Nebraska Department of Environmental Quality

2016 Ambient Air Monitoring Network Plan

NDEQ Document #16-020

Final 062816

This document is written to fulfill the requirements of 40 CFR Part 58.10 for an annual monitoring network plan as it pertains to the ambient monitoring conducted by the Nebraska Department of Environmental Quality (NDEQ), the Lincoln-Lancaster County Department (LLCHD) and the Douglas County Health Department (DCHD).

Nebraska 2016 Ambient Air Monitoring Network Plan

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Acronyms and Abbreviations

Agencies/Organizations

CASAC - Clean Air Scientific Advisory Committee [(a)]

DCHD - Douglas County Health Department

EPA - United States Environmental Protection Agency

EPA R7 - United States Environmental Protection Agency Region VII

LLCHD - Lincoln-Lancaster County Health Department

NDEQ - Nebraska Department of Environmental Quality

(a) CASAC was established by the Clean Air Act (CAA) Amendments of 1977, and provides independent advice to the EPA Administrator on the technical bases for EPA's national ambient air quality standards.

Regulations

CFR - Code of Federal Regulations

DRR - Data Requirements Rule or 40 CFR Part 51 Subpart BB - Data Requirements for Characterizing Air Quality for the Primary SO_2 NAAQS

NAAQS - National Ambient Air Quality Standards

Title 129 - Nebraska Air Quality Regulations

Site Types

IMPROVE - Interagency Monitoring of Protected Visual Environments (monitoring performed to evaluate regional haze)

MDN - Mercury Deposition Network (a type of NADP site)

NADP - National Atmospheric Deposition Program (analysis of deposition components in precipitation. May include NTN and MDN sites)

NCore - National Core multi-pollutant monitoring stations. Monitors at these sites are required to measure particles ($PM_{2.5}$, speciated $PM_{2.5}$, $PM_{10–2.5}$), O_3, SO_2, CO, nitrogen oxides (NO/NO_y), Pb, and basic meteorology.

NTN - National Trends Network (a type of NADP site that analyzes for acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., CA, Mg, K and Na))

SLAMS - State and Local Air Monitoring Stations

Monitor Terminology

AQS - Air Quality System, the name for EPA's air monitoring data base

FRM - Federal Reference Method used for determining compliance with the NAAQS

FEM - Federal Equivalent Method used for determining compliance with the NAAQS

PWEI - Population Weighted Emissions Index (a term defined in 40 CFR Part 58 Appendix D that relates to SO_2 monitoring requirements)

2014 Network Plan – Nebraska's *2014 Ambient Air Monitoring Network Plan*

2015 Network Plan - Nebraska's *2015 Ambient Air Monitoring Network Plan & 5-Year Assessment*

2016 Network Plan - Nebraska's *2016 Ambient Air Monitoring Network Plan* (i.e., this document)

Census Terminology

MSA - Metropolitan Statistical Area

MiSA - Micropolitan Statistical Area

Acronyms and Abbreviations (Continued)

Pollutants

CO - Carbon Monoxide

H_2S - Hydrogen sulfide (typically a major component of TRS)

O_3 - Ozone

Pb - Lead

TSP-Pb - Lead sampled using a TSP sampler

$PM_{2.5}$ - Particulate matter with a diameter equal to or less than 2.5 micrometers or microns (reported as $\mu g/m^3$ with air volumes measures at local conditions)

PM_{10} - Particulate matter with a diameter equal to or less than 10 micrometers or microns (reported as $\mu g/m^3$ with air volumes measures at standard conditions (25° C, 1 atm))

$PM_{10-2.5}$ - The difference between PM_{10} and $PM_{2.5}$ (Both being calculated at local conditions)

SO_2 - Sulfur Dioxide

TRS - Total Reduced Sulfur (H_2S + other reduced sulfur-containing compounds)

TSP - Total Suspended Particulates

Concentration Units

ppb - Parts per billion (a volume/volume concentration unit)

ppm - Parts per million (a volume/volume concentration unit)

mg/m^3 - Milligrams per cubic meter (a mass/volume concentration unit)

$\mu g/m^3$ - Micrograms per cubic meter (a mass/volume concentration unit)

Definitions

in situ - A Latin phrase meaning *in the place*. As used in this report it refers to the formation of pollutants in the atmosphere. For example, ozone is formed *in situ* from the photochemical reaction of pollutant precursors. Ozone is not emitted directly from sources. $PM_{2.5}$ and haze are also formed *in situ*, although they are also emitted by sources. PM_{10} and CO, on the other hand, are largely emitted from sources; *in situ* formation being of minimal importance. NOx and SOx are emitted and then undergo transformations to NO_2 and SO_2; they also can play a role in the *in situ* formation of ozone and $PM_{2.5}$.

Criteria Pollutants – The six pollutants for which National Ambient Air Quality Standards (NAAQS) have been established: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulates and lead.

I. Introduction and Purpose

This 2016 Ambient Air Monitoring Network Plan (hereafter referred to as the "2016 Network Plan") was prepared to meet the federal requirements set forth in 40 CFR Part 58.10. It serves several purposes.

- Describes the current ambient air monitoring network in Nebraska including:
  - The purpose of each monitoring site, and
  - Changes made since January 1, 2015.
- Discusses ambient air quality issues as they relate to the monitoring network.
- Reviews the ambient air monitoring network to determine that the requirements of 40 CFR Part 58 Appendixes A, C, D and E are met.
- Describes planned and possible changes to the ambient air monitoring network through 2017, as best they can be determined at the time this review was conducted.

II. Public Participation

Federal regulations require annual network plans to be made available for public inspection. The NDEQ meets this requirement by posting it on the NDEQ web site (http://deq. ne.gov/) for 30 days. During the 30 day public inspection period, written comments regarding this Network Plan may be submitted to the Nebraska Department of Environmental Quality (NDEQ). Contact information is provided below.

Mail:

Nebraska Department of Environmental Quality
Attn: Jim Yeggy - Air Quality Compliance Section
PO Box 98922
1200 N Street, The Atrium Suite 400
Lincoln, NE 68509

Email:

NDEQ.airquality@nebraska.gov

Informal inquiries may also be directed to Jim Yeggy at 402/471-2142. Non-written comments are not necessarily included or addressed as review comments.

The deadline for written comment submittal can be found on the NDEQ web site.

III. Overview of Current Ambient Air Monitoring Network

Nebraska's current air monitoring network is summarized in Table III-1 below. The network description tables in Attachment A provide more detailed information on the network, including site locations and monitoring objectives.

The network includes monitoring sites for ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, total reduced sulfur, lead, PM_{10}, $PM_{2.5}$, $PM_{10-2.5}$ and regional haze (i.e., IMPROVE monitors). The network is operated by the Nebraska Department of Environmental Quality and two local agencies: the Douglas County Health Department and the Lincoln-Lancaster County Health Department.

Table III-1: Nebraska Air Monitoring Network on March 31, 2016. (1)

Pollutant	DCHD Omaha MSA (2)(4)	NDEQ Cass County	LLCHD Lincoln MSA (5)	NDEQ Other Areas of NE (6)	Total Analytical Sites (4)
Ozone	3 (5)	0	1 (5)	0	4 (5)
Carbon Monoxide	2 (5)	0	0	0	2 (5)
Nitrogen Oxides	1 (5)	0	0	0	1 (5)
Sulfur Dioxide	2 (5)	0	0	0	2 (5)
PM_{10}	4 (5)	2	0	0 (7)	6 (5)
$PM_{2.5}$	4 (5)	0	1	2	7 (5)
$PM_{10-2.5}$	1 (5)	0	0	0	1 (5)
$PM_{2.5}$ Speciation	1 (5)	0	0	0	1 (5)
Lead	1 (5)	0	0	2	3 (5)
NCore (4)	1	0	0	0	1
IMPROVE (6)	0	0	0	1	1
Total Reduced Sulfur (8)	0	0	0	1 (8)	1
Totals Sites (4)	9 (4)	2	2 (5)	6	19 (4)

Footnotes:

(1) This table summarizes the number of operating sites in the NE SLAMS network as of 3/1/16.

(2) The Omaha MSA encompasses 5 NE counties: Cass, Douglas, Sarpy, Saunders & Washington. DCHD operates sites in Douglas, Sarpy & Washington. NDEQ operates sites in Cass County

(3) Cass County has limestone mining and processing facilities, which are subject to the Cass County specific air emission controls set forth in Chapter 21 of the NDEQ Title 129..

(4) There were 3 multi-pollutant monitoring sites in the Omaha MSA in 2015: 1616 Whitmore – SO_2 & Ozone; 24th & O Sts (South Omaha) : Ozone and a PM_{10} ; and NCore (42nd & Woolworth) - CO, NO/NOy, O_3, SO_2, PM, lead and meteorological

Thus there are 9 monitoring sites within the Omaha MSA. Three of those sites are multi-pollutant sites: NCore (9 pollutants), Whitmore (2 pollutants) and South Omaha (2 pollutants). Thus when the pollutants are counted separately there are 19 analytical sites. Similarly, there are19 monitoring sites in NE (sum of "Total Sites" row), and 28 analytical sites (sum of "Total Analytical Sites" column).

(5) This footnote means that one (1) monitor in this category is located at the NCore site.

(6) IMPROVE – Interagency Monitoring of Protected Visual Environments. These are fine particulate and particulate speciation monitors intended to provide information for studying regional haze that may impact Class I National Park and Wilderness Areas. IMPROVE sites are not SLAMS. EPA is responsible for the design of the IMPROVE network. Changes to the IMPROVE Network within Nebraska do not need to be included in Nebraska's annual network plan, but the existence of the sites are recognized within the network plans.

The NDEQ has provided administrative support (with EPA funding) for two IMPROVE sites: one at the Nebraska National Forest near Halsey, NE, and the other at the Crescent Lake National Wildlife Refuge. EPA made the determination to close Crescent Lake National Wildlife Refuge site at the end of CY2015. Thus, there is one remaining IMPROVE site that is administered through the NDEQ; the Nebraska National Forest site near Halsey, NE

(7) The NDEQ operated PM_{10} monitoring sites in Cozad and Gothenburg, which were closed 3/8/16 in accordance with the 2015 Network Plan.

(8) The NDEQ has one total reduced sulfur (TRS) site in Dakota City, which is scheduled for closure in mid-2016 in accordance with the 2015 Network Plan.

IV. Nebraska Ambient Air Monitoring Network: January 1, 2015 thru March 31, 2016

This section describes Nebraska's Ambient Air Monitoring Network in place from January 1, 2015 thru March 31, 2016, and changes made during that time period. Detailed information on individual monitoring sites, including purpose, scale, monitor specifications and start dates, is contained in Attachment A.

For the most part, this section is organized around the MSAs and MiSAs in which monitoring is conducted. For population and statistical information about the MSAs and MiSAs see Attachment C.

A. Omaha MSA Sites Operated by the DCHD

DCHD operates an ambient air network of 9 sites in Douglas, Sarpy and Washington Counties. Multi-pollutant monitoring is currently conducted at three of the sites:

- The NCore site monitors for 9 pollutant parameters (CO, NOy/NOx, O_3, SO_2, $PM_{2.5}$, PM_{10}, $PM_{10-2.5}$, $PM_{2.5}$ speciation & TSP-Pb), meteorological parameters, and atmospheric radiation (RADNET*);
- The South Omaha site has both an ozone and a PM_{10} monitor; and
- The 1616 Whitmore site has both SO_2 and ozone monitors.

Thus the Omaha area monitoring network is more extensive than the 9 site total might indicate; if the pollutants are counted separately, there are 19 pollutant monitoring sites.

* Note: RadNet is a nationwide system that monitors the nation's air, drinking water, precipitation, and pasteurized milk to determine levels of radiation in the environment. RadNet sample analyses and monitoring results provide baseline data on background levels of radiation in the environment and can detect increased radiation from radiological incidents. The RadNet monitor is not subject to the network planning process set forth in 40 CFR Part 58.10. It is recognized above for informational purposes only.

