, and address exhaust and evaporative emission standards. The rule also includes a variety of amendments to other programs that address nonroad and highway emissions.

Since 2008, Nebraska nonroad emissions decreased by 51.5% (NOx) and 55.3% (VOC). As noted above, nonroad emissions accounted for 49.8% of Nebraska's total NOx emissions in 2020.

Clean Alternative Fuel Vehicles and Engine Conversions

In 2011, EPA finalized the Clean Alternative Fuel Vehicle and Engine Conversions Rule,[103] which streamlined the process for manufacturers to demonstrate compliance of clean alternative fuel conversion systems with vehicle and engine emissions requirements. This rule exempted manufacturers of these systems from the CAA prohibition against tampering violations when vehicles and engines are converted to operate on a clean alternative fuel.

Use of Year-Round E15

Gasoline blended with 15% ethanol (E15) is not typically sold in the summer months due to its volatility in warmer temperatures. On April 28, 2022, Governors from eight states – including Nebraska – sent a letter[104] to EPA Administrator Michael Regan requesting that EPA promulgate a regulation to apply the Reid Vapor Pressure (RVP) limitation established in Section 211(h)(1) of the CAA for all fuel blends containing gasoline and 10% ethanol (E10), in place of the current limit in Section 211(h)(4). EPA approval of the RVP limit in Section

[101] EPA's 2008 National Emissions Inventory (NEI) data – NOx, Highway Vehicles and Off Highway, https://www.epa.gov/air-emissions-inventories/2008-national-emissions-inventory-nei-data#datas

[102] The nonroad NOx emissions total from Table 27 was used in this calculation.

[103] *Clean Alternative Fuel Vehicle and Engine Conversions* (76 FR 19829), April 8, 2011, https://www.govinfo.gov/content/pkg/FR-2011-04-08/pdf/2011-7910.pdf

[104] **Appendix J-1** -States' letter to EPA requesting approval of the RVP limit in CAA Section 211(h)(1), (April 28, 2022).

211(h)(1) would also allow for the year-round sale and use of higher blended ethanol fuels, such as E15, which state signatories of the April 2022 letter emphasized is needed.

The RVP limit of 9.0 pounds per square inch (psi), in Section 211(h)(1), is one psi lower than the current limit applicable to ethanol blended fuels. The signatory states provided a modeling analysis[105] to demonstrate that summertime use of E10 at 9.0 psi RVP would not result in increased emissions using the Motor Vehicle Emission Simulator – version 3 (MOVES3) modeling platform. The MOVES3 modeling summary indicates that onroad and nonroad NOx and VOC emissions in Nebraska would actually decrease by 0.09% and 2.6%, respectively, and recent studies[106] indicate that E15 would reduce vehicle exhaust emissions beyond that of E10.

On April 29, 2022, the EPA issued an emergency fuel waiver to allow E15 to be sold during the summer months in 2022.

In September 2022, Nebraska submitted its request to EPA for an RVP waiver and testing exemption for the use of E30 (70% gasoline and 30% ethanol) in state-owned non-flex fuel vehicles. On October 19, 2022, EPA granted an RVP waiver and test fuel exemption, per Nebraska's request, for a period of one year. Nebraska's request and EPA's response are contained in **Appendices J-3** and **J-4**.

EPA issued its proposed rulemaking on the request of the eight states on March 6, 2023,[107] which proposes to approve the request but delay the effective date until 2024. Fuel waivers for 2023 are being issued for short (3-week) periods; the most current waiver is available from EPA's Fuel Waivers webpage, https://www.epa.gov/enforcement/fuel-waivers.

c) National Emission Standards for Hazardous Air Pollutants (NESHAP) and Maximum Achievable Control Technology (MACT) Standards

National Emission Standards for Hazardous Air Pollutants (NESHAP) are promulgated by EPA. These standards, while not required to address regional haze, result in emission reductions of hazardous air pollutants (HAPs) as well as visibility impairing pollutants such as SO_2, NOx, and PM. Some of the most notable NESHAPS include:

- Oil and Natural Gas Production Facilities – Subpart HH
- Natural Gas Transmission and Storage Facilities – Subpart HHH

[105] **Appendix J-2** - Emissions Impacts of the Elimination of the 1-psi RVP Waiver for E10 (May 9, 2022).
[106] The California Air Resource Board (CARB) recently submitted a study completed by University of California-Riverside in support of its request to certify E15 use in its state https://ww2.arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splash-blended-e15. Oak Ridge Laboratories conducted research on combustion of higher ethanol blends for the Department of Energy (https://info.ornl.gov/sites/publications/Files/Pub31271.pdf) and on evaporative emissions of higher ethanol blends for the Renewable Fuels Association (https://d35t1syewk4d42.cloudfront.net/file/1277/RFA-NREL-Review-and-Evaluation-E15-Appendix.pdf).
[107] *Request From States for Removal of Gasoline Volatility Waiver* Proposed Rule, 88 FR 13758 (March 6, 2023), https://www.govinfo.gov/content/pkg/FR-2023-03-06/pdf/2023-04375.pdf

- Stationary Combustion Turbines - Subpart YYYY
- Reciprocating Internal Combustion Engines - Subpart ZZZZ
- Commercial, Industrial & Institutional Boilers & Process Heaters - Subpart DDDD
- Coal- and Oil-Fired Electric Utility Steam Generating Units- Subpart UUUUU
- Industrial, Commercial, & Institutional Boilers - Area Sources - Subpart JJJJJJ

The State has or intends to incorporate these rules into Title 129 – Nebraska Air Quality Regulations as they are issued and/or revised by EPA.

d) Visibility Requirements under New Source Review (NSR) and Prevention of Significant Deterioration (PSD) Program

The NSR Program consists of two parts: nonattainment new source review and the prevention of significant deterioration (PSD) program. All areas of Nebraska are currently in attainment with the National Ambient Air Quality Standards (NAAQS) and thus the provisions of the PSD program apply.

The visibility provisions of PSD are codified at 40 CFR 52.21(o) which requires owners or operators of new major sources or modifications provide a visibility impairment analysis as part of the PSD process. Section 40 CFR 52.21(o) requirements are incorporated into Title 129, Chapter 4. Section 40 CFR 52.21(p) requires notification and consultation with federal land managers (FLMs) of Class I areas which may be affected by emissions from the source. Section 40 CFR 52.21(p) is incorporated by reference in Title 129, Chapter 4.

The July 1, 2020 version of these sections have been adopted into the most recent Title 129 (effective September 28, 2022).

e) Nebraska Clean Diesel Rebate Program

The NDEE established the Nebraska Clean Diesel Program in 2008 to distribute funding received from the EPA for the purpose of reducing diesel emissions.

This funding was authorized by Congress in the Diesel Emissions Reduction Act (DERA), which was created as part of the Energy Policy Act of 2005. The DERA program provides funding annually to states for the establishment of grant, rebate, and loan programs that reduce diesel emissions. NDEE is supplementing the federal DERA grant with matching funds from the Volkswagen Diesel Emissions Environmental Mitigation Trust for State Beneficiaries.

Since its inception, NDEE's Clean Diesel Program has:

- reduced nitrogen oxide emissions by 1,100 tons
- reduced diesel particulate emissions by 53 tons

- reduced hydrocarbon emissions by 73 tons
- reduced carbon monoxide emissions by 227 tons
- funded early replacement of 40 school buses by new cleaner-burning buses
- funded early replacement of 31 diesel trucks by new cleaner-burning trucks
- funded replacement of 130 diesel irrigation engines with all-electric equipment
- retrofit pollution control devices on 334 diesel engines
- installed idle-reducing auxiliary power units on 39 long-haul trucks

Beginning in 2019, NDEE expanded its program to include rebates for diesel truck replacements by diesel or low-NOx compressed natural gas-powered trucks. In 2020, it further expanded to offer rebates for agricultural irrigation pump diesel engine replacement with electric equipment and, in 2021, rebates were also offered for diesel school bus replacements by diesel, gasoline, or low-NOx propane-powered buses.

f) Other Federal Rules Since the First Planning Period

i. National Ambient Air Quality Standards (NAAQS)

The NAAQS exist in the forms of primary and secondary standards: the primary NAAQS are designed to protect public health, including "the health of 'sensitive' populations such as asthmatics, children, and the elderly." The secondary NAAQS are designed to protect public welfare, "including protection against decreased visibility and damage to animals, crops, vegetation, and buildings."[108] EPA is required to review these standards and, if revised, states must demonstrate compliance with the revised standards.

Since the baseline RH planning period (2000-2004) certain NAAQS have been revised and are described below. Each of these standards are taken into consideration when issuing permits for new or modified major sources, which may include fossil fuel-fired EGUs, industrial boilers, or other operations. Any reductions in these pollutants as a result of revised standards contribute to protection of visibility in Class I Areas potentially impacted by Nebraska sources.

<u>2015 Ozone NAAQS</u>

EPA strengthened the annual standard for ozone from 0.075 parts per million, or ppm (75 parts per billion, or ppb) to 0.070 ppm in October of 2015.[109] In December 2020,[110] EPA retained these standards, without revision, and asserted in its fact sheet that the primary standard established in 2015 protects public health within an adequate margin of safety, including the

[108] EPA NAAQS Table, https://www.epa.gov/criteria-air-pollutants/naaqs-table
[109] 2015 *National Ambient Air Quality Standards for Ozone* (80 FR 65292), October 26, 2015, https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf
[110] *Review of the Ozone National Ambient Air Quality Standards* (85 FR 87256), December 31, 2020, https://www.govinfo.gov/content/pkg/FR-2020-12-31/pdf/2020-28871.pdf

health of at-risk populations. In October 2021, the new administration announced its decision[111] to reconsider the NAAQS retained in 2020, citing that the 2020 review was completed without the participation of an ozone-specific panel. A new NAAQS review was announced on August 21, 2023[112] that will incorporate the review of the 2020 reconsideration and will consider recent advice and recommendations of the CASAC[113] regarding the latest ozone science.

Nebraska submitted its state implementation plan (SIP) to demonstrate compliance with the 2015 standard in September 2018 and EPA approved most elements of this SIP in 2019.[114] On November 6, 2017, EPA designated all areas of Nebraska in attainment with the standard.[115] Because the standards were retained in 2020 without revision, there was no requirement to submit designations recommendations or a SIP as the standards had not changed.

In 2016[116] and 2021,[117] EPA finalized CSAPR updates to address the 2008 Ozone NAAQS, and in February 2022 EPA proposed a Federal Implementation Plan (FIP)[118] to address interstate transport of ozone to maintenance and nonattainment areas for the 2015 Ozone NAAQS. Nebraska was not identified as an affected state in these updates and was not subject to further requirements or obligations as part of these regulatory actions; the State continues to demonstrate attainment with these federal standards for ozone.