There was one change in the Omaha-DCHD monitoring network since January 1, 2015.

The 30th & Fort ozone monitoring site in Omaha was closed due to construction at the site, and relocated to 1616 Whitmore (the existing SO_2 site) for the 2015 and 2016 ozone monitoring seasons. At the end of the 2016 monitoring season, a review will be conducted to determine whether to keep the ozone monitor at 1616 Whitmore or return it to the 30th and Fort vicinity. There are 3 factors favoring the Whitmore site at this time:

1) The 30th & Fort Street location may not be available after re-construction is completed;
2) The Whitmore site is in a socioeconomically depressed area; and
3) The Whitmore site recorded the highest 4th high ozone value in the Omaha MSA in 2015.

See Attachment A for detailed information on the sites operated by DCHD.

B. Omaha MSA Sites Operated by the NDEQ

The NDEQ operates 2 PM_{10} monitoring sites in the Weeping Water area: one at the city waste water treatment plant (abbr. WW City site) and one approximately 1/3 mile northwest of the Weeping Water spur (State Spur 13K) and Highway 50 intersection (abbr. WW Farm site).

The WW City site has a primary and collocated R&P 2025 samplers. The collocated sampler suffered an electronic failure near the end of the 1st quarter of 2015. As described in the 2015 Network Plan, the primary and collocated 2025 samplers at the WW City site will be replaced with a MetOne BAM sampler sometime in 2016.

C. Lincoln MSA Sites Operated by the LLCHD

LLCHD operates two SLAMS monitoring sites:

- A $PM_{2.5}$ site at 3140 N Street in Lincoln, and
- An ozone site in Davey, NE.

The $PM_{2.5}$, N Street site has three monitors: a primary filter-based FRM sampler, a collocated filter-based FRM sampler, and a continuous MetOne BAM monitor. Data from the continuous monitor is reported to AirNow, but not AQS.

In 2015, LLCHD and NDEQ established a temporary, investigative site for ozone in Waverly. At the end of the 2015 ozone monitoring season the data from both the Davey and Waverly sites was compared. The comparison indicated little difference in the ozone concentrations at the two sites. LLCHD will continue to monitor at the Davey site. Further monitoring at Waverly is not anticipated at this time.

D. Sioux City Metropolitan Statistical Area in Dakota and Dixon Counties

In accordance with the 2015 Network Plan, the TRS monitoring site at 501 Pine Street in Dakota City will be closed in mid-2016. This will mark the end of TRS monitoring in Nebraska, at least for the time being.

There are monitoring sites in the Iowa and South Dakota portions of the Sioux City MSA:

- A $PM_{10}/PM_{2.5}$ site in Sioux City operated by the IA DNR,
- An SO_2 site in Sargent Bluff operated by the IA DNR, and
- A multi-pollutant site for SO_2, NO_2, O_3, PM_{10} & $PM_{2.5}$ in Union County, SD operated by the SD DENR.

E. Grand Island Metropolitan Statistical Area

The NDEQ operates a $PM_{2.5}$ filter-based FRM sampler at Grand Island Senior High. There were no changes to the monitoring network in the Grand Island MSA from January 1, 2015 thru March 31, 2016.

F. Scottsbluff Micropolitan Statistical Area

The NDEQ operates a $PM_{2.5}$ filter-based FRM sampler at the Scottsbluff Senior High School. The Thermo 2025i sampler at this site was moved approximately170 m W-SW on 4/15/16 (1st sample date at new location). The move was necessitated by re-construction of athletic fields and at the request of the school. The re-location did not require a new site ID #. The new site uses standard 110 v AC line power, as the solar and wind power supply previously used was not retained at re-located site.

G. Fremont Micropolitan Statistical Area

The NDEQ operates a TSP-Pb (lead) monitoring site at 1255 Front Street in Fremont. This site is source-oriented with respect to Magnus-Farley, a brass/bronze foundry. There are two TSP samplers at this site: a primary sampler and a collocated sampler. There were no monitoring network changes in the Fremont MiSA from January 1, 2015 thru March 31, 2016.

H. Lexington Micropolitan Statistical Area

In accordance with the 2015 Network Plan, the PM_{10} monitoring sites at Cozad and Gothenburg were closed March 7, 2016. There are currently no ambient air monitoring sites in the Lexington MiSA.

I. City of Auburn

In accordance with the 2015 Network Plan, the TSP-Pb monitoring site in Auburn will be closed in mid-2016.

J. IMPROVE Sites

IMPROVE is the acronym for Interagency Monitoring of Protected Visual Environments. These sites contain fine particulate and particulate speciation monitors intended to provide information for studying regional haze that may impact Class I National Park and Wilderness Areas. There are no Class I National Park and Wilderness Areas in Nebraska; the nearest sites are in Colorado and South Dakota. Data collected at the Nebraska sites facilitates regional haze and pollution transport studies.

There have been two IMPROVE sites in Nebraka for which the NDEQ provided administrative support: one at Halsey National Forest in Thomas County and one at Crescent Lake National Wildlife Refuge in Garden County. EPA concluded a review of IMPROVE program priorities in 2015 and determined the Crescent Lake National Wildlife Refuge site should be shut-down at the end of CY2015. The IMPROVE site at Halsey National Forest continues to operate.

K. National Atmospheric Deposition Program (NADP): National Trends Network (NTN) & Mercury Deposition Network (MDN)

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) is a federal, nationwide network of sites that monitor for deposition constituents in precipitation. The deposition parameters examined include acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., calcium, magnesium, potassium and sodium).

There are two NADP/NTN sites in Nebraska: one near Mead that has operated since 1978 and one near North Platte that has operated since 1985. These sites are operated by the University of Nebraska, with analytical and data development support from the federal NADP. There were no changes to the NADP/NTN network from January 1, 2015 thru March 31, 2016.

Mercury Deposition Network (MDN) monitoring was initiated at the Mead site on June 26, 2007, and is continuing. At the North Platte site, MDN monitoring was conducted from October 2008 thru October 2010.

The operation of NADP sites is not subject to the provisions of 40 CFR Part 58.10. Their inclusion in this Network Plan is for informational purposes only. More information on the NADP/NTN and the NADP/MDN sites can be found in Attachment A of this network plan. For NADP, NTN and MDN program information see: http://nadp.sws.uiuc.edu/ or http://nadp.sws.uiuc.edu/mdn/

V. Considerations for Network Planning

A. Federal Regulatory Requirements and Issues

1. EPA Air Monitoring and Network Design Requirements

The Nebraska Ambient Air Quality Network must comply with the applicable requirements of 40 CFR Part 58 Appendices A through E. Attachment D of this network plan contains a review of the Nebraska ambient air monitoring network with respect to these requirements.

As the review in Attachment D verifies, the Nebraska ambient air monitoring network, operated by the NDEQ, DCHD and LLCHD, is meeting all the applicable requirements of Appendixes A through E, except the NDEQ PM_{10} network collocation requirements as discussed below. The Nucor Steel lead-monitoring waiver and near-road NO2 monitoring in Omaha are also discussed below.

There are no PSD sites in Nebraska, so Part 58 Appendix B does not apply.

a) **NDEQ PM_{10} Network Collocation:** In March 2015, the collocated monitor at the Weeping Water City site suffered an electronic failure that was not readily repairable. Taking into consideration that the Weeping Water site was to be re-equipped with a continuous MetOne BAM sampler and that the Cozad and Gothenburg sites were going to be proposed for closure, the determination was made not to take extra-ordinary measures to get the collocated sampler re-started. There were two options for re-establishing the collocated sampler.
   1) Attempt to locate electronic boards for the obsolete R&P sampler; or
   2) Purchase a new or used 2025 sampler.

   Neither option was deemed feasible to pursue.

   The Cozad and Gothenburg monitors were shut-down March 8, 2016. The MetOne BAM sampler will be installed in 2016. At that point there will no longer be a 2025 filter-based sampler network and collocation will not be required.

b) **Lead Monitoring Waiver for Nucor Steel in Norfolk:** 40 CFR Part 58 Appendix D Sec 4.5, requires source-oriented lead monitoring near lead-sources of 0.5 tons per year. A waiver from this monitoring requirement is allowed if it can be demonstrated that ambient lead levels will not exceed 50% of the NAAQS. Nucor Steel's Norfolk, NE facility has lead emissions of 0.5 to 1.0 tpy threshold.

   Nucor Steel provided modeling that demonstrated ambient lead levels would not exceed 50% of the NAAQS. NDEQ reviewed and concurred with the Nucor submittal. The waiver request was forwarded to EPA R7 and EPA approved the waiver request in April 16, 2014. The waiver is effective for 5 years and thus will expire in April 2019.

c) Near-Road NOx Monitoring in the Omaha MSA

40 CFR Part 58 Appendix D Sec. 4.3.2 requires a near-road NO_2 monitoring site be implemented in Omaha by January 1, 2017. DCHD, with NDEQ concurrence, proposed putting the near-road NO_2 monitor at the existing CO site at 78th & Dodge. This proposal was included in the 2015 Network Plan.

On May 5, 2016, EPA proposed to narrow the scope of near-road monitoring by removing the requirement for near-road NO_2 monitoring stations in areas with populations between 500,000 and 1 million (see https://www3.epa.gov/airquality/nitrogenoxides/actions.html). The Omaha MSA falls into this population range.

This proposal is based on near-road monitoring results from larger metropolitan areas that are demonstrating attainment with the 1-hour NO_2 NAAQS. This is consistent with the information available to the NDEQ as shown in Table V-1 below, which shows near-road NO_2 levels in Minneapolis, St. Louis and Denver to be in attainment with the 1-hour NAAQS. These 3 metro areas are 3 to 4 times larger than Omaha, and have higher traffic densities and congestion.

Also see Attachment B, Table B-4b, which shows NOy-NO levels at 37% of the NAAQS at the Omaha NCore site. The NOy-NO parameter typically approximates, but can exceed NO2 levels.

The NDEQ/DCHD commitment to have the near-road NO_2 site operational by January 1, 2017 is contingent upon EPA funding to establish and operate the site. EPA will not be providing funding support at this time, and will not in the future if the proposed regulation is finalized. Thus at this time, the near-road NO_2 monitoring proposal is on hold. If the EPA proposal to not require near-road monitoring in MSA's with populations between 500,000 to 1 million is finalized, it is anticipated that the near-road NO_2 monitoring site will not be established in Omaha.

Table V-1: Near-Road NO_2 Levels in Minneapolis, St. Louis and Denver: 2013 - 2015

Site	Site #	98th Percentile Data			Design Value (2)	% NAAQS (2)	MSA Population (3)
		2013	2014	2015			
Minneapolis	27-053-0962	45.0	48.0	48.0	47.0	47%	~3,500,000
St. Louis	29-510-0094	50.4	50.1	46.1	48.9	49%	~2,800,000
Denver (1)	08-031-0002	67.6	76.6	71.6	71.9	72%	~2,800,000

Footnotes:

(1) The Denver site is a downtown, street canyon site. It may not be an official near-road NO_2 site.
(2) The Design Value is the 3-year average of the annual 98th percentile values. It is compared to the 100 ppb 1-hour NAAQS to evaluate attainment.
(3) These are 2015 population estimates. The 2015 population for the Omaha MSA was 915,000, or less than 1/3 the population of the near-road monitoring MSA's listed in this table.

2. Data Requirements for Demonstrating SO_2 Attainment:

On August 21, 2015 EPA finalized changes to 40 CFR Part 51 Subpart BB, §51.1200 - §51.1205 (a.k.a. the Data Requirements Rule or DRR) that set forth additional data requirements with respect to demonstrating attainment with the 1-hour SO_2 NAAQ promulgated in 2010.

There are 3 options that SLT agencies can utilize to meet the DRR requirements:

(a) Establish ambient monitoring in the vicinity of applicable sources by January 1, 2017;
(b) Submit air quality modeling analyses by January 13, 2017; or
(c) Establish enforceable emission limits to hold SO_2 emissions below 2000 tpy.

The NDEQ proposes to pursue the monitoring option to demonstrate compliance at OPPD's North Omaha Station and NPPD's Sheldon Station near Hallam, NE.

The NDEQ proposes a new SO_2 monitoring site to meet DRR requirements with respect to NPPD's Sheldon Station. Attachment E contains the justification and proposed location for this site.

The existing SO_2 monitoring site at 1616 Whitmore Street in Omaha is proposed to meet the DRR requirements for the OPPD North Omaha Station. Attachment A of this network plan contains technical information on the existing Whitmore site and the SO_2 monitor located there. Attachment B Table B-3 contains the 3-year, 2013 thru 2015 data summary for SO2, including the 3-year design value of 56 ppb, which is 75% of the NAAQS. Attachment F contains justification for using the Whitmore site to meet DRR requirements for OPPD North Omaha Station.

3. 40 CFR Part 58 Revisions Effective April 27, 2016

These revisions clarified ambiguities with respect to the annual network review and 5-year assessment process. These changes apply to the 2016 Network Plan (i.e., this network plan). It appears that Nebraska's previous Network Plans met most of the new requirements, and only minor changes to Attachment A were necessitated (i.e., a compliance declaration was added for each site with respect to Part 58 Appendix A-D requirements. Network Plan Attachment D, which contains the detailed compliance review with respect to Part 58 Appendixes A, C, D and E requirements, was retained.

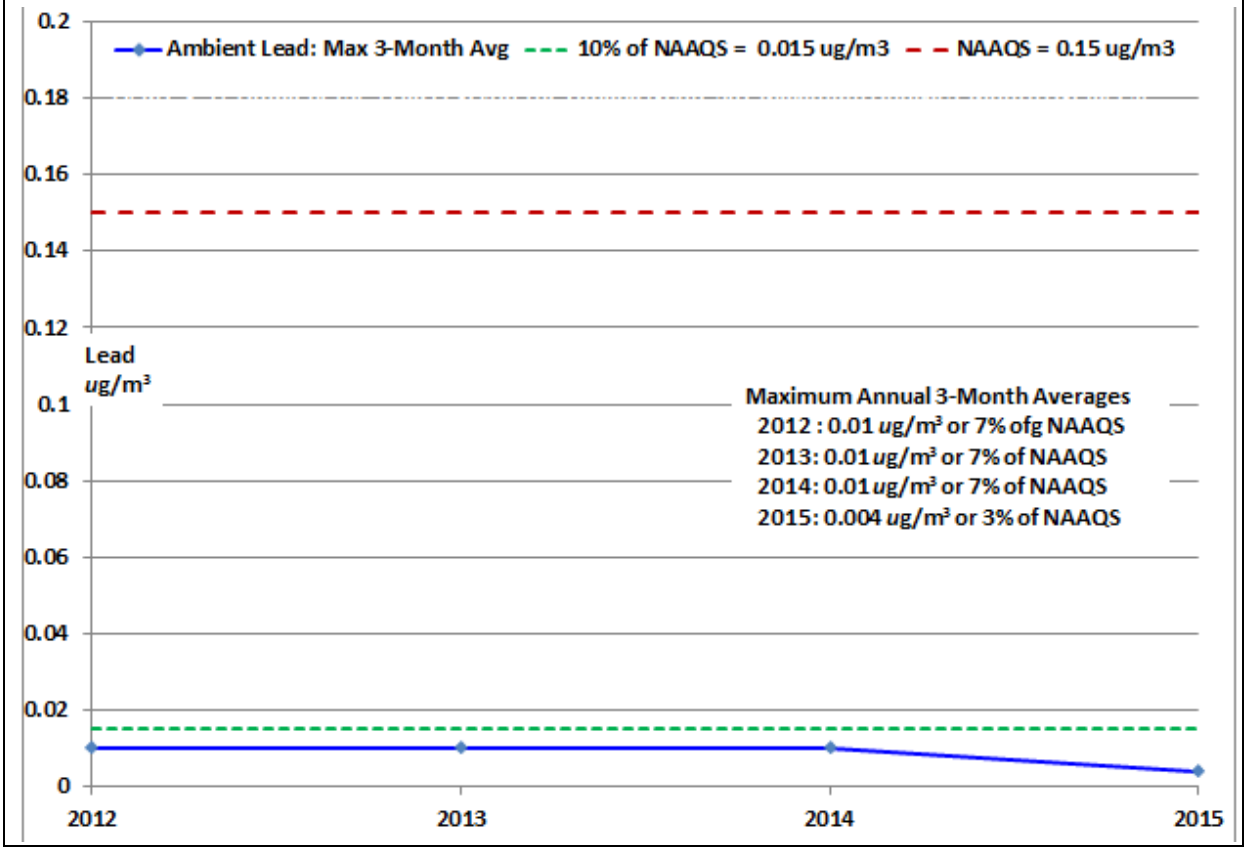
NCore Lead Monitoring: The modifications to Appendix D did contain one provision that will impact the Nebraska ambient air monitoring network in the future. The requirement to operate a lead monitor at NCore sites was removed. In the preamble of the revised regulation, it was stated that the NCore lead monitoring sites could be closed by proposing said closures in the Network Plan as allowed in Part 58.14(c).

The regulation pre-amble indicated that 3-years of data would be required to justify the closure request. However, Part 58.14(c) appears to require 5 years of data.

The Omaha NCore lead monitoring is finding very low lead levels as shown in Figure V-1 below.

The possibility of closing the NCore Lead monitor at the end of 2016 was discussed with DCHD. To accomplish this the closure proposal and justification would need to be included in this network plan. DCHD preferred to continue operating the NCore lead monitor through 2017. The limited time-frame for making the demonstration and resolving possible discrepancies between the pre-amble and Part 58.14(c), was a significant factor in their decision.

Figure V-1: Ambient TSP-Lead Levels at the Omaha NCore Site: Maximum Annual 3-Month Averages from 2012 thru 2015



B. Air Quality and NAAQS Attainment

The monitoring results from all Nebraska monitoring sites, and adjacent state monitoring sites in the Omaha and Sioux City MSAs, for 2013 thru 2015 are in attainment with the NAAQS. See the monitoring data tables in Attachment B for more information on the 2013 thru 2015 monitoring results.

Nebraska has never had a declared non-attainment determination. EPA has not yet determined all areas of Nebraska to be in "attainment" with respect to the 1-hour NO_2 and SO_2 NAAQS established in 2010. These and other air quality issues are discussed in more detail below.

1. **Sulfur Dioxide (SO_2)**: The NAAQS for SO_2 was revised in 2010 to establish a 1-hour NAAQS of 75 ppb. Currently areas of Nebraska have "unclassifiable/attainment' or "unclassifiable" designations. These are being resolved in accordance with the requirements of 40 CFR Part 51 Subpart BB (a.k.a. Data Requirements Rule or DRR). See Section V.A.2 above (*Data Requirements for Demonstrating SO_2 Attainment*) for information on monitoring that is being proposed as part of this process.

   There are 2 SO_2 monitors in Omaha, and 2 in adjacent state areas of the Sioux City MSA (one in Sargent Bluff IA and one in Union County, SD. The SO2 levels being found at these sites are in attainment with the NAAQS. See Attachment B Table B-3. The Whitmore St site in Omaha and the Sergeant Bluff, IA site are source-oriented with respect to coal-fired power plants. One–hour SO2 concentrations at these sites are at 75% and 19% of the NAAQS, respectively.

2. **Nitrogen Dioxide (NO_2)**: The NAAQS for NO_2 was revised in 2010 to establish a 1-hour NAAQS of 100 ppb. An "unclassifiable/attainment" classification currently applies in Nebraska with respect to this standard. The unclassifiable determination is based on the absence of any near-road NO_2 monitoring in Nebraska. See Section V.A.1.(b) above (*Near-Road NO_2 Monitoring)* for more information on this topic.

   There is 1 NO_2 monitoring site in Union County, SD within the Sioux City MSA. This is an area background site and is finding 1-hour NO_2 levels at 20% of the NAAQS.

   There is an NOy/NO monitor at the Omaha NCore site. The NOy-NO parameter generally approximates NO_2, with NOy-NO being equal to or possibly higher than NO_2. The 1-hour NOy-NO levels at the Omaha NCore site were at 37% of the 1-hour NO2 NAAQS in the 2013 thru 2015 time frame.

   See Attachment B Tables B-4a and B-4b for NO2 and NOy-NO concentration data.

3. **Carbon Monoxide (CO):** There are 2 CO monitors in Nebraska. Both are finding CO levels less than 25% of the 8-hour NAAQS and less than 10% of the 1-hour NAAQS. See Attachment B Table B-2. Vehicle emissions are the primary source of ambient CO. Vehicle emission standards have reduced ambient CO. The 78th & Dodge St site is a near-road, highest concentration site. EPA last reviewed the CO NAAQS in 2011 and determined that the NAAQS were protective and did not need to be changes.

4. **Ozone:** On October 1, 2015, EPA strengthened (lowered) the ozone NAAQS from 0.075 ppm to 0.070 ppm. As shown in Attachment B Table B-1, the 2013-15 Design Values (DVs) for monitoring sites in Nebraska and adjacent state areas in the Omaha and Sioux City MSAs are in attainment with this standard.

   Ozone DVs ranged from 84% to 91% of the NAAQS in the 2013-2015 time-frame. The highest ozone levels are being found in the Omaha MSA and near Santee, NE (an EPA CASTNET site). The ozone levels being found at Santee are somewhat surprising. However, ozone data from Nebraska and near-by states indicate that ozone levels similar to those found in Omaha and Santee are ubiquitous to the multi-state area. See the 2015 Network Plan (Figure E-13) for a more detailed description of ozone levels in Nebraska and surrounding states.

5. **$PM_{2.5}$:** EPA last revised the $PM_{2.5}$ NAAQS in 2012 setting the annual average NAAQS at 12 ug/m^3 (changed from 15 ug/m^3) and retaining the 24-hour NAAQS at 35 ug/m^3. As shown in Attachment B Tables B-6a and B-6b all $PM_{2.5}$ sites in Nebraska are in attainment with the NAAQS.

   The highest $PM_{2.5}$ concentrations were found in the Omaha MSA at 65% of the 24-hour NAAQS and 78% of the annual average NAAQS. Unlike ozone, $PM_{2.5}$ concentrations do not appear to be ubiquitously distributed over large areas of Nebraska and near-by states. $PM_{2.5}$ levels are significantly lower in Grand Island and lower yet in Scottsbluff. See Attachment B Tables B-6a and B-6b.

   $PM_{2.5}$ derived from wild fires and prescribed burns is an exception. Wild fires and prescribed prairie/grassland burns can create large smoke plumes that impact large areas of the North American continent. See the *Wild Fires and Prescribed Burns* subsection below.

6. **PM_{10}:** EPA last modified the PM_{10} NAAQS in 2006 when the 50 ug/m^3 annual average standard was dropped and the 150 ug/m^3 24-hour standard was retained. PM_{10} is more source-oriented and remains more localized to its point of origin than $PM_{2.5}$. As shown by the data in Attachment B Table B-5a, all the monitors in Nebraska are demonstrating attainment with the PM_{10} NAAQS over the 2013 thru 2015 time-frame. Two areas where there have been high PM_{10} levels in the past are: Weeping Water and 46th & Farnam in Omaha. These are discussed below.

   The PM_{10} NAAQS is interpreted such that there cannot be more than three PM_{10} 24-hour average values of 155 ug/m^3 or more over the latest 3-year time frame. This means the 4th high value over the most recent 3-years needs to be below155 ug/m^3.

   a) **Weeping Water:** The Weeping Water area has several limestone mining and processing facilities. There are two PM_{10} monitoring sites in the Weeping Water area: one at the city wastewater treatment facility (Weeping Water City site) and one approximately 2 miles west of city (Weeping Water Farm site).