2012 $PM_{2.5}$ NAAQS (78 FR 3085, January 15, 2013)[119]

EPA strengthened the annual standard for fine particles ($PM_{2.5}$) from 15.0 micrograms per cubic meter (µg/m3) to 12.0 µg/m3. EPA asserted in its fact sheet addressing the revision that "emission reductions from EPA and states rules already on the books will help 99 percent of counties with monitors meet the revised $PM_{2.5}$ standards without additional emission reductions."[120]

[111] EPA Reconsideration of the Retained 2015 Ozone NAAQS, https://www.epa.gov/ground-level-ozone-pollution/epa-reconsider-previous-administrations-decision-retain-2015-ozone
[112] EPA announcement of New Review of the Ozone NAAQS to Reflect the Latest Science, https://www.epa.gov/newsreleases/epa-initiates-new-review-ozone-national-ambient-air-quality-standards-reflect-latest
[113] CASAC documents are available at https://casac.epa.gov/ords/sab/r/sab_apex/casac/home.
[114] Nebraska infrastructure SIP status is available at https://edap.epa.gov/public/extensions/S4S_Public_Dashboard_2/S4S_Public_Dashboard_2.html. One SIP element, 110(a)(2)(D)(i)-II Prong 4: Interstate Transport – protect visibility, is pending action following approval of the Regional Haze SIP revision.
[115] State designations, 2015 Ozone Standards, https://www.epa.gov/ozone-designations/2015-ozone-standards-state-recommendations-epa-responses-and-technical-support
[116] Final Cross-State Air Pollution Rule Update, https://www.epa.gov/csapr/final-cross-state-air-pollution-rule-update
[117] Revised Cross-State Air Pollution Rule Update, https://www.epa.gov/csapr/revised-cross-state-air-pollution-rule-update
[118] Proposed Good Neighbor Plan for 2015 Ozone NAAQS, https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs
[119] NAAQS for Particulate Matter, Final Rule, https://www.govinfo.gov/content/pkg/FR-2013-01-15/pdf/2012-30946.pdf
[120] Overview of EPA's Revisions to the Air Quality Standards for Particle Pollution (Particulate Matter), https://www.epa.gov/sites/default/files/2016-04/documents/overview_factsheet.pdf

Nebraska submitted its state implementation plan (SIP) to demonstrate compliance with the standard in February 2016 and EPA approved most elements of this SIP in 2018.[121] On January 15, 2015, EPA designated all areas of Nebraska in attainment with the standard.[122]

Following a review of the existing NAAQS in 2020, EPA announced its decision to retain the current primary and secondary standards without revision.[123] Several parties filed petitions for review in response to this action, and in June 2021 EPA announced that it will reconsider the decision to retain the standards. EPA issued its proposed rulemaking in January 2023.[124] Final rulemaking is expected in late 2023.

2010 SO_2 NAAQS (75 FR 35520, June 22, 2010)[125]

EPA strengthened the primary SO_2 NAAQS, revising it to a singular short-term (24-hour) standard of 75 parts per billion (ppb) 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum SO_2 concentrations. This dramatically increased the stringency of the standard, as the revoked 24-hour standard was 0.14 parts per million (ppm) – equivalent to 140 ppb. The secondary standard, designed to protect public welfare, is a 3-hour standard of 0.5 ppm (500 ppb), which is not to be exceeded more than once per year. Subsequent reviews of the NAAQS resulted in retention, without revision, of both the primary (health-related) and secondary (public welfare) standards.[126]

The designations process was divided into four rounds to address attainment status of areas within the U.S. Round 1 addressed only nonattainment areas and Rounds 2 through 4 addressed the remaining areas. Following is a timeline of state (Nebraska) and federal (EPA) actions regarding this NAAQS:

June 2011	Nebraska submits its initial designations recommendations[127] to EPA; Round 1 designations will address only nonattainment areas.
July 2013	EPA issues its Round 1 designations; no Nebraska areas are included.

[121] Nebraska infrastructure SIP status is available at https://edap.epa.gov/public/extensions/S4S_Public_Dashboard_2/S4S_Public_Dashboard_2.html. One SIP element, 110(a)(2)(D)(i)-II Prong 4: Interstate Transport – protect visibility, is pending action following approval of the Regional Haze SIP revision.

[122] 2012 $PM_{2.5}$ NAAQS Designations, https://www.govinfo.gov/content/pkg/FR-2015-01-15/pdf/2015-00021.pdf

[123] News Release, https://www.epa.gov/newsreleases/epa-reexamine-health-standards-harmful-soot-previous-administration-left-unchanged

[124] Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, https://www.govinfo.gov/content/pkg/FR-2023-01-27/pdf/2023-00269.pdf

[125] NAAQS for Sulfur Dioxide, Final Rule, https://www.govinfo.gov/content/pkg/FR-2010-06-22/pdf/2010-13947.pdf

[126] Secondary SO_2 NAAQS retained, April 3, 2012; Primary SO_2 NAAQS retained, March 18, 2019, https://www.epa.gov/so2-pollution/timeline-sulfur-dioxide-national-ambient-air-quality-standards-naaqs

[127] Nebraska initial 2010 SO_2 designation recommendations, https://www.epa.gov/sites/default/files/2016-03/documents/ne-rec.pdf

August 2013	Nebraska submits its infrastructure SIP[128] to demonstrate compliance with CAA Section 110(a)(2) requirements for the 2010 SO_2 NAAQS.
August 2015	EPA issues its Data Requirements Rule (DRR) for the NAAQS,[129] requiring states to evaluate areas surrounding large sources of SO_2 emissions, specifically those that emit 2,000 tpy or more of SO_2. States were required to submit a list of sources subject to the DRR by January 15, 2016 and notify EPA of its method for characterizing these sources by July 1, 2016. States could rely on air dispersion modeling or ambient air monitoring to demonstrate compliance, or could subject sources to emission limits below the 2,000 tpy threshold.
September 2015	Nebraska submits its designation recommendations[130] for three areas subject to the DRR: Lancaster County, Lincoln County, and Otoe County. This submittal included modeling analyses for Sheldon Station (Lancaster County), GGS (Lincoln County), and NCS (Otoe County). The modeling analysis for Sheldon Station included stack height increases for both units to achieve compliance, per consent order.
January 2016	Nebraska submits its list[131] of sources with annual SO_2 emissions over 2,000 tpy, pursuant to the DRR.
April 2016	Nebraska submits supplemental information[132] to address the stack height increase project at Sheldon station (construction permits, air dispersion modeling analysis).
June 2016	EPA provides its list of sources/counties subject to the DRR.[133]
July 2016	EPA issues its Round 2 designations[134] for three areas in Nebraska: • Lancaster County – unclassifiable • Lincoln County – unclassifiable/attainment • Otoe County – unclassifiable/attainment

[128] Nebraska 2010 SO_2 Infrastructure SIP submittal, regulations.gov Docket ID: EPA-R07-OAR-2017-0477 https://www.regulations.gov/search?documentTypes=Supporting%20%26%20Related%20Material&filter=EPA-R07-OAR-2017-0477

[129] 2010 SO_2 NAAQS Data Requirements Rule, https://www.govinfo.gov/content/pkg/FR-2015-08-21/pdf/2015-20367.pdf

[130] Nebraska's updated 2010 SO_2 designation recommendations and supporting documentation, https://www.epa.gov/sites/default/files/2016-03/documents/ne-rec-r2.pdf https://www.epa.gov/sites/default/files/2016-04/documents/ne-rec-atts-r2.pdf

[131] Nebraska DRR source list, https://www.epa.gov/sites/default/files/2016-06/documents/ne.pdf

[132] Nebraska supplement to updated designation recommendations, https://www.epa.gov/sites/default/files/2016-04/documents/ne-remarks-r2.pdf https://www.epa.gov/sites/default/files/2016-04/documents/ne-remarks-atts-r2.pdf

[133] EPA DRR Source list, https://www.epa.gov/sites/default/files/2016-06/documents/drr-source-list-epa.pdf

[134] EPA 2010 SO_2 Designations – Round 2, https://www.govinfo.gov/content/pkg/FR-2016-07-12/pdf/2016-16348.pdf#page=1

	Nebraska notified EPA[135] of the selected method of characterization for three areas subject to the DRR (Adams, Douglas, and Lancaster counties).
January 2017	Nebraska submits its updated designation recommendations[136] for one area (Adams County), relying on air dispersion modeling to demonstrate compliance with the NAAQS. Ambient air monitoring begins for two areas with monitors located near two large sources, NOS (Douglas County) and Sheldon Station (Lancaster County).
January 2018	EPA issues its Round 3 designations;[137] all areas (counties) in Nebraska not previously designated, except for Douglas County, were addressed in this action. These areas were designated "attainment/unclassifiable."
April 2018	EPA issues its approval[138] of Nebraska's infrastructure SIP for the NAAQS.
January 2020	Ambient air monitoring for Douglas and Lancaster counties concludes.
May 2020	Nebraska submits its updated designation recommendations[139] for two areas (Douglas and Lancaster counties), relying on source-specific ambient air monitoring to demonstrate compliance with the NAAQS.
October 2020	Nebraska submits its 2010 SO_2 Transport SIP[140] to address the interstate transport elements (110(a)(2)(D)(i)(I)-Prongs 1 and 2); these elements in the original SIP were yet to be approved, as the "McCarthy Memo"[141] on which Nebraska relied to address interstate transport, had been revoked. This memo stated that EPA would not expect states to address interstate transport of SO_2 pursuant to the submittal deadline for the infrastructure SIP.
March 2021	EPA issues its Round 4 designations;[142] Douglas County is designated as "attainment/unclassifiable".

[135] Nebraska's notification of method of characterization, https://www.epa.gov/sites/default/files/2016-07/documents/nebraska_source_characterization.pdf
[136] Nebraska's updated 2010 SO_2 designation recommendations, https://www.epa.gov/so2-pollution/so2-data-requirements-rule-january-13-2017-state-submittals-nebraska
[137] EPA 2010 SO_2 Designations – Round 3, https://www.govinfo.gov/content/pkg/FR-2018-01-09/pdf/2017-28423.pdf
[138] EPA approval of Nebraska's 2010 SO_2 infrastructure SIP, https://www.govinfo.gov/content/pkg/FR-2018-04-03/pdf/2018-06654.pdf#page=1
[139] Nebraska's updated 2010 SO_2 designation recommendations, https://www.epa.gov/sites/default/files/2020-07/documents/ne_round_4_so2d_recommendation_05-06-20.pdf
[140] Nebraska's SO_2 Transport SIP, Docket ID: EPA-R07-OAR-2021-0365, www.regulations.gov
[141] The "McCarthy Memo", https://www.epa.gov/sites/default/files/2016-10/documents/csapr_memo_to_regions.pdf
[142] EPA 2010 SO_2 Designations – Round 4, https://www.govinfo.gov/content/pkg/FR-2021-03-26/pdf/2021-05397.pdf

June 2021	EPA issues its approval of Nebraska's 2010 SO_2 Transport SIP.[143]
July 2021	EPA issues its redesignation of Lancaster County[144] to attainment/unclassifiable.

NO_2 NAAQS

Primary Standard, 75 FR 6474, February 9, 2010; retained without revision April 18, 2018, 83 FR 17226

Secondary Standard, 36 FR 8186, April 30, 1971; retained without revision in 1985, 1996, and on April 3, 2012, 77 FR 20218)

EPA established a new 1-hour primary standard to supplement the existing annual standard. This 1-hour standard is set at a level of 100 ppb, based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations. Concurrent with the new standard, EPA required monitoring of NO_2 levels near major roadways. To date, no Nebraska population centers have met the current threshold (population of 1,000,000) to require near-roadway monitoring, however, the State's ambient air monitoring network is configured to comply with this requirement if and when the threshold is met.

Nebraska submitted its state implementation plan (SIP) to demonstrate compliance with the standard in February 2013 and EPA approved most elements of this SIP in 2017.[145] On February 17, 2012, EPA designated all areas of Nebraska in attainment with the standard.[146]

ii. Mercury and Air Toxics Standards (MATS)

On February 16, 2012, EPA finalized national emission standards for hazardous air pollutants (NESHAPs)[147] from coal- and oil-fired power plants to reduce mercury and other toxic air pollution, codified in 40 CFR 63, Subpart UUUUU, also referred to as the Mercury and Air Toxics Standards (MATS). This rule established emission standards for mercury, acid gases, and non-mercury metallic toxic pollutants.

EPA estimated that 2015 emissions of mercury, $PM_{2.5}$, SO_2, and acid gas would decrease 75, 19, 41, and 88%, respectively, from power plants with emissions greater than 25 megawatts

[143] EPA Approval of Interstate Transport Prongs 1 and 2 for the 2010 SO_2 Standard for Kansas and Nebraska, https://www.govinfo.gov/content/pkg/FR-2021-08-11/pdf/2021-16759.pdf
[144] EPA 2010 SO_2 Designations – Redesignation of unclassifiable areas, https://www.govinfo.gov/content/pkg/FR-2021-07-16/pdf/2021-14376.pdf
[145] Nebraska infrastructure SIP status is available at https://edap.epa.gov/public/extensions/S4S_Public_Dashboard_2/S4S_Public_Dashboard_2.html; one SIP element, 110(a)(2)(D)(i)-II Prong 4: Interstate Transport – protect visibility, is pending action following approval of the Regional Haze SIP revision.
[146] 2010 NO2 NAAQS Designations, https://www.govinfo.gov/content/pkg/FR-2012-02-17/pdf/2012-3150.pdf
[147] The "MATs Rule", February 16, 2012 (77 FR 9303), https://www.govinfo.gov/content/pkg/FR-2012-02-16/pdf/2012-806.pdf

(MW). Emission reductions resulting from implementation of this rule was anticipated to reduce light extinction and, thus, anthropogenic sources of regional haze. Compliance with the MATS rule was required by April 16, 2015.

Nebraska adopted and incorporated by reference the MATS rule into its air regulations (Title 129) in Chapter 28, as published at 40 CFR Part 63 effective July 1, 2013. This rule was adopted and incorporated by reference in the recently revised Title 129 (effective September 28, 2022) in Chapter 13, section 002.90, as published at 40 CFR Part 63 effective July 1, 2020.

Coal-fired power plants in Nebraska subject to the MATS rule include Platte Generating Station, Whelan Power Station, NCS, and GGS.

A number of revisions to the rule have been promulgated since its initial release, with the most recent being in January 2022, but a recent Risk and Technology Review (RTR)[148] was published in April 2023 and includes a proposal to strengthen the standard. NDEE includes requirements of the MATS rule and subsequent revisions in permits issued by the Agency and are addressed during compliance inspections by NDEE inspectors.

2) Measures to Mitigate the Impacts of Construction Activities

Rapid growth is directly related to construction activities and is a significant concern in expanding cities and large urban centers. Nebraska has not experienced rapid growth and is not anticipated to do so over time through 2028. **Figure 6** is included in the 2022 Ambient Air Quality Monitoring Network Plan and shows the top ten Nebraska counties and their respective growth for periods over the past 10 years.

[148] *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review* Proposed Rule https://www.govinfo.gov/content/pkg/FR-2023-04-24/pdf/2023-07383.pdf

FIGURE 6. Top Ten Nebraska Counties for 2020 Population (Table D-4, 2022 Nebraska Ambient Air Monitoring Network Plan)

Table D-4: Top Ten Nebraska Counties for 2020 Population, 2010-2015 Population Growth, and 2010-2020 Population Growth

2020 Population				Population Growth 2010-2015					Population Growth 2010-2020				
Rank	County	Census 2020 Population	% State Pop.	Rank	County	Estimated 2015 Population	Pop. Growth 2010-2015	% Pop. Growth	Rank	County	Census 2010 Population	Pop. Growth 2010-2020	% Pop. Growth
1	**Douglas**	584,526	29.8	1	**Douglas**	549,029	31,919	6.2	1	**Douglas**	517,110	67,416	13.0
2	**Lancaster**	322,608	16.4	2	**Lancaster**	306,096	20,689	7.2	2	**Lancaster**	285,407	37,201	13.0
3	**Sarpy**	190,604	9.7	3	**Sarpy**	175,173	16,333	10.3	3	**Sarpy**	158,840	31,764	20.0
4	**Hall**	62,895	3.2	4	**Hall**	61,132	2,525	4.3	4	**Hall**	58,607	4,288	7.3
5	**Buffalo**	50,084	2.6	5	**Buffalo**	48,578	2,476	5.4	5	**Buffalo**	46,102	3,982	8.6
6	Dodge	37,167	1.9	6	**Platte**	32,876	639	2.0	6	**Platte**	32,237	2,059	6.4
7	Scotts Bluff	36,084	1.8	7	Seward	16,994	244	1.5	7	Saunders	20,780	1,498	7.2
8	Madison	35,585	1.8	8	Adams	31,567	203	0.6	8	Cass	25,241	1,357	5.4
9	Lincoln	34,914	1.8	9	Colfax	10,717	202	1.9	9	Seward	16,750	859	5.1
10	**Platte**	34,676	1.8	10	Cass	25,421	180	0.7	10	Madison	34,876	709	2.0
	Nebraska	1,961,504	100		Nebraska	1,934,408	64,936	3.6		Nebraska	1,826,341	135,163	7.4

Observations from the data above and from additional data in Table D-1:

(1) The six counties identified with **Bold font** and the orange highlight (**Buffalo, Douglas, Hall, Lancaster, Platte,** and **Sarpy**) appear in the top 10 for population, population growth, and percent growth.

(2) The five most-populous counties in Nebraska (**Buffalo, Douglas, Hall, Lancaster,** and **Sarpy**) include 61.7% of the state's 2020 population.

(3) These five most-populous counties also were the counties with the highest population growth from 2010 to 2015 and 2010 to 2020. The aggregate population growth 2010-2020 in these five counties was 144,651, which was 107% of Nebraska's total population gain over this period. (This value is greater than 100% because 69 of the state's 93 counties lost population, a total of 19,397 people).

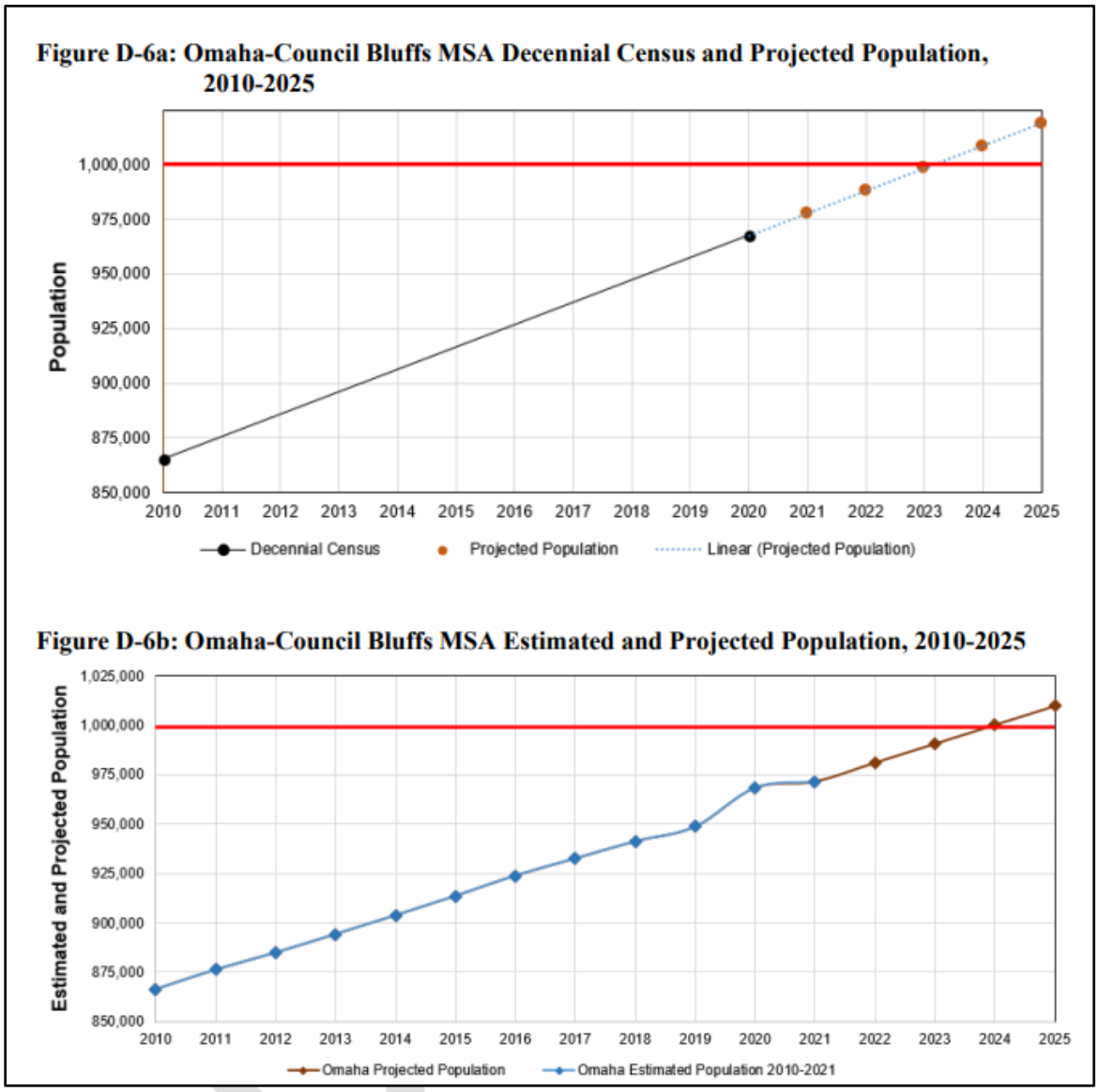
(4) Nebraska's three most populous counties (Douglas, Lancaster, and Sarpy) have a total population of 1,097,738, or 56.0% of the state population. These three counties also had the highest percentage population growth from 2010 to 2020 of any Nebraska counties.

The population data used in this table were obtained from the U.S. Census Bureau in November 2021.

Source: 2022 Nebraska Ambient Air Network Monitoring Plan - Appendix D
http://dee.ne.gov/Publica.nsf/PubsForm.xsp?documentId=9B155494B10B9054862589B00064FF51&action=openDocument

Population growth is projected to remain at a steady pace and **Figure 7** illustrates the projected population growth through 2025 for the Omaha Metropolitan Statistical Area (MSA). Figure D-6a plots this past population growth along with projected growth to 2025 assuming a linear growth rate. Figure D-6b plots U.S. Census Bureau's estimated population data from 2010 through 2021 along with projected population growth through 2025, assuming an average annual growth rate. If either of these growth rates hold true, the total Omaha MSA population will exceed 1,000,000 by 2024. This milestone will trigger additional monitoring requirements for several air pollutants.