      The Weeping Water City site has detected relatively low PM_{10} levels (i.e., maximum 24-Hour PM_{10} levels ~30% of the NAAQS), since Martin Marietta closed down their limestone processing facility on the west edge of Weeping Water. They developed a new site ~ 2 miles SW of the city.

      Higher PM_{10} levels are detected at the Weeping Water Farm site. The Kerford Limestone and Iowa Limestone processing facilities are located ~ ¼ mile west of this monitoring site. These facilities are aware of their air quality responsibilities and challenges. Their environmental contact will call to check on PM_{10} levels being detected by the continuous monitor at this site when he suspects additional controls may be needed. In the 2013 thru 2015 time frame, one 24-hour PM_{10} value met or exceeded 155 ug/m^3, a 166 ug/m^3 value on 3/11/15. The 4th highest value for the 2013 thru 2015 time frame was 111 ug/m^3 or 74% of the NAAQS.

   b) **46th & Farnam, Omaha:** The PM_{10} site at 46th and Farnam was source-oriented with respect to Omaha Steel, a PM_{10} emission source. The Omaha Steel facility was closed in 2014. In 2015 demolition and re-development activities were being under-taken. As can be seen in Attachment B table B-5.a, the highest 24-hour average value in the 2013-2015 time period was 153 ug/m^3 and the 4th highest value was 97 ug/m^3 or 65% of the NAAQS.

7. **Lead:** The lead NAAQS was last changed in 2008, when it was tightened from1.5 ug/m^3 to 0.15 ug/m^3. There are 3 lead monitoring sites in Nebraska: Fremont, Auburn and Omaha NCore. All three are demonstrating attainment with the NAAQS (see Attachment B Table B-7).

   a) Omaha NCore Site: The 2013-15 Design Value (DV) for this site was 7% of the NAAQS. The Part 58 revisions effective April 27, 2016 no longer require lead monitoring at NCore sites. It is anticipated that the NCore lead monitor will be shut-down after the 2017 monitoring year (i.e., to be proposed in the 2017 Network Plan).

   b) Auburn Site: This site is source-oriented with respect to Magnolia Metals, a bronze foundry. In 2012 and 2013, Magnolia Metals implemented a series of pollution-control upgrades that significantly lowered ambient lead levels and dropped their lead emissions to 0.1 tpy, below the 0.5 tpy threshold for requiring lead monitoring. The 2013 to 2015 DV was 20% of the NAAQS, and 2014 and 2015 levels were at or below 5% of the NAAQS. This site is to be closed in 2016 in accordance with the 2015 Network Plan.

c) Fremont Site: This site is source-oriented with respect to Magnus-Farley, a bronze & brass casting facility. In 2012 the maximum 3-month average ambient lead level was 0.14 ug/m^3 or 93% of the NAAQS. In 2013 thru 2015 the maximum 3-month average lead concentrations were lower at 73%, 60% and 53% of the NAAQS, respectively. Facility awareness and diligence, coupled with NDEQ feedback on ambient air lead concentrations appears to have facilitated the air quality improvements. See Attachment B Table B- 7 for the 2013 thru 2015 ambient air quality summary data.

8. **Total Reduced Sulfur (TRS):** There is not a NAAQS for TRS. Nebraska established ambient air quality standards for TRS in Title 129 Chapter 4: a 1-minute average standard of 10 ppm and 30-minute average standard of 0.10 ppm. There was one TRS site operating in Nebraska in 2015 on east Pine Street in Dakota City. As shown in Attachment B Table B-8, TRS levels at this site were meeting the NE standards in the 2013 thru 2015 time-frame. This site will be closed in 2016 in accordance with the 2015 Network Plan.

9. **Wild Fires and Prescribed Burns:** Nebraska's air quality is periodically impacted by smoke from wildfires and prescribed burning. In July 2015, Nebraska's air quality was impacted by western wildfires from the Pacific Northwest and Canada in the summer. This was discussed in the 2015 Network Plan.

   Prescribed burning of prairies and grasslands is conducted to promote native prairie species, suppress tree growth, and release nutrients back into the soil. It is a conservation/grassland management tool recognized by state and federal agencies, as described at the following web addresses:

   - http://www.npwrc.usgs.gov/resource/habitat/burning/
   - http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ia/newsroom/features/?cid=stelprdb1077081
   - http://outdoornebraska.ne.gov/wildlife/programs/wildnebraska/options.asp

   The Flint Hills of eastern Kansas and northeast Oklahoma (see Figure V-1) contain the densest coverage of intact tall-grass prairie in North America. It is roughly 200 miles N-to-S and 80 miles E-to-W. The northern end of the Flint Hills is within 20 miles of the Nebraska/Kansas boundary. The cattle ranchers within the Flint Hills conduct spring burning to maintain the prairie.

   A negative aspect of prescribed burning is that smoke from fires can travel great distances and contribute to air pollution hundreds of miles from the site of the fires. In April of 2014, 2015 and 2016, Nebraska air quality was impacted by smoke and air pollution from prescribed burning in the Flint Hills. These impacts were discussed in the 2014 and 2015 Network Plans. Additional detail on the 2016 impacts are discussed below.

Figure V-2: Flint Hills Area of Kansas and Oklahoma

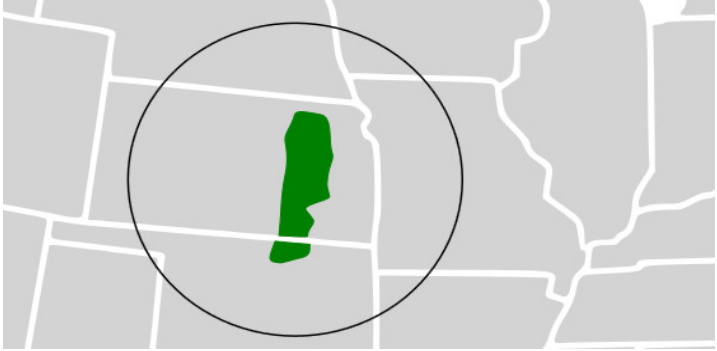
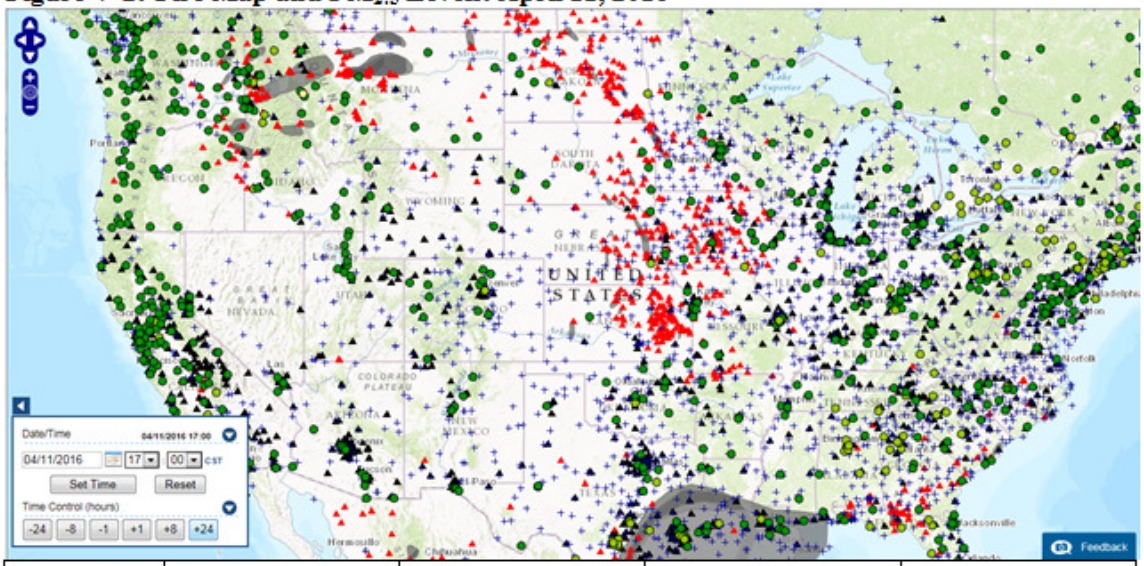


Figure V-2: Fire Map and $PM_{2.5}$ Levels: April 11, 2016

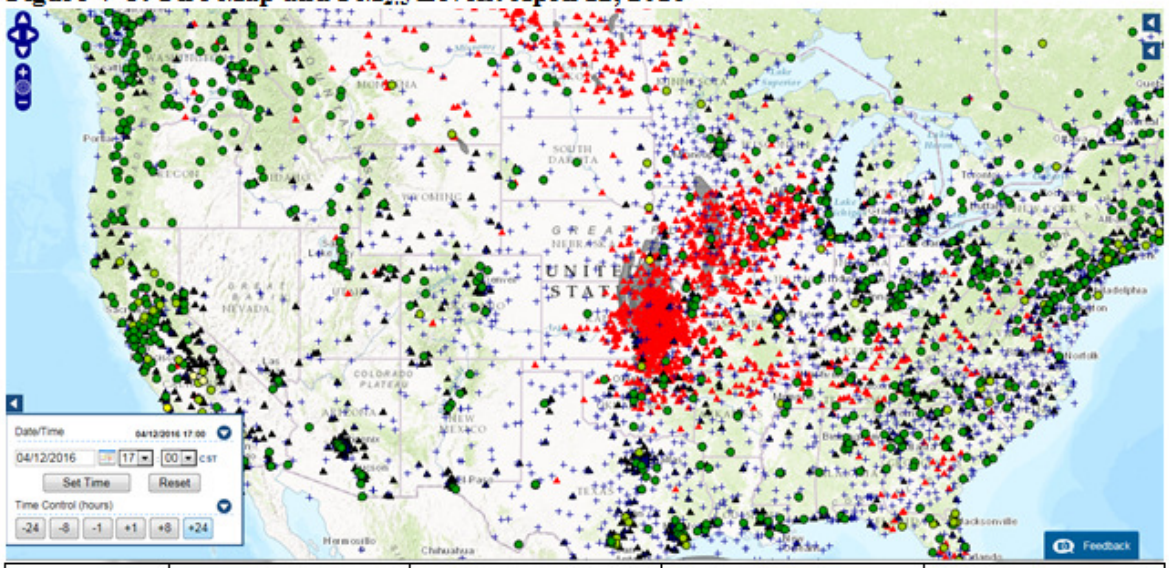


Pollutant	Omaha MSA	Lincoln MSA	Sioux City MSA	Santee, NE
Ozone	43	41	40	42
$PM_{2.5}$	4	7	6	nd

AQI Color Code: Good | Moderate | Unhealthy to Sensitive Groups

Comments: Prescribed burns occurring. Air qualityy good.

Figure V-3: Fire Map and $PM_{2.5}$ Levels: April 12, 2016

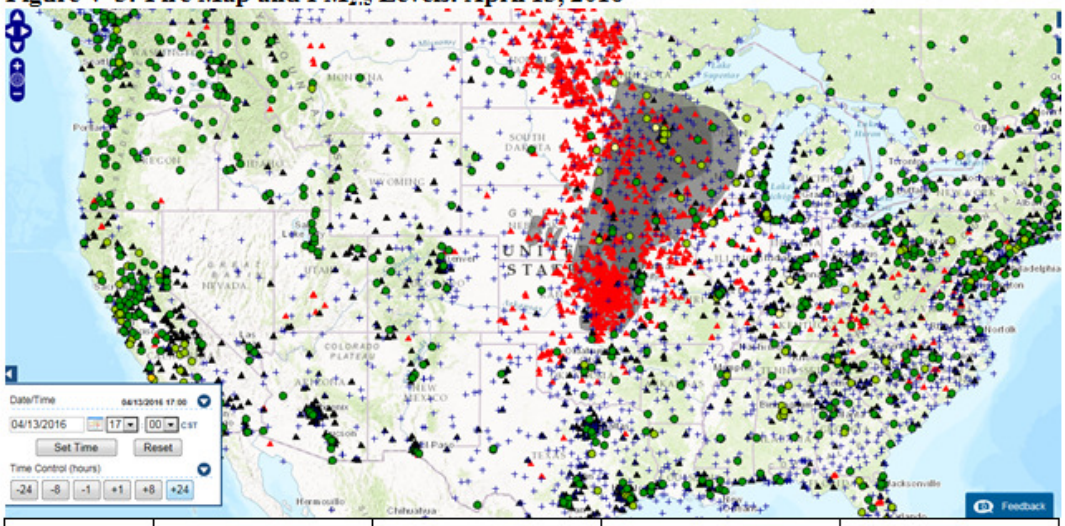


Pollutant	Omaha MSA	Lincoln MSA	Sioux City MSA	Santee, NE
Ozone	47	57	46	45
$PM_{2.5}$	7	25	11	nd

AQI Color Code: Good | Moderate | Unhealthy to Sensitive Groups

Comments: Many prescribed fires in Flint Hills area. Lincoln's air quality impacted.