FIGURE 7. Projected Population Growth, Omaha MSA (Figures D-6a and D-6b, 2022 Nebraska Ambient Air Monitoring Network Plan)



Source: 2022 Nebraska Ambient Air Network Monitoring Plan - Appendix D
http://dee.ne.gov/Publica.nsf/PubsForm.xsp?documentId=9B155494B10B9054862589B00064FF51&action=openDocument

Nebraska Title 129 contains measures to limit impacts from the construction industry as follows:

Chapter 3 – Construction Permits
Chapter 4 – Prevention of Significant Deterioration (PSD)
Chapter 15, section 002 – Open Fires; Prohibitions; Exceptions
Chapter 15, section 003 – Dust; Duty to Prevent Escape Of

3) Source Retirements and Replacements

A number of projects at Nebraska sources have or will reduce emissions of visibility impairing pollutants.

Western Sugar Cooperative, a sugar beet processing plant, has been ordered to install natural gas boilers to replace two coal-fired boilers at its facility in Scottsbluff (Scottsbluff County) as part of an April 16, 2019, consent decree. The coal-fired boilers must be decommissioned no later than September 30, 2023, or the owner must pay a civil penalty. The construction permit for this project was issued on May 10, 2022 containing permit limits of 0.20 lbs/MMBtu (NOx) and 1.7 lbs/hr (PM_{10}). Sulfur dioxide emissions (2021) from this facility were 156 tpy. Anticipated emission reductions[149] (based on PTE) are as follows:

TABLE 12. Anticipated Emission Reductions (Western Sugar Cooperative)

Pollutant	Anticipated reduction (%)*
SO_2	99.2%
NOx	19.4%
$PM_{2.5}$	76.6%
PM_{10}	66.7%

SOURCE: DEQ Fact Sheet – Basis of Permit, 5/10/2022 (DEQ Facility Number 44141)
https://ecmp.nebraska.gov/PublicAccess/index.html?&MyQueryID=340
**Calculated using PTE values in table Type and Quantity of Air Contaminant Emissions Anticipated, p2 ([Change in PTE ÷ Previous PTE]/100)*

The most recent semi-annual progress report[150] submitted by Western Sugar states that natural gas boilers are operating and commissioning is underway and is expected to take several months; the facility has no intention to operate the coal-fired boilers for the foreseeable future unless needed. Within 180 days of completion of the commissioning of the new boilers, the coal-fired boilers will be decommissioned.

The most recent air compliance inspection[151] was conducted on May 16-17, 2023, and inspectors were informed that the electronics had been removed from the coal conveyors and

[149] Calculated from PTE values provided by Western Sugar Cooperative, DEQ Facility Number 44141 – 5/10/2022 DEQ Fact Sheet - Basis of Permit, available at NDEE Public Records webpage https://ecmp.nebraska.gov/publicaccess/viewer.aspx?&MyQueryID=340
[150] Semi-annual Progress Report (February 15, 2023) available via the NDEE Public Records database (Western Sugar, DEQ Facility Number 44141), https://ecmp.nebraska.gov/PublicAccess/index.html?&MyQueryID=340
[151] Compliance Inspection report (May 24, 2023) available via the NDEE Public Records database (Western Sugar, DEQ Facility Number 44141), https://ecmp.nebraska.gov/PublicAccess/index.html?&MyQueryID=340

dispensing. NDEE received a performance specification test plan[152] for the natural gas boilers; testing is scheduled for June 28-29, 2023.

North Omaha Station The conversion of units 4 and 5 at NOS to natural gas is discussed in **Section B**. Units 1, 2, and 3, following conversion to natural gas, individually experienced emission reductions (both SO_2 and NOx) of over 99%; the remaining coal-fired units are anticipated to experience similar reductions once operating on natural gas. Since 2015, facility emissions have decreased significantly, as shown in **Table 13**, and further reductions are anticipated following repowering of the remaining coal-fired units.

TABLE 13. North Omaha Station Air Emissions (tpy)

Year	SO_x	NO_x	$PM_{2.5}$	PM_{10}
2015	13,899	5,842	296	454
2016	8,902	3,818	191	292
2021	5,826	2,850	155	237
% change (2015-2021)	-58.1%	-51.2%	-47.6%	-47.8%

SOURCE: Omaha Quality Air Control

Nucor Steel, a steel recycling facility located in Norfolk (Madison County), is replacing a natural gas-fired reheat furnace (fitted with low NOx burners) with a natural gas unit fitted with ultra-low NOx burners. NDEE issued a construction permit for this project on January 4, 2022, and the project is currently underway. This project is anticipated to reduce facility NOx emissions by 2.2% based on potential to emit (PTE).

Chief Ethanol Fuels, an ethanol manufacturing plant located in Hastings (Adams County), replaced its remaining coal-fired boiler with a natural gas-fired boiler. The coal-fired boiler was decommissioned on March 9, 2022, when the new boiler began operation. This project was anticipated to reduce NOx and SO_2 emissions (based on PTE) by 53.7% and 92.7%, respectively; preliminary emissions inventory data (2022) indicate emission reductions, thus far, of 28.3% (NOx) and 50.0% (SO_2).

Ash Grove Cement Company, a Portland cement manufacturing plant in Louisville (Cass County), received approval in March 2022 to add biomass as an additional fuel source for use in its permitted kiln. Previously the source was permitted to use both natural gas and coal as fuel

[152] Compliance Test plan (May 26, 2023) available via the NDEE Public Records database (Western Sugar, DEQ Facility Number 44141), https://ecmp.nebraska.gov/PublicAccess/index.html?&MyQueryID=340

in the kiln system but has gradually reduced its use of coal; biomass fuel would provide cost savings and is more readily available. Emissions testing indicates that NOx and SO_2 emissions, calculated in pound per ton clinker (lb/ton clinker), would decrease by as much as 35% and 65.9%, respectively.

4) Basic Smoke Management Practices for Prescribed Fire and Smoke Management Programs

Nebraska is required by 40 CFR 51.308(f)(2)(iv)(D) to consider smoke management techniques for the purposes of agricultural and forestry management in developing reasonable progress goals.

The most recent emissions inventories utilize a standard equation to calculate emissions from fires and indicate that Nebraska's emissions from fires is not significant. Nebraska *Title 129 Chapter 15, section 002 – Open Fires, Prohibitions; Exceptions* includes a ban on burning with a few exceptions. Exceptions include agricultural and prescribed burning. These exceptions are limited in scope and most require a burn permit from NDEE and the local fire authority and require that no nuisance or traffic hazard be created.

Agricultural burning is a practice used in Nebraska and is confined to trees or vegetation indigenous to the property being burned and agriculturally-related material used on the property when disposal by burning is recommended by the manufacturer.

For purposes of agricultural burning, the following circumstances apply:

- Burning must be conducted in an agricultural setting
- No nuisance or traffic hazard can be created
- Only trees or vegetation indigenous to the property may be burned
- Burning is recommended for disposal due to the hazardous nature of the materials; such materials must be those that have been used on the property.

The U.S. Department of Agriculture (USDA) – National Resource Conservation Service (NRCS) Nebraska field office technical guide webpage[153] provides conservation practice documents and other resources for prescribed burning activities. A burn plan template is also available at https://efotg.sc.egov.usda.gov/references/Delete/2015-1-24/NE-ECS-72_Prescribed_Burn_Management_Plan.pdf

For purposes of forestry or land management, such burning is allowed under Title 129, Chapter 15, section 002.02F provided it is conducted by the Nebraska Game and Parks Commission,

[153] USDA-NRCS Nebraska Field Office Technical Guide, https://efotg.sc.egov.usda.gov/#/state/NE/documents/section=4&folder=-183

the US Forest Service, the University of Nebraska, or other entities determined to be acceptable by the Department. The University of Nebraska Extension service provides information on how to properly conduct a prescribed burn. These resources are available through their website at https://extensionpubs.unl.edu/publication/9000016364801/conducting-a-prescribed-burn-and-prescribed-burning-checklist/

To date Nebraska has not further developed a smoke management plan. Existing measures are presently effective in managing smoke from prescribed fires within the state. However, NDEE continues to evaluate the need for additional measures.

5) Anticipated Net Effect on Visibility Due to Projected Emissions Through 2028

Since the end of the first implementation period (2018), key point sources in Nebraska have reduced SO_2 and NOx emissions. The largest contributors of SO_2 and NOx emissions in the state are coal-fired EGUs. The state's top emitter of SO_2, GGS, demonstrated a 30.1% reduction in SO_2 emissions since 2018 under currently applicable CAA programs. Emissions changes since 2018 for this source and others described in this SIP are shown below in **Tables 14** and **15**. Sources listed in these tables include those of concern identified by the NPS, which are further discussed in **Appendix B**.

TABLE 14. Nebraska Point Source SO_2 Emissions[154] Change 2018-2021

SOURCE	2018	2019	2020	2021	% change 2018-2021
Gerald Gentleman Station	27,739	23,412	18,176	19,403	-30.1%
Nebraska City Station	17,209	10,387	11,480	9,465	-45.0%
North Omaha Station	7,285	5,793	5,447	5,826	-20.0%
Platte Generating Station	523	500	369	438	-16.3%
Sheldon Station	2,624	2,071	1,460	2,537	-3.3%
Whelan Power Plant	2,827	2,192	2,015	2,476	-12.4%
Lon D Wright	712	712	588	838	17.7%
Ash Grove Cement Company	888	681	685	725	-18.4%
Western Sugar Cooperative	142	145	150	156	9.9%
NGPL Compressor Station 106	0.3	0.3	0.2	0.2	-33.3%
Clean Harbors Environmental	206	206	202	197	-4.4%
Northern Natural Gas - Beatrice	0.9	0.9	0.8	0.3	-70.0%
Northern Natural Gas - Palmyra	1.6	2.2	1.2	-0.6	-50.0%
ADM Corn Processing	482	430	399	500	3.7%

[154] Emissions data available from NDEE State Level Emissions Inventory System (SLEIS), https://ndeqsleis.nebraska.gov/ and Nebraska Enterprise Content Management Portal, https://ecmp.nebraska.gov/PublicAccess/index.html?&MyQueryID=340

TABLE 15. Nebraska Point Source NOx Emissions[155] Change 2018-2021

SOURCE	2018	2019	2020	2021	% change 2018-2021
Gerald Gentleman Station	8,052	7,478	6,289	6,197	-23.0%
Nebraska City Station	5,834	4,150	5,317	4,304	-26.2%
North Omaha Station	3,393	3,343	3,176	2,850	-16.0%
Platte Generating Station	592	565	444	529	-10.6%
Sheldon Station	2,099	2,024	1,331	2,473	17.8%
Whelan Power Plant	819	796	605	818	-0.1%
Lon D Wright	469	445	349	513	9.4%
Ash Grove Cement Company	2,526	1,909	1,788	2,287	-9.5%
Western Sugar Cooperative	420	429	445	477	13.6%
NGPL Compressor Station 106	1,719	1,727	1,161	1,032	-40.0%
Clean Harbors Environmental	201	201	198	193	-4.0%
Northern Natural Gas - Beatrice	1,719	1,727	1,161	1,032	-40.0%
Northern Natural Gas - Palmyra	1,325	1,137	959	807	-39.1%
ADM Corn Processing	425	397	272	378	-11.1%

EPA's 2028 projected emissions[156] for the sources listed in the following tables were based on the 2011 version 6.3 emissions modeling platform; 2028 projections are included in **Table 16** along with the most recent emissions (2021) reported by these sources. As noted for **Tables 14** and **15**, sources included were identified by the NPS as those of concern regarding regional haze, and are further discussed in **Appendix B**.