Figure V-3: Fire Map and $PM_{2.5}$ Levels: April 13, 2016

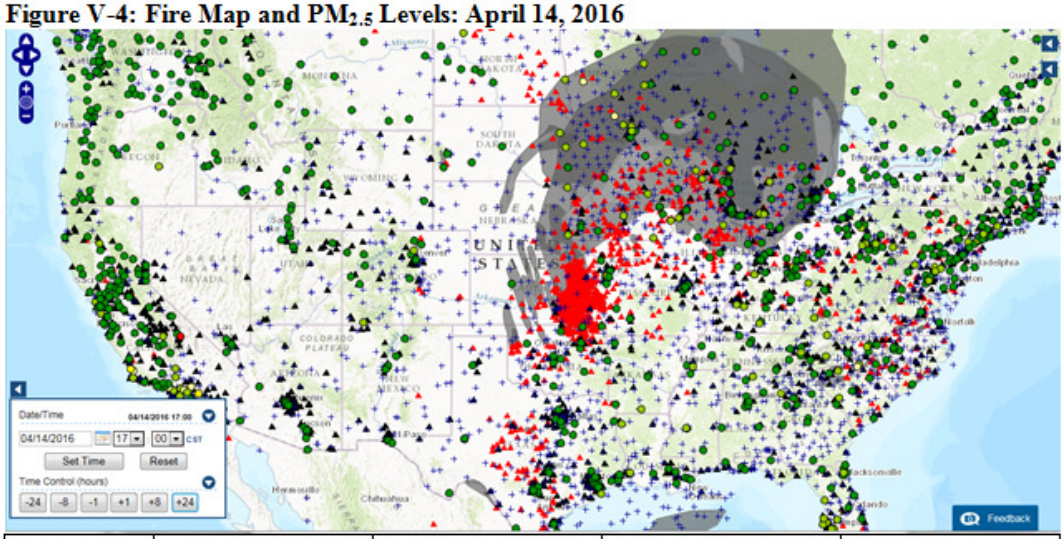


Pollutant	Omaha MSA	Lincoln MSA	Sioux City MSA	Santee, NE
Ozone	60	55	55	51
$PM_{2.5}$	13	54	38	nd

AQI Color Code: Good | Moderate | Unhealthy to Sensitive Groups

Comments: Many prescribed fires in Flint Hills area and elsewhere, with extensive smoke plume covering parts of several states. Air quality impacted, in order of most to least impact, in: Lincoln, Sioux City and Omaha MSAs.

Figure V-4: Fire Map and $PM_{2.5}$ Levels: April 14, 2016

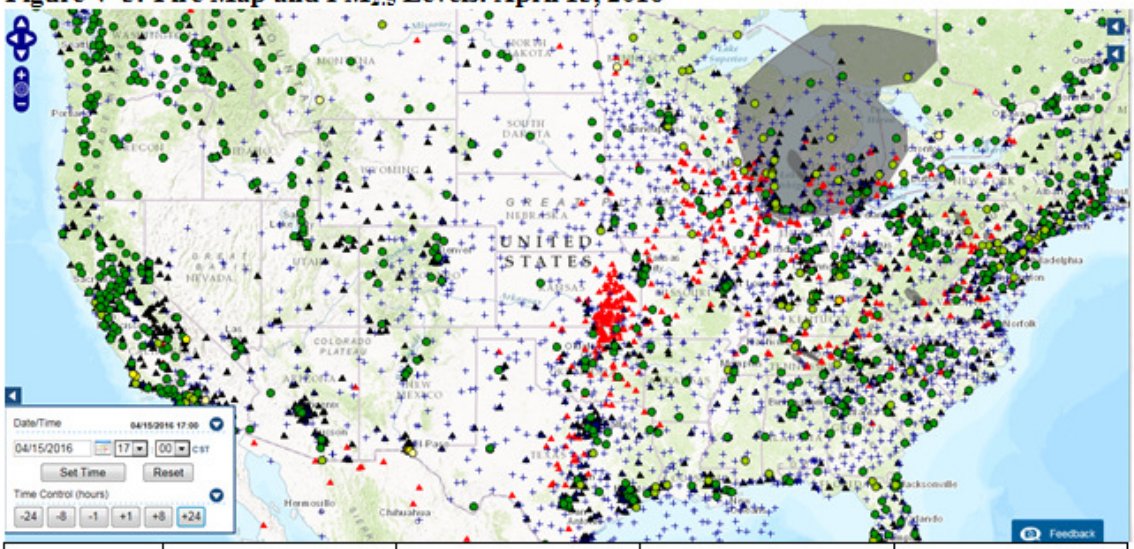


Pollutant	Omaha MSA	Lincoln MSA	Sioux City MSA	Santee, NE
Ozone	59	54	55	61
$PM_{2.5}$	46	30	21	nd

AQI Color Code: Good | Moderate | Unhealthy to Sensitive Groups

Comments: Many prescribed fires in Flint Hills area and elsewhere, with extensive smoke plume extending 100's of miles across the USA and into Canada several states. Air quality impacted, in order of most to least impact, in: Omaha MSA, Santee, Sioux City MSA and Lincoln MSAs.

Figure V-5: Fire Map and $PM_{2.5}$ Levels: April 15, 2016

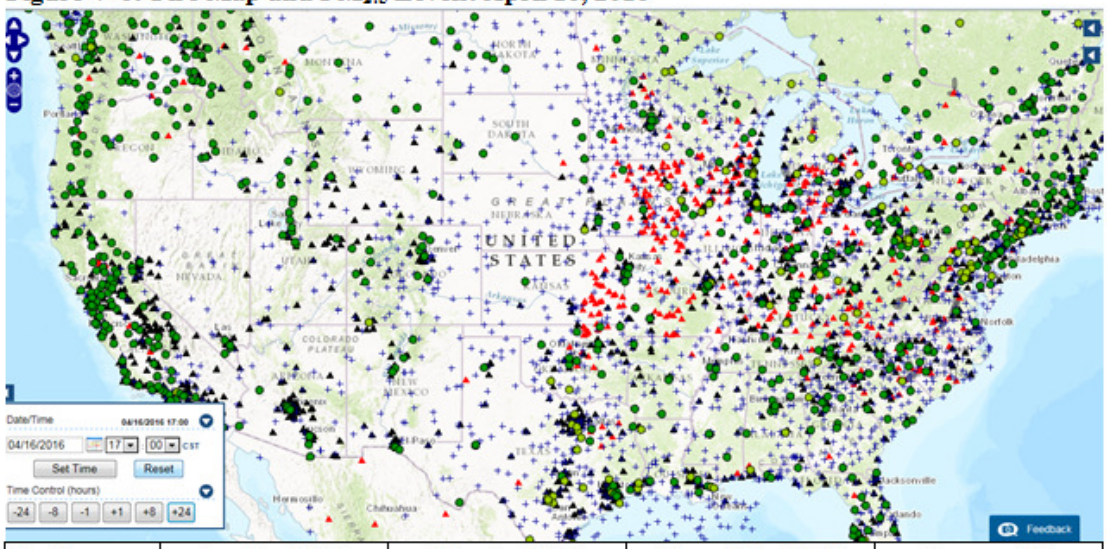


Pollutant	Omaha MSA	Lincoln MSA	Sioux City MSA	Santee, NE
Ozone	55	51	49	46
$PM_{2.5}$	7	14	10	nd

AQI Color Code: Good | Moderate | Unhealthy to Sensitive Groups

Comments: Many less prescribed fires than previous day. Smoke plume still large, but shrinking. Air quality impacted in: Omaha and Lincoln MSAs.

Figure V-6: Fire Map and $PM_{2.5}$ Levels: April 16, 2016



Pollutant	Omaha MSA	Lincoln MSA	Sioux City MSA	Santee, NE
Ozone	43	38	40	31
$PM_{2.5}$	6	10	5	nd

AQI Color Code: Good | Moderate | Unhealthy to Sensitive Groups

Comments: Some prescribed fires, but much less than precedinmg 4 days. No visible smoke plume. Air quality good at all ites.

C. Population Trends and Network Design

Population related data is reviewed as part of the network planning process because:

- Population growth may be associated with pollution source growth;
- High population density generally correlates with high air pollution potential; and
- Some 40 CFR Part 58 requirements are based on population and/or federally defined metropolitan statistical definitions.

Attachment C contains a review of population growth and growth trends in Nebraska. The data in Attachment C is based on 2010 census and 2014 survey estimate data.

Overall growth trends in Nebraska appear basically unchanged from those described in previous annual Network Plans. Most of the population growth is occurring in Nebraska's 3 most populous and densely populated counties: Douglas, Lancaster and Sarpy (i.e., the Omaha and Lincoln MSAs).

The basic design of the Nebraska ambient air monitoring network is consistent with these population trends: 61% of the monitoring sites and 73% of the pollutant monitors are located within the Omaha and Lincoln MSAs. The Omaha MSA network contains 52% of the monitoring sites in Nebraska and 67% of the monitors.

D. Funding

Air monitoring is supported by a combination of federal, cash, state and local funding sources. Table V-4 below provides a summary of the primary funding sources used for air monitoring.

Federal CAA §103 funding is used to operate $PM_{2.5}$ and IMPROVE monitors. Funding for April 2016 through March 2017 was maintained at the same level as the previous year.

Initial indications are that Federal CCA §105 funding for October 2016 thru September 2017 will be maintained at current levels. Current funding levels are adequate to continue the operation of the existing Nebraska air monitoring network, provided major new equipment purchases are not required.