[155] Emissions data available from NDEE State Level Emissions Inventory System (SLEIS), https://ndeqsleis.nebraska.gov/ and Nebraska Enterprise Content Management Portal, https://ecmp.nebraska.gov/PublicAccess/index.html?&MyQueryID=340

[156] EPA Index page – file "2028emissions/", 2018-01-30, https://gaftp.epa.gov/air/emismod/2011/v3platform/

TABLE 16. Actual 2021 and EPA 2028 Projected Nebraska Point Source SO_2 and NOx

	SO_2		NOx	
SOURCE	**2021**	**2028**	**2021**	**2028**
Gerald Gentleman Station	19,403	28,399[1]	6,197	9,278
Nebraska City Station	9,465	2,839[2]	4,304	2,757[2]
North Omaha Station	5,826	[3]	2,850	[3]
Platte Generating Station	438	1.9E-07	529	1.0E-07
Sheldon Station	2,537	[3]	2,473	[3]
Whelan Power Plant	2,476	2,312	818	1,500
Lon D Wright	838	884	513	816
Ash Grove Cement Company	725	534	2,287	1,558
Western Sugar Cooperative	156	152[4]	477	433[4]
NGPL Compressor Station 106	0.2	0.01	1,032	77
Clean Harbors Environmental	197	0.7	193	55
Northern Natural Gas - Beatrice	0.2	41	1,032	0.02
Northern Natural Gas - Palmyra	1	31	807	0.08
ADM Corn Processing	500	199	378	331

[1] NPPD's Portfolio Optimization Software model projects GGS 2028 SO_2 emissions to be 20,993 tpy, which NDEE recognizes as a more realistic projection of 2028 emissions.
[2] EPA modeling inputs for this facility incorrectly assumed that installed MATS controls would significantly reduce SO_2, which resulted in much lower emission projections than anticipated. See discussion in Section I.F.
[3] EPA assumed retirement of this facility before 2028; source not listed in projected 2028 emissions source list.
[4] EPA modeling inputs did not account for a 2019 consent decree requiring a fuel switch at this facility, since modeling was completed prior to 2019.

Emission reductions by Nebraska's coal-fired EGUs is expected to continue through the second implementation period.[157] This is driven, in part by the increasing amount of wind generation in SPP and its displacement of coal-fired generation.[158] It is also the result of fuel-switching projected to take place within the EGU fleet (e.g., NOS Units 4 and 5). NPPD has agreed[159] to

[157] See Section III. Emissions Inventory.
[158] **Appendix H-1.1** - NPPD Regional Haze Response to NDEE ICR for GGS (November 2, 2020) pages 3-4.
[159] **Appendix H-1.8** - Regional Haze MOU – NDEE-NPPD.

cap its annual SO_2 emissions from GGS, starting in 2027. This will ensure that progress towards the national visibility goal remains ahead of schedule.

Projected 2028 emissions from Nebraska, as a whole, are shown in **Table 17**. For comparison, the 2014 NEI actual emissions are provided.[160]

TABLE 17. 2028 Projected Nebraska Emissions[161]

	SO_2	NOx	$PM_{2.5}$	PM_{10}	VOC	Ammonia
2028	42,052	138,622*	71,278	368,933	462,145	155,736
2028 without natural sources		89,665			88,747	
2014 NEI	65,902	220,898*	71,344	336,561	434,420	148,011
2020 State EI	43,316	106,775				

* Includes emissions from natural (biogenic) sources
SOURCE: EPA Projected 2028 Emissions, https://gaftp.epa.gov/Air/emismod/2016/v1/ ; 2014 NEI, https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data#datas; 2020 State Emissions Inventory (compiled from state emission inventory submittals)

Visibility in Class I areas potentially affected by Nebraska source emissions is expected to improve by the end of the second implementation period, as illustrated in **Table 18**. The projected visibility improvement values are based on EPA modeling data[162] at all affected Class I areas except Wheeler Peak (WHPE), for which EPA did not provide this data; for WHPE the WRAP modeling data[163] was used (the future year (2028) value used was the most conservative value provided in the WRAP modeling analysis). Information on WRAP procedures for visibility predictions and glidepath adjustments can be found at http://www.wrapair2.org/pdf/2028_Vis_Proj_Glidepath_Adj_2021-03-01draft_final.pdf.

The anticipated net effect on visibility due to the projected changes in emissions this planning period are shown in **Tables 18** and **19**. These data show the 2028 RPG compared to the 2014-2018 baseline for both the 20% most impaired days and the clearest days, indicating visibility

[160] EPA 2014 National Emission Inventory (NEI) Data, https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data#datas
[161] EPA 2028 projected emissions available from https://gaftp.epa.gov/Air/emismod/2016/v1/; Technical Support document for this modeling platform is available at https://www.epa.gov/sites/default/files/2020-11/documents/2016v1_emismod_tsd_508.pdf.
[162] EPA 2028 Visibility Air Quality Modeling, Table 3-2 https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf and EPA Technical Addendum with Visibility Data through 2018 https://www.epa.gov/sites/default/files/2020-06/documents/memo_data_for_regional_haze_technical_addendum.pdf
[163] WRAP Ambient Data Analysis – Express Tools (Chart #6) https://views.cira.colostate.edu/tssv2/Express/AmbientDataAnalysisTools.aspx and Modeling Data Analysis – Express Tools (Chart #8) http://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx

improvement on the most impaired days (MID) and improvement with no degradation on the clearest days (CD).

TABLE 18. Anticipated Net Visibility Improvement – 20% Most Impaired Days

Class I Area Site ID	Class I Area Name	IMPROVE Monitor Site ID	Base Year (2014-2018) (dv)	Future Year (2028) (dv)	Net Improvement (dv)
BADL	Badlands NP	BADL1	12.33	11.71	0.62
WICA	Wind Cave NP	WICA1	10.53	9.93	0.6
WHPE	Wheeler Peak Wilderness	WHPE1	5.95	5.54	0.41

SOURCE: EPA and WRAP Modeling Data[164]

TABLE 19. Anticipated Net Visibility Improvement – 20% Clearest Days

Class I Area Site ID	Class I Area Name	IMPROVE Monitor Site ID	Base Year (2014-2018) (dv)	Future Year (2028) (dv)	Net Improvement (dv)
BADL	Badlands NP	BADL1	5.39	5.36	0.03
WICA	Wind Cave NP	WICA1	3.52	3.43	0.09
WHPE	Wheeler Peak Wilderness	WHPE1	0.31	0.15	0.16

SOURCE: EPA and WRAP Modeling Data[165]

Visibility impairment attributed to sulfates at each of these areas is predominantly attributed to international anthropogenic sources, which are beyond control of the states.

Visibility modeling and analyses provided by NPPD and OPPD also show that visibility in all relevant Class I areas will improve over current conditions and will not degrade during the remainder of the second implementation period in the base case (i.e., without any additional

[164] Base Year (2014-2018) data for all Class I areas are available in EPA's *Technical addendum including updated visibility data through 2018*, Table 1 (June 3, 2020), https://www.epa.gov/sites/default/files/2020-06/documents/memo_data_for_regional_haze_technical_addendum.pdf; Future Year (2028) data for BADL and WICA available in EPA's *Availability of Modeling Data and Associated Technical Support Document for the EPA's Updated 2028 Visibility Air Quality Modeling* https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf ; Future Year (2028) data available from WRAP Modeled Data Analysis - Express Tools, Product #5 - Adjustment Options for End of URP Glidepath (2028OTBa2 EPA Projection) and Product #8 – State 2028 Visibility Projections Summary Table (Clearest Days, 2028 OTBa2 Model), https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx.

[165] Base Year (2014-2018) data for all Class I areas are available in EPA's *Technical addendum including updated visibility data through 2018*, Table 1 (June 3, 2020), https://www.epa.gov/sites/default/files/2020-06/documents/memo_data_for_regional_haze_technical_addendum.pdf; Future Year (2028) data for BADL and WICA available in EPA's *Availability of Modeling Data and Associated Technical Support Document for the EPA's Updated 2028 Visibility Air Quality Modeling* https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf; Future Year (2028) data available from WRAP Modeled Data Analysis-Express Tools, Product #8 – State 2028 Visibility Projections Summary Table (Clearest Days, 2028 OTBa2 Model), https://views.cira.colostate.edu/tssv2/Express/ModelingTools.aspx.

controls on Nebraska sources). Modeling analyses are included in **Appendices H-2.1, 2.2, 2.8,** and **I-2**.

I. Reasonable Progress Summary

Class I areas potentially impacted by Nebraska emission sources have demonstrated visibility improvement during the first RH planning period consistent with or better than the URP. Projected visibility conditions at these areas for the second planning period are anticipated to continue improving at a rate faster than or consistent with the URP. During the second planning period state consultation process, Nebraska was not requested by any state to make additional emission reductions deemed necessary to meet 2028 RPGs. Because Nebraska's RH SIP will need to be revised again in 2028, Nebraska sources may be the subject of consultation discussions in that and future planning periods.

Continued efforts to reduce emissions and lessen potential visibility impacts of Nebraska sources are in place through federal and state programs and other measures described in this section (**Section I. Long-Term Strategy)**. Visibility improvement at Class I areas potentially impacted by Nebraska sources indicates that increased use of renewable and cleaner energy resources in Nebraska, improved efficiency and optimization of power generation within the state, and source retirements and replacement projects have played a role in reducing regional haze. For all of the reasons discussed above, NDEE has determined that there are no additional measures that are necessary to achieve reasonable progress in the second RH planning period for Nebraska.

Moreover, even if additional measures were appropriate to ensure continued reasonable progress on visibility during the second implementation period, analysis of the four statutory factors and additional considerations as set forth in the RH Rule leads to the conclusion that no additional controls would be reasonable for either GGS or NCS.

II. Monitoring Strategy

A. Evaluation of Reasonably Attributable Visibility Impairment at Affected Class I Areas

40 CFR 51.308(f)(4) requires a state to include in its RH SIP revision an appropriate strategy for evaluating reasonably attributable visibility impairment (RAVI) in a Class I area if advised by the EPA Administrator, EPA Regional Administrator, or an affected Federal Land Manager (FLM) of the need for additional monitoring.

Nebraska has no Class I areas within its state borders, and has not been advised by the Administrator, Regional Administrator, or affected FLM of any need for additional monitoring to assess RAVI (reasonably attributable visibility impairment) at a Class I area.