Table V-2: Primary Funding Sources used to Support Air Monitoring in Nebraska	
Nebraska Department of Environmental Quality (NDEQ)	
Funding Source	**Comments**
State General Funds	At a minimum must be sufficient to meet minimum federal match requirements
State Title V Funds	Fees paid by major sources based on the quantity of air pollutants they emit. NDEQ collects Title V fees for sources through-out Nebraska, except those regulated by LLCHD and Omaha Air Quality Control. Title V funds cannot be used for state/local match.
CAA §105 Funds	Federal grant funds used for air monitoring activities set forth in a bi-annually negotiated EPQA-NDEQ work plan. Requires a 40% state/local match. A portion of this grant funding is passed on to DCHD and LLCHD.
CAA §103 Funds	Federal grant funds used for air monitoring activities set forth in a bi-annually negotiated EPQA-NDEQ work plan. This money is currently limited to funding $PM_{2.5}$ and IMPROVE monitoring, and sometimes for specified equipment purchases and/or special monitoring studies. Requires no state/local match. A portion of this grant funding is passed on to DCHD and LLCHD.
Douglas County Health Department (DCHD)	
Local County Funds	At a minimum must be sufficient to meet minimum federal match requirements
City of Omaha Title V funds	See *State Title V Funds* comments above. The Omaha Air Quality Control regulates air emission sources in the City of Omaha, including the collection of Title V fees from major sources. A portion of the Omaha Title V funds are directed to DCHD to support air monitoring. Title V funds can not be used for state/local match.
CAA §105 Funds	NDEQ passes-through a portion of the Federal §105 funds to DCHD for activities described in an NDEQ/DCHD work plan. DCHD is required to meet the 40% state/local match requirement.
CAA §103	NDEQ passes-through a portion of the federal §103 funds to DCHD for activities described in an NDEQ/DCHD work plan, primarily $PM_{2.5}$ related monitoring activities. There is no state/local match requirement.
Metropolitan Area Planning Assoc. (MAPA) Funds	Typically federal grant funds obtained by MAPA are for specific purposes such as transportation or homeland security related activities. Historically they have been used for equipment purchases and site set-up, not network operating costs.
Lincoln-Lancaster County Health Department (LLCHD)	
Local County Funds	At a minimum must be sufficient to meet minimum federal match requirements
Lancaster County Title V funds	See *State Title V Funds* comments above. LLCHD regulates air emission sources in Lancaster County, including the collection of Title V fees from major sources. A portion of the Title V funds are used to support air monitoring activities performed by LLCHD. Title V funds cannot be used for state/local match.
CAA §105 Funds	NDEQ passes-through a portion of the Federal §105 funds to LLCHD for activities described in an NDEQ/LLCHD work plan. LLCHD is required to meet the 40% state/local match requirement.
CAA §103	NDEQ passes-through a portion of the federal §103 funds to LLCHD for activities described in an NDEQ/LLCHD work plan, primarily $PM_{2.5}$ related monitoring activities. There is no state/local match requirement.

VI. 2015 Network Assessment Modification Plan

The NDEQ prepared and submitted the *2015 Ambient Air Monitoring Network Plan and 5-Year Assessment* (referred to herein as the 2015 Network Plan) to comply with the requirements of 40 CFR Parts 58.10 and 58.14. Several network modifications were proposed in that document as a result of the 5-year assessment process. These changes were included in the 2015 Network Plan.

On March 10, 2016 EPA finalized changes to Part 58, which became effective April 27, 2016. EPA has indicated they expect these changes to be implemented in the 2016 Network Plan. One new requirement, 58.14(a) relates to the submittal of an implementation plan (highlight added for emphasis).

> *40 CFR Part 58.14(a) The state or where appropriate local agency shall develop a network modification plan and schedule to modify the ambient air quality monitoring network that addresses the findings of the network assessment required every 5 years by §58.10(d). The network modification plan shall be submitted as part of the Annual Monitoring Network Plan that is due no later than the year after submittal of the network assessment.*

As the 2015 Network Plan contained the network modification plan developed from the 5-year assessment, the Part 58.14(a) requirements have been met. The implementation status of the modification plan is described in Section VII.A below.

VII. Anticipated Nebraska Air Monitoring Network Modifications

A. Implementation Status of Network Modifications Proposed in the 2015 Network Plan

The six network changes listed below were proposed in the 2015 Network Plan.

1. **Weeping Water WWTF PM_{10} Site:** The R&P 2025 primary and collocated samplers are to be replaced with a MetOne BAM FEM monitor.
2. **Cozad PM_{10} Site:** Site was closed on March 8, 2016.
3. **Gothenburg PM_{10} Site:** Site was closed on March 8, 2016.
4. **Auburn TSP-Lead Site:** Site to be closed in 2016.
5. **Dakota City TRS Site:** Site to be closed in 2016**.**
6. **Near-Road NO_2 site in Omaha:** On hold pending finalization of proposed EPA regulation to not require this monitoring site. This site will not be operational by 1/1/17 as previously proposed. If the EPA proposal is finalized, it is anticipated that this site will not be developed. See Section V.1.c above.

Also with the conversion of the Weeping Water site to use a continuous monitor, and the closure of the Cozad and Gothenburg sites, the NDEQ will no longer be using filter-based PM_{10} samplers. Thus the NDEQ PM_{10} filter lab will also be closed in 2016. The HHS Lab will continue to supply filter analytical support of the $PM_{2.5}$ sites at Lincoln, Grand Island and Scottsbluff .

B. Network Modifications to Satisfy 40 CFR Part 51 Subpart BB - Data Requirements for Characterizing Air Quality for the Primary SO_2 NAAQS (a.k.a. Data Requirements Rule or DRR)

Two SO_2 monitoring sites are proposed to meet the DRR requirements for characterizing air quality near two coal-fired power plants to ascertain the attainment-status with respect to the 1-hour SO_2 NAAQS.

1. A new SO_2 monitoring site located at NPPD's Sheldon Station as detailed in Attachment E.
2. The use of the existing SO_2 site at 1616 Whitmore Street in Omaha as detailed in Attachment F.

C. Ozone Monitor Relocation from 30th & Fort to 1616 Whitmore

The ozone monitoring site at 30th and Fort in Omaha had to be shut-down after the 2014 monitoring season because the site was being demolished and redeveloped. The monitor was relocated to 1616 Whitmore for the 2015 and 2016 monitoring seasons.

At the end of the 2016 monitoring season, a review will be conducted to determine whether to keep the ozone monitor at 1616 Whitmore or return it to the 30th and Fort vicinity. There are 3 factors favoring the Whitmore site at this time:

1) The 30th & Fort Street location may not be available after re-construction is completed;
2) The Whitmore site is in a socioeconomically depressed area; and
3) The Whitmore site recorded the highest 4th high ozone value in the Omaha MSA in 2015.

It is anticipated that this will be addressed in the 2017 Network Plan.

D. Closure of the IMPROVE Site at the Crescent Lake Wildlife Refuge

EPA concluded a priority review and determined this site would be closed at the end of CY2015. The design of the IMPROVE network is the responsibility of the EPA. Changes in the IMPROVE network are not subject to the provisions of Part 58.10 or 58.14 (i.e., not subject to the annual network review and planning process). This closure is noted here, but it is an action taken by EPA, and is not subject to 40 CFR Part 58 requirements for inclusion in a network plan.

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See Attachment D for a compliance review with respect to 40 CFR Part 58 Appendixes A through E.

Omaha NCore Site Operated by DCHD

Site Name: Omaha NCore [1]	AIRS ID: 31-055-0019 [1]
Location: 4102 Woolworth St., Omaha	Latitude: 41.246792º Longitude: -95.973964º
Operating Agency: Douglas County Health Department	
Purpose: NCore	Scale: Neighborhood
Monitor/Pollutant: Carbon Monoxide (CO) - Trace Level	
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 48i-TLE	EPA Method: RFCA-0981-054 (AQS 554)
Start-Up Date: 1/20/11	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor/Pollutant: Ozone (O_3)	
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 49i	EPA Method: EQOA-0880-047
Start-Up Date: 4/1/11	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor/Pollutant: Nitrogen Oxides (NO/NO_y)	
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 42i $NO/NO_2/NOx$	EPA Method: RFNA-1289-074
Start-Up Date: 1/20/11	Closure Date: Currently operating
Data used for NAAQS comparison: Not Applicable. Monitors for NO & NOy, but not NO_2	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor/Pollutant: Sulfur Dioxide (SO_2) – Trace Level	
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 43i-TLE	EPA Method: EQSA-0486-060 (AQS 560)
Start-Up Date: 1/20/11	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor/Pollutant: $PM_{2.5}$ [2]	
Type/POC: Primary Continuous / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Met One BAM-1020 [2]	EPA Method: EQPM-0308-170
Start-Up Date: 2/1/04 [2]	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor/Pollutant: $PM_{2.5}$ [2]	
Type/POC: Collocated / POC 002	Monitoring Frequency: Once every 6 days
Analyzer/Sampler: 2025 Sequential [2]	EPA Method: RFPS-0498-118
Start-Up Date: 1/1/99 [2]	Closure Date: Currently operating
Data used for NAAQS comparison: Only when POC 1 data is not available.	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor/Pollutant: $PM_{2.5}$ Speciation [3]	
Type/POC: Speciation / POC 005 [3]	Monitoring Frequency: Once every 3 days
Analyzer/Sampler: $PM_{2.5}$ Speciation	Sampler Type: SASS and a 3000 URG [3]
Start-Up Date: 5/25/01	Closure Date: Currently operating
Data used for NAAQS comparison: Not applicable	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Continued on next page	

Omaha NCore Site Operated by DCHD

Site Name: Omaha NCore AIRS ID: 31-055-0019 (See Comment 1)
Location: 4102 Woolworth St., Omaha Latitude: 41.246792º Longitude: -95.973964º
Operating Agency: Douglas County Health Department (continued from previous page)

Monitor/Pollutant: PM_{10} – STP & Local Conditions

Type/POC: Continuous [3] / POC 001 — Monitoring Frequency: Continuous
Analyzer/Sampler: Met One BAM-1020 [4] — EPA Method: EQPM-0798-122
Start-Up Date: 1/1/11 [4] — Closure Date: Currently operating

Data used for NAAQS comparison: Local conditions data only
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable

Monitor/Pollutant: $PM_{10-2.5}$ – Local Conditions

Type/POC: Continuous [3] / POC 001 — Monitoring Frequency: Continuous
Analyzer/Sampler: Met One BAM-1020 [4] — EPA Method: EQPM-0709-185
Start-Up Date: 1/1/11 [4] — Closure Date: Currently operating

Data used for NAAQS comparison: Yes
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable

Monitor/Pollutant: Lead (Pb) – Non-source oriented

Type/POC: Primary / POC 1 — Monitoring Frequency: Once every 6 days
Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS) — EPA Method: EQL-0310-189
Start-Up Date: 12/1/12 — Closure Date: Currently operating

Data used for NAAQS comparison: Yes
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable

Meteorological Parameters – Manufacturer & Model – Start Date
Wind Direction & Velocity – MetOne 50.5 Sonic - 5/13/11
Temperature - MetOne Model 083D – 4/12/11
Barometric Pressure – MetOne Model 090D – 4/12/11
Relative Humidity – MetOne 083D – 4/12/11
Solar Radiation – MetOne Model 096-1 – 4/12/11
Closure Date: Currently operating

Atmospheric Radiation – RadNet Air Monitor
RadNet is a nationwide system that monitors the nation's air, drinking water, precipitation, and pasteurized milk to determine levels of radiation in the environment. RadNet sample analyses and monitoring results provide baseline data on background levels of radiation in the environment and can detect increased radiation from radiological incidents. The RadNet monitor is not subject 40 CFR Part 58 requirements. It is recognized in this Network Plan for informational purposes only. The RadNet monitor began operating at the Woolworth site in June 2006.

Comments:

1. Site History: Site 31-055-0019 was referred to as the "Woolworth site" through 12/31/10. The Woolworth site was a PM monitoring site with $PM_{2.5}$ filter-based, continuous and speciation monitors located on the roof of Douglas County Hospital. To accommodate NCore monitoring, more space was required and the site was moved approximately 550 ft north to the roof of an adjacent/attached building. The move was initiated in December 2010 with the moving of the $PM_{2.5}$ monitors. Gaseous and meteorological monitorts began operation in 2011 and lead in 2012.
2. On 1/1/99 $PM_{2.5}$ sampling was initiated using primary and collocated R&P 2025 filter-based FRM samplers. A continuous monitor was first operated at this site 2/1/04. The initial continuous monitor was an R&P TEOM, which was not an FRM/FEM. It was used for AirNow reporting, but was not used for NAAQS comparison. It was replaced by a MetOne BAM FEM monitor on 1/6/09. The MetOne BAM was operated as an auxiliary monitor to the primary and collocated R&P 2025 FRM samplers through September 2009. Beginning 10/1/09, the MetOne BAM was designated the primary sampler and an R&P 2025 FRM sampler was retained as the collocated sampler.
3. The POC 5 speciation monitor is comprised two speciation samplers: a SASS and a 3000 URG. The speciation data derived from both samplers are reported as POC 005 results.