Despite having no Class I areas within its state borders, a visibility monitor at Halsey National Forest was maintained by the Nebraska Forest Service until it was destroyed in a large wildfire in October 2022. Efforts are underway to replace this monitor.

Nebraska continues to rely on the IMPROVE network and on Federal Land Management agencies and other Western Regional Air Partnership (WRAP)[166] members for maintenance of the IMPROVE network. Nebraska expects that operations and maintenance will continue to include data collection, analysis, quality assurance, and reporting, and that IMPROVE data will continue to be publicly available through web platforms that include the Technical Support System[167] and Federal Land Manager Environmental Database.[168]

B. Strategy for Measurement, Characterization, and Reporting Reasonably Attributable Visibility Impairment

Because Nebraska has no Class I areas within its state borders, it relies on the IMPROVE network and FLM agencies and other entities that maintain the IMPROVE network as stated in **Section II.A.** above.

[166] The Western Regional Air Partnership (WRAP) is a voluntary partnership of states, tribes, federal land managers, local air agencies and the US EPA whose purpose is to understand current and evolving regional air quality issues in the West. https://www.wrapair2.org/.
[167] WRAP Technical Support System, https://views.cira.colostate.edu/tssv2/.
[168] Federal Land Manager (FLM) Environmental Database, https://views.cira.colostate.edu/fed/.

C. Establishing the Need for Additional Monitoring Sites or Equipment

As stated in **Sections II.A.** and **B.** above, Nebraska has no Class I areas within its state borders, has not been advised of the need for additional monitoring, and relies on the IMPROVE network and on FLM agencies and other entities that maintain the IMPROVE network.

III. Emissions Inventory

40 CFR 51.308(f)(2)(iii) requires the state to "document the technical basis, including…emissions information, on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress in each mandatory Class I Federal area it affects...The emissions information must include, but need not be limited to, information on emissions in a year at least as recent as the most recent year for which the State has submitted emission inventory information to the Administrator…."

40 CFR 51.308(f)(6)(v) requires that the RH SIP include "a statewide inventory of emissions of pollutants anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area." This inventory must include emissions for the most recent year for which data are available and estimates of future projected emissions. Emissions inventory data provided in this section meets these statutory requirements and includes the change in emissions over the period since the last plan.

40 CFR 51.308(g)(4) requires that the RH SIP include "an analysis tracking the change over the period since the period addressed in the most recent plan…" and that "…emissions changes should be identified by type of source or activity." The analysis of emissions trends since the period addressed in Nebraska's initial RH SIP is included in this section for source categories as well as specific sources.

Nebraska is committed to update its emission inventory pursuant to 40 CFR 51.15 and 51.30.

NDEE compiles annual statewide air emissions inventories and submits the data to EPA's National Emissions Inventory (NEI) database. States are required to report their emissions data to the NEI following the guidelines established in the revised Air Emissions Reporting Rule (AERR).[169] This rule requires states to submit criteria air pollutant information every year as well as a more comprehensive set of data every three years.

The NEI source categories were established with the 2008 NEI and are grouped into five major categories: point, non-point, on-road, non-road, and event. Emissions from these categories as well as Nebraska electric generating units (EGUs) and agricultural activities are addressed in this section.

Nebraska also compiles an inventory for hazardous air pollutants and greenhouse gas emissions and voluntarily submits this data to the NEI.

[169] EPA Air Emissions Reporting Requirements, https://www.epa.gov/air-emissions-inventories/air-emissions-reporting-requirements-aerr; *Revisions to the Air Emissions Reporting Requirements: Revisions to Lead (Pb) Reporting Threshold and Clarifications to Technical Reporting Details* (809 FR 8787, February 19, 2015) https://www.govinfo.gov/content/pkg/FR-2015-02-19/pdf/2015-03470.pdf

States are required by 40 CFR 51.308(f)(6)(v) to conduct a statewide emissions inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I area. To evaluate Nebraska's potential impact on these Class I areas, a baseline emissions inventory was established and trends in more recent inventories have been reviewed.

Nebraska's first RH plan included an emissions inventory for the RH baseline period, specifically a summary of the 2002 emissions inventory; emissions data for EGUs through 2010 were also included in that plan. Nebraska's RH progress report, submitted in 2017, included an assessment of emissions changes for the period 2010-2014. Finally, in this revision to the SIP which addresses the second planning period (2018-2028), Nebraska provides an analysis of state emissions inventory data for 2014 and 2020, emissions changes since 2010 and 2014, and EGU emissions for the period since the last plan (2010-2021). The NEI source categories, as well as EGU and agricultural activities are addressed with regard to this analysis.

Emissions data in **Tables 20** and **21** were obtained from the EPA 2017 NEI Data Summaries and Sector Summaries, available at https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data, and the Nebraska State and Local Emissions Inventory System (SLEIS) (https://ndeqsleis.nebraska.gov/).

A. Emissions Inventory Summary (2014 – 2017 – 2020)

The National Emissions Inventory (NEI) is conducted by EPA at three-year intervals; the 2017 NEI is the most recent national inventory available. This inventory includes estimates of air emissions for criteria pollutants, their precursors, and hazardous air pollutants. Emissions data are obtained from state, local, and tribal air agencies; EPA emissions programs (the Toxics Release Inventory (TRI), emissions trading programs, and other datasets). Details regarding the NEI are available in EPA's technical support document (TSD)[170] for the 2017 NEI.

The data in **Table 20** contains Nebraska emissions data for sulfur dioxide (SO_2), nitrogen oxides (NOx), fine particulates ($PM_{2.5}$), coarse particulates (PM_{10}), volatile organic compounds (VOCs), and ammonia (NH_3) from the 2014 state emissions inventory data. Although the 2017 NEI is the most current national emissions inventory publicly available at the present time, NDEE opted to use 2014 state emissions data in this SIP revision. Data acquired from EPA's 2017 NEI database[171] appeared to underestimate state emissions totals for SO_2 and NOx; moreover, the 2014 state and local emissions inventory data was used in Nebraska's RH Progress report (2017) and its use in this SIP revision provides for continuity.

[170] EPA's 2014 National Emissions Inventory, version 2 (July 2018) Technical Support Document, https://www.epa.gov/sites/default/files/2018-07/documents/nei2014v2_tsd_05jul2018.pdf
[171] https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data

TABLE 20. Nebraska 2014 State and Local Emissions Inventory (tpy)

Source	SO_2	NOx	$PM_{2.5}$	PM_{10}	VOC	Ammonia
Point	65,081	37,998	2,921	8,165	7,053	2,447
On-Road	203	49,532	1,545	2,671	25,590	793
Non-Road	607	76,336	3,899	4,135	14,247	56
Wild Fires	110	8	979	1,155	2,496	92,463
Prescribed Fires	1,054	1,077	9,792	11,555	25,302	50,138

Table 21 contains Nebraska state emissions inventory data for 2020, including additional source sectors that contribute to the pollutant categories in Nebraska. Although the nonpoint source category is not listed in the table, emissions data for this category was submitted to EPA via state survey. EPA's overall strategy in calculating nonpoint emissions includes emissions estimates derived from air quality modeling or other calculations; the survey allows states to identify source categories inventoried in the state point source emissions inventory and quantify the magnitude of the overlap, which is then subtracted from the EPA nonpoint total. During the annual state emissions inventory process, NDEE and the local agencies include point sources that emit below AERR thresholds, thereby yielding more comprehensive statewide emissions estimates.

TABLE 21. Nebraska 2020 State and Local Emissions Inventory (tpy)

Source	SO_2	NOx	$PM_{2.5}$	PM_{10}	VOC	Ammonia
Point	42,527	26,881	2,009	4,678	7,765	1,063
On-Road	99	23,481				734
Non-Road	131	53,793	2,431	2,529	8,492	52
Wild Fires	4	8				
Prescribed Fires	555	1,077				

Emissions of SO_2 and NOx are of primary concern with respect to visibility at Class I areas potentially impacted by Nebraska sources. In Nebraska, the source categories that emit the majority of these pollutants are point sources (SO_2), and on-road/non-road sources (NOx). Emissions data for these pollutants are included in **Tables 22** and **23** for the baseline period (2002), the beginning and end of the period addressed in the last progress report (2010 and 2014), and the most current year inventory (2020). Consistent progress has been demonstrated in reductions of both SO_2 and NOx emissions since the baseline period.

TABLE 22. Nebraska SO_2 Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
Point	105,086	67,963	65,081	42,527
On-Road	2,761	476	203	99
Non-Road	8,879	1,142	607	131
Wild Fires	0.3	0	110	4
Prescribed Fires	7	0	1,054	555
TOTALS	116,733	69,581	67,055	43,316
% change since 2014				-35.4%
% change since 2010			-3.6%	-37.7%
% change since 2002		-40.4%	-42.6%	-62.9%

TABLE 23. Nebraska NOx Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
Point	101,620	48,066	37,998	28,416
On-Road	94,045	52,841	49,532	23,481
Non-Road	108,281	105,406	76,336	53,793
Wild Fires	0.4	0	245	8
Prescribed Fires	3	0	2,284	1,077
TOTALS	303,949	206,313	166,395	106,775
% change since 2014				-35.8%
% change since 2010			-19.3%	-48.2%
% change since 2002		-32.1%	-45.3%	-64.9%

Tables 24 through **26** show emissions progress for other pollutants in Nebraska. Total emissions for these pollutants show significant increases since the baseline period which can be attributed to changes in how emissions are calculated for the Wild Fires and Prescribed Fires source categories. On-road, wildfire, and prescribed fire emission estimates are not yet available for the 2020 emissions inventory and changes since previous inventory years are not calculated.

TABLE 24. Nebraska $PM_{2.5}$ Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
Point	2,393	2,529	2,921	2,009
On-Road	2,975	1,744	1,545	
Non-Road	6,373	5,229	3,899	2,431
Wild Fires	3	0	979	
Prescribed Fires	36	0	9,792	
TOTALS	11,780	9,502	19,136	
% change since 2014				
% change since 2010			101.4%	
% change since 2002		-19.3%	62.4%	

TABLE 25. Nebraska PM_{10} Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
Point	11,744	7,536	8,165	4,678
On-Road	3,467	2,216	2,671	
Non-Road	6,541	5,570	4,135	2,529
Wild Fires	4	0	1,155	
Prescribed Fires	43	0	11,555	
TOTALS	21,799	15,322	27,681	
% change since 2014				
% change since 2010			80.7%	
% change since 2002		-29.7%	27.0%	

TABLE 26. Nebraska VOC Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
Point	9,592	8,373	7,053	7,765
On-Road	31,845	22,491	25,590	
Non-Road	21,919	17,738	14,247	8,492
Wild Fires	6	0	2,496	
Prescribed Fires	105	0	25,302	
TOTALS	63,467	48,602	74,688	
% change since 2014				
% change since 2010			53.7%	
% change since 2002		-23.4%	17.7%	

B. Source Categories and Sectors

1) Point Source Emissions

Point sources are large emission sources located at a fixed, stationary location. Examples include large industrial facilities, electric power plants, airports, and smaller industrial, non-industrial, and commercial facilities.

NDEE conducts an annual emissions inventory of all Class I major sources and Class II synthetic minor facilities. Class I major sources are those with the potential to emit more than 100 tpy of any criteria pollutant (excluding lead), 10 tpy of any single hazardous air pollutant (HAP) or 25 tpy of a combination of HAPs, or 5 tpy of lead. Synthetic minor sources are those with the potential to emit (PTE) at or above the Class I emission levels but are subject to permit restrictions that limit emissions to below the Class I levels. Smaller facilities in Nebraska are inventoried on a triennial basis and include those permitted as Low Emitters, Permit-By-Rule, and No Permit Required sources. This cycling of lower emitting sources ensures a complete inventory at least once every three years. NDEE follows internal quality assurance procedures and submitted its most recent data to EPA for the 2020 national emissions inventory.

Regarding the visibility-impairing pollutants of most concern, point sources in Nebraska contribute 98.2% of the state's annual SO_2 emissions and 26.6% of its annual NOx emissions based on the most recent state emissions inventory (2020). Pollutants from Nebraska point sources have the greatest potential to contribute to visibility impairment at two Class I areas in South Dakota - Badlands and Wind Cave National Parks - as detailed in **Section II.C**. Nebraska point sources have demonstrated consistent progress in reducing SO_2 and NOx emissions since the baseline period and since the last progress report.

a) Electric Generating Units (EGUs)

The majority of point source SO_2 and NOx emissions in Nebraska currently come from the electric utility sector. The top seven contributing facilities[172] account for 93.0% of the point source SO_2 emissions and 61.6% of the point source NOx emissions in the 2020 state emissions inventory.

The state's utility system is entirely public; power is provided to wholesale and retail customers through municipal or rural utility districts. The largest units are found in the eastern part of Nebraska and in the panhandle area of the state and medium-sized units serving moderately sized communities are located throughout the state.

[172] GGS, NCS, NOS, Whelan Energy Center, Sheldon Station, Lon D Wright Power Plant, and Platte Generating Station.

In 2021, the continuous emission monitors (CEMs) from the top seven contributing EGUs reporting to EPA's Clean Air Markets Program Data (CAMPD)[173] monthly unit emissions averages of 285 tons SO_2 and 122 tons NOx. This indicates a significant reduction when compared to the monthly emissions averages from the 13 units reporting to CAMPD for the baseline period (2002) which ranged from 5,000-6,000 tons SO_2 and approximately 4,000 tons NOx, as noted in Nebraska's 2017 RH Progress Report.[174] EGU emissions are addressed in more detail in **Section 6)c)**.

b) Non-EGU Facilities

Other point sources that emit visibility-impairing pollutants, primarily NOx, include natural gas pipeline facilities, cement manufacturing plants, and grain processing facilities. These facilities contribute a smaller portion of NOx emissions annually in Nebraska and six of these facilities are briefly addressed in **Appendix B** to this SIP.

2) Nonpoint Source Emissions

Nonpoint sources are those that don't meet the point source criteria but still have the potential to emit significant amounts of pollutants. Examples include residential heating, commercial combustion, asphalt paving, and commercial and consumer solvent use. Agricultural fires are also included in this category.

With respect to the visibility-impairing pollutants of most concern, nonpoint sources in Nebraska contribute a relatively small portion of the state's annual SO_2 emissions and a slightly more significant portion of its annual NOx emissions.

3) On-road and Non-road Source Emissions (Mobile Source Emissions)

Mobile sources are a significant contributor of NOx and VOC emissions. In Nebraska, most mobile source emissions are attributed to locomotives, non-road diesel equipment (such as construction and agricultural equipment), and on-road light-duty gasoline and heavy-duty diesel vehicles.

On-road sources are those that emit pollutants while operating on roadways and highway ramps, and during idling; these include passenger vehicles, commercial transport vehicles, and waste, utility, and emergency vehicles. Non-road sources are those that emit pollutants while operating off of roadways and include construction equipment, locomotives, aircraft, marine vessels recreational vehicles, and other equipment (lawn mowers, etc.).

[173] EPA Clean Air Markets Program Data, https://campd.epa.gov/data
[174] The link to this document is available at http://dee.ne.gov/NDEQProg.nsf/OnWeb/Haze

EPA uses the Motor Vehicle Emission Simulator (MOVES) model to compute on-road source emissions from Nebraska based on model inputs provided by NDEE and local and tribal air agencies.

For many non-road sources, the EPA uses the MOVES-NONROAD model and these emissions data are included in the emission inventory system (EIS) non-road Data Category. Starting with the 2008 NEI, some nonpoint sources are included in other EIS data categories: Aircraft engine emissions (landing and takeoff operations) and the ground support and power unit equipment are included in the EIS Point data category for airport locations. Locomotive emissions at rail yards are also included in the EIS Point data category. Emissions of other locomotives and commercial marine vessels are included in the EIS Nonpoint data category.

Emission reductions in the mobile source categories since the first implementation period (2008-2018) are significant, despite a 10.2% increase in vehicle miles traveled[175] in Nebraska during that time period. Progress in reducing emissions from these source categories is shown in **Tables 27** and **28**.

TABLE 27. Nebraska Mobile Source NOx Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
On-Road	94,045	52,841	49,532	32,662
Non-Road	108,281	105,406	76,336	61,757
TOTALS	202,326	158,247	125,868	94,419
% change since 2014				-25.0%
% change since 2010			-20.5%	-40.3%
% change since 2002		-21.8%	-37.8%	-53.3%

TABLE 28. Nebraska Mobile Source VOC Emissions Inventory (2002, 2010, 2014, 2020)

Source	2002	2010	2014	2020
On-Road	31,845	22,491	25,590	16,888
Non-Road	21,919	17,738	14,247	9,814
TOTALS	53,764	40,229	39,864	26,702
% change since 2014				-50.3%
% change since 2010			-0.9%	-33.6%
% change since 2002		-25.2%	-25.9%	-33.0%

[175] Motor Vehicle Miles Traveled in Nebraska (2018), https://neo.ne.gov/programs/stats/72b/72b_2020.html

4) Event Source Emissions

Event sources are fires that are reported in a day-specific format and include wildfires and prescribed burns.

EPA calculates these emissions using a satellite detection approach combined with fire models and activity data provided by state, local, and tribal air agencies or forestry agencies. In 2011, EPA developed new methods for estimating fire emissions which account for the significant change in data values in those categories. For Nebraska, the estimated emission contributions from fires have been based on model parameters which include acres burned, types of fuel, fuel moistures, and burn efficiency. Air quality model inputs for Nebraska have not significantly changed since 2011; therefore, without specific event data being compiled, these emission estimates are anticipated to remain consistent for the 2020 emissions inventory year. The method for calculating emissions estimates for this category is expected to be more developed in future years.

5) Other Source Emissions

a) Agricultural Source Emissions

Nebraska's leading industry is agriculture, and ammonia emissions from activities associated with that sector impact the state emissions profile. **Table 29** shows the ammonia emission totals and trends for Nebraska from 2002 through 2017. In Nebraska, agriculturally related source sectors - such as livestock waste and fertilizer applications - contribute a majority of the ammonia emissions. Because these emissions estimates for the 2020 NEI are not yet available, the 2017 NEI data is presented in **Table 29**.

Analysis of ammonia emission trends is difficult; estimation procedures for some of these sectors have changed periodically, making comparisons to prior years a challenge. The largest source of ammonia emissions in Nebraska is livestock waste, and emission calculation methodologies were changed and improved for the 2011 NEI. Overall reductions of 21.2% in ammonia emissions were demonstrated over the period 2011-2014. Emissions data from the 2011 NEI is included as opposed to those from 2010, as the two largest contributing source sectors (Livestock Waste and Fertilizer Application) are inventoried as part of the NEI, not the annual state inventory.

TABLE 29. Nebraska Agriculture Emissions Inventory (2002, 2011, 2014, 2017), Ammonia (tpy)

Source	2002	2011	2014	2017
Livestock Waste	103,772	111,498	92,463	118,065
Fertilizer Application	63,351	69,469	50,138	29,435
TOTALS	167,123	180,967	142,601	147,500
% change since 2014				3.4%
% change since 2010			-21.2%	-18.5%
% change since 2002		8.3%	-14.7%	-11.7%

b) Biogenics

Biogenic emissions are those attributed to natural sources, such as vegetation, soils, volcanic emissions, lightning, and sea salt. These emissions contribute to background air chemistry and, in Nebraska, comprise a significant portion of the state's NOx and VOC emissions, as shown in **Tables 30** and **31**.[176]

TABLE 30. Nebraska Biogenics Emission Inventory (2002, 2011, 2014, 2017), NOx (tpy)

Pollutant	2002	2011	2014	2017
NOx	51,440	52,775	45,713	50,855
% change since 2014				11.2%
% change since 2010			-13.4%	-3.6%
% change since 2002		2.6%	-11.1%	-1.1%

TABLE 31. Nebraska Biogenics Emission Inventory (2002, 2011, 2014, 2017), VOC (tpy)

Pollutant	2002	2011	2014	2017
VOC	526,385	372,699	326,428	168,212
% change since 2014				-48.5%
% change since 2010			-12.4%	-54.9%
% change since 2002		-29.2%	-38.0%	-68.0%

[176] Biogenic emission estimates are calculated as part of the NEI, and 2020 NEI data are not yet available, thus 2017 NEI estimates are included in **Table 30**. Additional information on how biogenics emission estimates are developed for the NEI is available at EPA's Biogenics Emission Inventory System (BEIS) webpage, https://www.epa.gov/air-emissions-modeling/biogenic-emission-inventory-system-beis.

c) EGU Emissions

Reductions in EGU emissions of SO_2 and NOx over the first implementation period were significant, as shown in **Tables 11** and **12**. In the first period, two sources were identified for BART controls for NOx (GGS and NCS) and both facilities completed installation of these controls early in that period. These controls have effectively reduced NOx emissions from each of the sources.

NOS is expected to convert its two remaining coal fired units to natural gas during the second implementation period. This project is discussed in more detail in **Section I.F.3)**.

Nebraska participates in the CSAPR Group 2 SO_2 and NOx trading program.[177] The current SO_2 and NOx budgets[178] for the state total 68,162 tons (SO_2) and 30,039 tons (NOx), allocated[179] among 19 facilities (including those listed in **Tables 31** and **32**). Emissions from these facilities have demonstrated compliance with CSAPR allocations and total point source emissions of SO_2 and NOx in 2020 were within the Nebraska CSAPR budgets for these pollutants.

Tables 32 and **33** show SO_2 and NOx emissions data and trends for the top seven contributing EGUs in Nebraska. These facilities contributed 93.0% of the point source SO_2 emissions and 61.6% of the point source NOx emissions in the 2020 state emissions inventory. Significant progress in SO_2 and NOx emission reductions were achieved during the first implementation period and this trend continues thus far in the second implementation period.