Carbon Monoxide Sites in the Omaha MSA Operated by DCHD

Site Name: 78th & Dodge – Omaha	AIRS ID: 31-055-0056
Location: 78th St and W Dodge Rd, Omaha	Latitude: 41.259175° Longitude: -96.028628°
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: Carbon Monoxide (CO)**
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 48c	EPA Method:
Purpose: Highest Concentration	Scale: Microscale
Start-Up Date: 10/01/07	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: None	

Combined Sulfur Dioxide & Ozone Site in the Omaha MSA Operated by DCHD

Site Name: Whitmore – Omaha	AIRS ID: 31-055-0053
Location: 1616 Whitmore St, Omaha (1)	Latitude: 41.3225° Longitude: -95.9383°
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: Sulfur Dioxide (SO_2)**
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 43c-tle	EPA Method: EQSA-0486-060
Purpose: High Conc. & Population Oriented (1)	Scale: Neighborhood (1)
Start-Up Date: 7/1/99	Closure Date: Currently operating*
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor Information	**Pollutant: Ozone (O_3)** (2)
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 49C	EPA Method: EQOA-0880-047
Purpose: Population Oriented (1)	Scale: Neighborhood (1)
Start-Up Date: 4/1/15	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments:	
(1) This site is in a socioeconomically disadvantaged area.	
(2) The ozone monitor from the 30th & Fort Street site was re-located to this site in 2015 & 2016 due to demolition/construction activities.	

Temporarily Closed(1) Ozone Site in the Omaha MSA Operated by DCHD

Site Name: 30th & Fort - Omaha	AIRS ID: 31-055-0035
Location: 30th & Fort Sts., Omaha	Latitude: 41.306111° Longitude: -95.960278°
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: Ozone (O_3)**
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 49C	EPA Method: EQOA-0880-047
Purpose: Population Oriented	Scale: Neighborhood
Start-Up Date: 5/1/81	Closure Date: 11/1/14
Data used for NAAQS comparison: NA (not operating)	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: NA (site temporarily closed) (1)	
Comment: (1) This site was closed due to demolition/construction activity. The monitor was re-located to 1616 Whitmore St for the 2015 & 2016 monitoring seasons. The future availability of the 30th & Fort St site is uncertain. Data from 2015 indicates that the 1616 Whitmore site may have higher ozone levels than 30th & Fort. A determination as to the permanent location for this monitor will be made at the end of 2016.	

Combined Ozone & PM_{10} Site in the Omaha MSA Operated by DCHD

Site Name: South Omaha – Ozone	AIRS ID: 31-055-0028
Location: 2411 O Street, Omaha	Latitude: 41.207500º Longitude: -95.947500º
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: Ozone (O_3)**
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 49C	EPA Method: EQOA-0880-047
Purpose: Population Oriented	Scale: Neighborhood
Start-Up Date: 7/1/78	Closure Date: Currently operating
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Primary / POC 001	Monitoring Frequency: Once every 6 days
Analyzer/Sampler: Hi-Vol Filter	EPA Method: RFPS 1287-063
Purpose: Population & Source Oriented	Scale: Neighborhood
Start-Up Date: 6/1/06 (1)	Closure Date: Currently operating
Data used for NAAQS comparison: Only when there is no primary data Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: (1) The PM_{10} sampler was initially set-up as a SPAM at 25th & L Sts and then moved to 2411 O St on 8/22/07.	

PM_{10} Sites in the Omaha MSA that are Operated by DCHD

Site Name: 19th & Burt, Omaha	AIRS ID: 31-055-0054
Location: 19th & Burt Sts., Omaha	Latitude: 41.267770º Longitude: -95.940830º
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Primary / POC 001	Monitoring Frequency: Once every 6 days
Analyzer/Sampler: Hi-Vol Filter	EPA Method: RFPS 1287-063
Purpose: Population & Source Oriented	Scale: Middle
Start-Up Date: 6/1/01	Closure Date: Currently operating
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Collocated / POC 002	Monitoring Frequency: Once every 6 days (1)
Analyzer/Sampler: Hi-Vol Filter	EPA Method: RFPS 1287-063
Purpose: Population & Source Oriented	Scale: Middle
Start-Up Date: 6/1/01	Closure Date: Currently operating
Data used for NAAQS comparison: Only when there is no primary data Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: None	

PM_{10} sites continued on next page

PM_{10} Sites in the Omaha MSA that are Operated by DCHD - continued

Site Name: 46th & Farnam, Omaha	AIRS ID: 31-055-0045
Location: 46th & Farnam Sts, Omaha	Latitude: 41.257500º Longitude: -95.976111º
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Primary Continuous / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo FH 62 C14	EPA Method: EQPM-1102-150
Purpose: Source Oriented	Scale: Middle
Start-Up Date: 1/1/93 (1)	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments:	
(1) This site utilized a Hi-Vol sampler on a once every 6 day sampling schedule until 1/1/08, when a continuous sampler was installed.	

$PM_{2.5}$ Sites in the Omaha MSA that are Operated by DCHD

Site Name: Berry Street Omaha	AIRS ID: 31-055-0052
Location: 9225 Berry Street, Omaha	Latitude: 41.333056º Longitude: -96.099722º
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: $PM_{2.5}$**
Type/POC: Primary / POC 001	Monitoring Frequency: Once every 3 days
Analyzer/Sampler: 2025 Sequential	EPA Method: RFPS-0498-118
Purpose: Population & Source Oriented	Scale: Neighborhood
Start-Up Date: 1/1/99	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor Information	**Pollutant: $PM_{2.5}$**
Type/POC: Collocated / POC 002	Monitoring Frequency: Once every 6 days
Analyzer/Sampler: 2025 Sequential	EPA Method: RFPS-0498-118
Purpose: Population & Source Oriented	Scale: Neighborhood
Start-Up Date: 10/1/14	Closure Date: Currently operating
Data used for NAAQS comparison: Only when there is no primary data	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: None	

Site Name: Bellevue	AIRS ID: 31-153-0007
Location: 2912 Coffey Ave., Bellevue	Latitude: 41.166944º Longitude: -95.923889º
Operating Agency: Douglas County Health Department	
Monitor Information	**Pollutant: $PM_{2.5}$**
Type/POC: Primary Continuous / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Met One BAM-1020 (1)	EPA Method: EQPM-0308-170
Purpose: Population & Source Oriented	Scale: Neighborhood
Start-Up Date: 3/1/99	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: (1) This site was operated with a 2025 sequential sampler from 3/1/99 thru 6/30/10 (RFPS-0498-118). On 7/1/10 a Met One BAM monitor began operating.	

$PM_{2.5}$ Sites in the Omaha MSA that are Operated by DCHD - continued

Site Name: Blair **Location: 2242 Wright St., Blair**	AIRS ID: 31-177-0002 Latitude: 41.551136º	Longitude: -96.146753
Operating Agency: Douglas County Health Department		
Monitor Information Type/POC: Primary / POC 001 Analyzer/Sampler: 2025 Sequential Purpose: Population & Source Oriented Start-Up Date: 4/6/09	**Pollutant: $PM_{2.5}$** Monitoring Frequency: Once every 3 days EPA Method: RFPS-0498-118 Scale: Neighborhood Closure Date: Currently operating	
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable		
Comments: None		

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PM_{10} Sites in the Weeping Water Area* that are Operated by NDEQ

Site Name: Weeping Water City (1)	AIRS ID: 31-025-0002
Location: 102 P Street, Weeping Water	Latitude: 40.866228 Longitude: -96.137678
Operating Agency: Nebraska Department of Environmental Quality	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Primary / POC 001	Monitoring Frequency: Once per 3 days
Analyzer/Sampler: 2025 Sequential	EPA Method: RFPS-1298-127
Purpose: Population & Source Oriented	Scale: Neighborhood
Start-Up Date: 1/1/85	Closure Date: Currently operating
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, except App A collocation requirements after 3/25/15, when the collocation sampler failed. See Section V.A.1.a. App B not applicable	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Collocated / POC 001	Monitoring Frequency: Once per 6 days
Analyzer/Sampler: 2025 Sequential	EPA Method: RFPS-1298-127
Purpose: Population & Source Oriented	Scale: Neighborhood
Start-Up Date: 1/1/85	Closure Date: 3/25/15 (2)
Data used for NAAQS comparison: Only when primary data was not available Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: (1) Site is located at the city waste water treatment facility. (2) The collocated sampler suffered a major electronic breakdown and last sampled on 3/25/15. Both the primary and collocated samplers are scheduled for replacement with a MetOne BAM sampler in 2016. See Section V.A.1.a for more detail.	

Site Name: Weeping Water Farm	AIRS ID: 31-025-0009
Location: 5102 Hwy 50, Cass Co.	Latitude: 40.873309º Longitude: -96.183359º
Operating Agency: Nebraska Department of Environmental Quality	
Monitor Information	**Pollutant: PM_{10}**
Type/POC: Primary Continuous / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: R&P TEOM	EPA Method: RFPS 1090-079
Purpose: Source Oriented	Scale: Neighborhood
Start-Up Date: 4/8/05	Closure Date: Currently operating
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: None	

* The Weeping Water Area is in Cass County, which is part of the Omaha MSA. This is a relatively non-urbanized area of the county with limestone mining and processing activities. The PM_{10} monitoring conducted here is for evaluation of air quality in the vicinity of Weeping Water, and not the Omaha MSA as a whole.

Sites in the Lincoln MSA that are Operated by LLCHD

Site Name: Davey **Location: 1st & Maple Sts., Davey**	AIRS ID: 31-109-0016 Latitude: 40.984722º Longitude: -96.677222º
Operating Agency: Lincoln-Lancaster County Health Department	
Monitor Information Type/POC: Primary / POC 001 Analyzer/Sampler: Teledyne API 400E Purpose: Population Oriented Start-Up Date: 1/1/85	**Pollutant: Ozone** Monitoring Frequency: Continuous EPA Method: EQOA-0992-087 Scale: Urban Closure Date: Currently operating
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comments: This site was upgraded at the beginning of the 2014 ozone season with the Teledyne API 400E analyzer replacing the Dasibi 1003 AH analyzer.	

Site Name: LLCHD Building **Location: 3140 N St., Lincoln**	AIRS ID: 31-109-0022 Latitude: 40.812590º Longitude: -96.683020º
Operating Agency: Lincoln-Lancaster County Health Department	
Monitor Information Type/POC: Primary / POC 001 Analyzer/Sampler: R&P 2025 Seq. Filter Purpose: Population Oriented Start-Up Date: 1/1/99	**Pollutant: $PM_{2.5}$** Monitoring Frequency: Once every 3 days EPA Method: RFPS 0498-118 Scale: Neighborhood Closure Date: Currently operating
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor Information Type/POC: Collocated / POC 002 Analyzer/Sampler: R&P 2025 Seq. Filter Purpose: Population Oriented Start-Up Date: 1/1/99	**Pollutant: $PM_{2.5}$** Monitoring Frequency: Once every 6 days EPA Method: RFPS 0498-118 Scale: Neighborhood Closure Date: Currently operating
Data used for NAAQS comparison: Only when primary data is not available. Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Monitor Information Type/POC: Continuous / POC 003(1) Analyzer/Sampler: Met One BAM-1020 Purpose: Population Oriented Start-Up Date: 7/1/06	**Pollutant: $PM_{2.5}$** Monitoring Frequency: Continuous EPA Method: EQPM-0308-170 Scale: Neighborhood Closure Date: Currently operating
Data used for NAAQS comparison: No. Reports to AirNow, but not AQS (1) Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	
Comment: (1) The MetOne BAM monitor reported data to AirNow , but not AQS. Data from the MetOne BAM is not used for NAAQS comparison. The MetOne BAM data typically demonstrates a positive bias when compared to same day FRM data. In 2015, there was a 39% bias on same-day annual average data, and a 17% positive bias for the same-day 98th percentile.	