TABLE 32. Top Seven Nebraska EGU SO_2 Emissions Trend (tpy)

	2002	2008	2017	2018	2019	2020	2021	% change since 2002	% change (2008-17)	% change since 2018
Gerald Gentleman Station	32,152	31,362	21,255	27,739	23,412	18,176	19,403	-39.7%	-32.2%	-30.1%
Nebraska City Station	12,820	17,498	15,950	17,209	10,387	11,480	7,133	-44.4%	-8.8%	-58.6%
North Omaha Station	11,509	15,012	7,897	7,285	5,793	5,447	5,826	-49.4%	-47.4%	-20.0%
Sheldon Station	5,624	4,552	1,961	2,624	2,071	1,460	2,537	-54.9%	-56.9%	-3.3%
Platte Generating Station	2,250	3,086	316	523	500	369	438	-80.5%	-89.8%	-16.3%
Whelan Energy Center	2,007	2,229	2,274	2,827	2,192	2,015	2,476	23.4%	2.0%	-12.4%
Lon D. Wright Power Plant	978	1,958	615	712	712	588	838	-14.3%	-68.6%	17.7%

[177] EPA Cross-State Air Pollution Rule, https://www.epa.gov/csapr.

[178] CSAPR State Budgets, Variability Limits, and Assurance Provisions, https://www.epa.gov/csapr/cross-state-air-pollution-rule-csapr-state-budgets-variability-limits-and-assurance.

[179] CSAPR Allowance Allocations, Initial Allocations to Existing Units (CSAPR), https://www.epa.gov/csapr/csapr-allowance-allocations.

TABLE 33. Top Seven Nebraska EGU NOx Emissions Trend (tpy)

	2010	2017	2018	2019	2020	2021	% change (2010-17)	% change since 2018
Gerald Gentleman Station	13,164	6,893	8,052	7,478	6,289	6,197	-47.6%	-23.0%
Nebraska City Station	8,830	6,053	5,834	4,150	5,317	4,304	-31.4%	-26.2%
North Omaha Station	6,765	3,639	3,393	3,343	3,176	2,850	-46.2%	-16.0%
Sheldon Station	5,824	1,399	2,099	2,024	1,331	2,473	-76.0%	17.8%
Platte Generating Station	1,201	366	592	565	444	529	-69.5%	-10.6%
Whelan Energy Center	1,079	677	819	796	605	818	-37.3%	-0.1%
Lon D. Wright Power Plant	449	419	469	445	349	513	-6.7%	9.4%

C. Summary

Pollutants of concern for visibility impairment at Class I areas potentially impacted by Nebraska are SO_2 and NOx, and the primary sources of these pollutants in the state are point sources (SO_2 and NOx) and mobile sources (NOx). Power plants comprise the majority of SO_2 and a significant portion of NOx point source emissions and have achieved significant emission reductions since the baseline period, which is projected to continue. With the continued downward trend in emissions from these sources, and overall downward emission trends for all pollutants in Nebraska, no additional emission reduction measures are necessary or reasonable at this time.

IV. Coordination, Consultation, and Public Participation

Nebraska conducted consultation with states, Federal Land Managers, and other groups pursuant to 40 CFR 51.308(i). A consultation log outlining consultation dates, participants, and topics of discussion, and related documents are included in **Appendix D-7**.

A. Federal Land Manager (FLM) Consultation

As Nebraska develops its RH SIP revisions and progress reports, it commits to providing the Federal Land Managers (FLMs) adequate opportunities to provide input and feedback.

Nebraska initiated informal consultation with FLMs on June 5, 2020 during initial SIP revision development. Formal consultation was initiated by email on November 17, 2022 and NDEE submitted Nebraska's draft RH SIP to the following FLMs which included an opportunity for in person consultation at least 60 days prior to any notice of public hearing. A consultation call was conducted between the FLMs and NDEE on January 19, 2023. The public notice period for Nebraska's draft RH SIP was scheduled for (DATES) and a public hearing was scheduled for and held on (DATE).

1. Tim Allen, U.S. Fish & Wildlife Service, Lakewood, Colorado;
2. Jeff Sorkin, USDA Forest Service, Great Lakes National Forests – Eastern Region;
3. Melanie Peters, National Park Service, Air Resources Division, Lakewood, Colorado;
4. Don Shepherd, National Park Service, Air Resources Division, Lakewood, Colorado;
5. Andrea Stacy, National Park Service, Air Resources Division, Lakewood, Colorado;
6. Debra Miller, National Park Service, Air Resources Division, Lakewood, Colorado;
7. Lisa Devore, National Park Service, Air Resources Division, Lakewood, Colorado;
8. David Pohlman, National Park Service, Air Resources Division, Lakewood, Colorado;
9. Kirsten King, National Park Service, Air Resources Division, Lakewood, Colorado;
10. Anita Rose, USDA Forest Service, Ecosystem Analysis and Planning, Southwestern Region (Region 3 – AZ & NM)

A log of FLM/NDEE consultation activities is provided in **Appendix D-7**. Comments from FLMs on Nebraska's draft SIP are provided in **Appendix D-5.2** and **D-5.4**, and responses to these comments are provided in **Appendix D-6**.

Nebraska commits to ongoing consultation on regional haze activities, including SIP revision and progress report development, and other related activities. Procedures for this consultation includes notification of FLMs at key points in the process of SIP/progress report development,

review, and public notice periods; formal consultation as required by 40 CFR 51.308(i)(4); and notification of related program activities.

B. State Consultation

Nebraska initiated contact with the following states on June 11, 2020 and conducted a number of calls with each state to discuss SIP development and potential impacts from Nebraska sources on visibility at Class I areas within their respective states.

- Colorado (Department of Public Health and Environment)
- South Dakota (Department of Environment and Natural Resources)
- New Mexico (Environment Department)
- Minnesota (Pollution Control Agency)

No states requested emission reductions from Nebraska sources during these consultations.

One state (Oklahoma) formally requested[180] selection of one Nebraska source (NCS) for further evaluation of controls; this source was selected for further evaluation during Nebraska's source selection process. A log of State/NDEE consultation activities is provided in **Appendix D-7**.

C. Consultation With Other Agencies/Groups

Nebraska was contacted by one tribe (Winnebago Tribe of Nebraska) to discuss RH SIP development, which was conducted on April 12, 2022. No Nebraska sources identified for evaluation are located on Tribal lands.

Nebraska had numerous calls with EPA Region 7 to discuss SIP development.

A log of NDEE consultation activities with these groups and EPA Region 7 is provided in **Appendix D-7**.

D. Public Participation

(In progress – when these activities are completed this section will discuss opportunities for public review/comment, comments received during the formal comment period, and how the state met requirements of the RH Rule for inclusion in the final draft submitted to EPA)

[180] **Appendix D-2** - Oklahoma DEQ Request letter to NDEE (July 17, 2020).

V. Progress Report

40 CFR 51.308(g)

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

A description of measures and respective implementation of these measures is included in this SIP revision are included in Sections I.C through I.E.

40 CFR 51.308(g)

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

A summary of emissions reductions is included in Section II.E.

40 CFR 51.308(g)

(3) 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, least impaired and/or clearest days as applicable expressed in terms of 5-year averages of these annual values.

This section does not apply to Nebraska as it has no Class I areas.

40 CFR 51.308(g)

4) An analysis tracking the change over the period since the period addressed in the most recent plan required under paragraph (f) of this section 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. With respect to all sources and activities, the analysis must extend at least through the most recent year for which the state has submitted emission inventory information to the Administrator in compliance with the triennial reporting requirements of subpart A of this part as of a date 6 months preceding the required date of the progress report. With respect to sources that report directly to a centralized emissions data system operated by the Administrator, the analysis must extend through the most recent year for which the Administrator has provided a State-level summary of such reported data or an internet-based tool by which the State may obtain such a summary as of a date 6 months preceding the required date of the progress report. The State is not required to backcast previously reported emissions to be consistent with more recent emissions estimation procedures, and may draw attention to actual or possible inconsistencies created by changes in estimation procedures.

Analysis of emissions changes for those pollutants that contribute to visibility impairment is described in Section II.E.

40 CFR 51.308(g)

(5) An assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred since the period addressed in the most recent plan required under paragraph (f) of this

section including whether or not these changes in anthropogenic emissions were anticipated in that most recent plan and whether they have limited or impeded progress in reducing pollutant emissions and improving visibility.

(6) An assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or other States with mandatory Class I Federal areas affected by emissions from the State, to meet all established reasonable progress goals for the period covered by the most recent plan required under paragraph (f) of this section.

(7) For progress reports for the first implementation period only, a review of the State's visibility monitoring strategy and any modifications to the strategy as necessary.

Changes in anthropogenic emissions in Nebraska are addressed in this SIP revision (Section III). The adequacy of strategies and plan elements are discussed in Section I.I. and Appendix A. 40 CFR 51.308(g)(7) does not apply to the current report because it references the report for the first implementation period.

40 CFR 51.308(g)

(8) For a state with a long-term strategy that includes a smoke management program for prescribed fires on wildland that conducts a periodic program assessment, a summary of the most recent periodic assessment of the smoke management program including conclusions if any that were reached in the assessment as to whether the program is meeting its goals regarding improving ecosystem health and reducing the damaging effects of catastrophic wildfires.

This section does not apply because Nebraska does not include a smoke management plan as part of its Long-Term Strategy.

40 CFR 51.308(h)

Determination of the adequacy of existing implementation plan. *At the same time the State is required to submit any 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 declaration that 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.

On July 6, 2012, EPA partially disapproved Nebraska's Regional Haze plan for the first implementation period, rejecting Nebraska's best available retrofit technology (BART) determination and long-term strategy for GGS for SO_2, and substituted a Federal Implementation Plan (FIP) that relied on the Transport Rule as an alternative to source-specific BART and for the long-term strategy.[181] The U.S. Court of Appeals for the Eighth Circuit upheld the BART FIP in *Nebraska v. EPA*,[182] but before that decision, EPA was granted a voluntary remand of the portion of the FIP that addressed long-term strategy.[183]

NDEE has implemented the BART FIP for GGS, as well as the approved portions of its SIP for the first implementation period. These plans have proven to be adequate to ensure reasonable progress on visibility as required by the Clean Air Act and the RH Rule. States potentially affected by emissions from Nebraska sources were successful in meeting their respective RPGs for the first implementation period. Nebraska's SIP revision for the second implementation period includes updated data and information that further demonstrates the adequacy of the state's efforts.

This SIP revision fulfills Nebraska's statutory responsibility to develop a long-term strategy for the second implementation period, and upon approval it will supersede the plans for the first implementation period. Nebraska requests that EPA review and approve this revision which includes the most current and relevant strategies determined to be reasonable and necessary to address potential visibility impacts from Nebraska sources on Class I areas in other states for the second implementation period of the RH Rule.

[181] *Approval, Disapproval and Promulgation of Implementation Plans; State of Nebraska; Regional Haze State Implementation Plan; Federal Implementation Plan for Best Available Retrofit Technology Determination*, Final Rule (July 6, 2012), p 40151 https://www.epa.gov/sites/default/files/2017-12/documents/77_fr_40150_july_6_2012_ne_regional_haze.pdf

[182] *State of Nebraska v. EPA*, https://ecf.ca8.uscourts.gov/opndir/16/02/123084P.pdf

[183] EPA Motion for Partial Voluntary Remand, https://downloads.regulations.gov/EPA-R06-OAR-2014-0754-0087/attachment_95.pdf.