Sites in the Lincoln MSA that are Operated by LLCHD - continued

Site Name: Waverly	AIRS ID: Temporary Investigative
Location: 141st & Oldfield Sts. Waverly	Latitude: 40.92181° Longitude: -96.53011°
Operating Agency: Lincoln-Lancaster County Health Department	
Monitor Information	**Pollutant: Ozone**
Type/POC: Primary / POC 001	Monitoring Frequency: Continuous
Analyzer/Sampler: Thermo 49c	EPA Method: EQOA-0880-047
Purpose: Investigative	Scale: Urban
Start-Up Date: on or about 6/1/15	Closure Date: 10/31/15
Data used for NAAQS comparison: No (1)	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	

Comments:

(1) This was a temporary, investigative site, set-up to determine if a location in the Slat Creek valley northeast of Lincoln might have higher zone levels than the Davey site. Data from the Davey and Waverly sites were compared, and there was little difference in the ozone levels at these two sites. Thus the ozone site at Davey was retained, and the Waverly site was shut-down.

$PM_{2.5}$ Sites Operated by NDEQ

Site Name: Grand Island Senior High	AIRS ID: 31-079-0004
Location: 2124 N Lafayette Ave, Grand Island	Latitude: 40.942099° Longitude: -98.364967°
Operating Agency: Nebraska Department of Environmental Quality	
Monitor Information	**Pollutant: $PM_{2.5}$**
Type/POC: Primary FRM/ POC 1	Monitoring Frequency: Once every 3 days
Analyzer/Sampler: R&P 2025 Sequential	EPA Method: RFPS-0498-118
Purpose: Transport & Population Oriented	Scale: Regional & Neighborhood
Start-Up Date: 5/7/04	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	

Comments: None

Site Name: Scottsbluff Senior High School	AIRS ID: 31-157-0004
Location: Hwy 26 & 5th Ave, Scottsbluff (1)	Latitude: 41.87609° Longitude: -103.6587°
Operating Agency: Nebraska Department of Environmental Quality	
Monitor Information	**Pollutant: $PM_{2.5}$**
Type/POC: Primary FRM/ POC 1	Monitoring Frequency: Once every 3 days
Analyzer/Sampler: Thermo 2025i Sequential	EPA Method: RFPS-0498-118
Purpose: Background & Population Oriented	Scale: Regional & Neighborhood
Start-Up Date: 5/13/09	Closure Date: Currently operating
Data used for NAAQS comparison: Yes	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable	

Comments:

(1) The sampler was moved ~170 m W-SW on 4/15/16 (1st sample date at new location). The move was necessitated by re-construction of athletic fields and at the request of the school. The site ID # was retained. The new site uses standard 110 v AC line power, as the solar and wind power supply used at the old location was not retained.

PM_{10} Sites Operated by NDEQ (Outside of the Omaha, Lincoln & Sioux City MSAs)

Site Name: Cozad	AIRS ID: 31-047-0001	
Location: 215 W 8th Street, Cozad	Latitude: 40.859444º	Longitude: -99.987778º
Operating Agency: Nebraska Department of Environmental Quality		
Monitor Information	**Pollutant: PM_{10}**	
Type/POC: Primary FRM/ POC 1	Monitoring Frequency: Once every 6 days	
Analyzer/Sampler: 2025 Sequential	EPA Method: RFPS-1298-127	
Purpose: Source and Population Oriented	Scale: Neighborhood	
Start-Up Date: 10/1/94	Closure Date: March 7, 2016 (1)	
Data used for NAAQS comparison: Yes, until closure in March 2016. Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: NA. Closed		
Comments: (1) Site was closed on March 8, 2016 in accordance with the 2015 Network Plan.		

Site Name: Gothenburg	AIRS ID: 31-047-0003	
Location: 409 9th Street, Gothenburg	Latitude: 40.92750º	Longitude: -100.16278º
Operating Agency: Nebraska Department of Environmental Quality		
Monitor Information	**Pollutant: PM_{10}**	
Type/POC: Primary FRM/ POC 1	Monitoring Frequency: Once every 6 days	
Analyzer/Sampler: 2025 Sequential	EPA Method: RFPS-1298-127	
Purpose: Source and Population Oriented	Scale: Neighborhood	
Start-Up Date: 9/1/91	Closure Date: March 7, 2016 (1)	
Data used for NAAQS comparison: Yes, until closure in March 2016. Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: NA. Closed		
Comments: (1) Site was closed on March 8, 2016 in accordance with the 2015 Network Plan.		

Source-Oriented Lead (Pb) Sites Operated by NDEQ

Site Name: Fremont	AIRS ID: 31-053-0005	
Location: 1255 Front St., Fremont, NE	Latitude: 41.424819º	Longitude: -96.480819º
Operating Agency: Nebraska Department of Environmental Quality		
Monitor Information	**Pollutant: Lead (Pb)**	
Type/POC: Primary / POC 1	Monitoring Frequency: Once every 6 days	
Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS)	EPA Method: EQL-0310-189	
Purpose: Source-Oriented (1)	Scale: Micro-scale	
Start-Up Date: 3/9/10	Closure Date: Currently operating	
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable		
Monitor Information	**Pollutant: Lead (Pb)**	
Type/POC: Collocated / POC 2	Monitoring Frequency: Once every 6 days	
Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS)	EPA Method: EQL-0310-189	
Purpose: Source Oriented	Scale: Micro-scale	
Start-Up Date: 3/9/10	Closure Date: Currently operating	
Data used for NAAQS comparison: Only if primary sampler data is not available Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable		
Comments: (1) Source-oriented with respect to Magnus Farley.		

Site Name: Auburn	AIRS ID: 31-127-0002	
Location: RR2, Auburn, NE	Latitude: 40.40254º	Longitude: -95.84164º
Operating Agency: Nebraska Department of Environmental Quality		
Monitor Information	**Pollutant: Lead (Pb)**	
Type/POC: Primary / POC 1	Monitoring Frequency: Once every 6 days	
Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS)	EPA Method: EQL-0310-189	
Purpose: Source Oriented (1)	Scale: Micro-scale	
Start-Up Date: 5/8/10	Closure Date: Currently operating (2)	
Data used for NAAQS comparison: Yes Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable		
Comments: (1) Source-oriented with respect to Magnolia Metals. (2) This site is scheduled to be shut-down in 2016 in accordance with the 2016 Network Plan and 5-Year Assessment. Magnolia Metals has installed pollution control equipment that dropped their Pb emissions below the 0.5 tpy threshold for requiring monitoring.		

Source-Oriented Lead Monitoring Waivers pursuant to 40 CFR Part 58 Section 4.5(ii)

(1) Nucor Steel in Norfolk, NE: Waiver approved by the EPA R7 Administrator in April 2014 and is effective through April 2019, unless revoked or extended.

Total Reduced Sulfur (TRS) Sites operated by NDEQ

Site Name: Pine Street – Dakota City	AIRS ID: State SPM, AIRS ID not assigned
Location: 501 Pine St, Dakota City	Latitude: 42.421867° Longitude: -96.403031°
Operating Agency: Nebraska Department of Environmental Quality	
Monitor Information	**Pollutant: Total Reduced Sulfur (TRS)**
Type/POC: State TRS monitor	Monitoring Frequency: Continuous
Analyzer/Sampler: API 102A w TOX	Method: NDEQ T129 Chap 4.007
Purpose: Source Oriented	Scale: Neighborhood
Start-Up Date: 9/15/97	Closure Date: Currently operating (1)
Data used for NAAQS comparison: Not applicable. Compared to Nebraska TRS standards	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Not applicable	
Comments:	
(1) Scheduled to be closed in 2016 in accordance with the 2015 Network Plan.	

Interagency Monitoring of Protected Visual Environments (IMPROVE) Sites *

* Interagency Monitoring of Protected Visual Environments (IMPROVE) monitors are operated to evaluate regional haze that may impact Federal Class I areas in National Parks and Wilderness Areas. Fine particulate and particulate speciation monitoring is conducted at these sites. They do not have an AIRS ID, are not subject to 40 CFR Part 58 requirements, and are not used for NAAQS attainment determinations.

Site Name: Crescent Lake IMPROVE	AIRS ID: Not applicable
Location: Crescent Lake WRA, Gosper Co.	Latitude: 41.7627° Longitude: -102.4336°
Operating Agency: Nebraska Department of Environmental Quality / US Fish & Wildlife Service	
Monitor Information	**Pollutant: IMPROVE** (See Comments)
Type/POC: IMPROVE	Monitoring Frequency: Continuous
Method Description: : IMPROVE	EPA Method: Not applicable
Purpose: Background & Transport	Scale: Regional
Start-Up Date: 2002	Closure Date: 12/31/15 (1)
Data used for NAAQS comparison: Not applicable.	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Not applicable	
Comments:	
(1) Closed by EPA in accordance with their review of IMPROVE network priorities.	

Site Name: NE National Forest IMPROVE	AIRS ID: Not applicable, See Comments
Location: Nebraska National Forest, Thomas Co.	Latitude: 41.8888° Longitude: -100.3387°
Operating Agency: Nebraska Department of Environmental Quality / US Forest Service	
Monitor Information	**Pollutant: IMPROVE** (See Comments)
Type/POC: IMPROVE	Monitoring Frequency: Continuous
Method Description: : IMPROVE	EPA Method: Not applicable
Purpose: Background & Transport	Scale: Regional
Start-Up Date: 2002	Closure Date: Currently operating
Data used for NAAQS comparison: Not applicable.	
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Not applicable	
Comments: None	

National Atmospheric Deposition Program (NADP) Sites**

** The NADP site information below is included in the Network Plan for informational purposes only. They are not subject to 40 CFR Part 58 requirements, nor used for NAAQS attainment determinations.

Site Name: Mead NADP	AIRS ID: Not applicable, See Comments
Location: U of Ne Field Lab, Saunders Co.	Latitude: 41.1528º Longitude: -96.4912
Operating Agency: University of Nebraska	
Monitor Information	**Pollutant: TNT/MDN**
Type/POC: NTN/MDN	Monitoring Frequency: Continuous
Method Description: NTN/MDN	EPA Method: Not applicable
Purpose: Background & Transport	Scale: Regional
Start-Up Date: 7/25/78	Closure Date: Currently operating

Comments: The Mead and North Platte National Atmospheric Deposition Program (NADP) sites are operated by the University of Nebraska with analytical and data processing support from the NADP. NADP sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. They are included herein for informational purposes only.

- Monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM).
- The National Trends Network (NTN) sites collect deposition data on acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., calcium, magnesium, potassium and sodium).
- Mercury Deposition Network (MDN) sites collect mercury deposition data.
- The NADP oversees both NTN and MDN sites, and provides analytical and data processing support.
- The Mead site initiated operation as an NTN site in 1978 and began MDN operations in June 2007.

Site Name: North Platte NADP	AIRS ID: Not applicable, See Comments
Location: U of Ne Ag Station, Lincoln, Co.	Latitude: 41.0592º Longitude: -100.7464º
Operating Agency: University of Nebraska	
Monitor Information	**Pollutant:** NTN
Type/POC: NTN	Monitoring Frequency: Continuous
Method Description: NTN	EPA Method: Not applicable
Purpose: Background & Transport	Scale: Regional
Start-Up Date: 9/24/85	Closure Date: Currently operating

Comments: The Mead and North Platte National Atmospheric Deposition Program (NADP) sites are operated by the University of Nebraska with analytical and data processing support from the NADP. NADP sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. . They are included herein for informational purposes only.

- Monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM).
- The National Trends Network (NTN) sites collect deposition data on acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., calcium, magnesium, potassium and sodium).
- Mercury Deposition Network (MDN) data was collected at this site from October 2009 thru October 2011 using Nebraska Environmental Trust funding.
- The NADP oversees both NTN and MDN sites, and provides analytical and data processing support.

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Nebraska 2016 Ambient Air Monitoring Network Plan

Attachment B: Comparison of Ambient Air Monitoring Data to NAAQS

This attachment compares ambient air quality data from 2013 thru 2015 to the NAAQS, or in the case of Total Reduced Sulfur to Nebraska's state standard. The annual data presented below was retrieved from the EPA AQS database, except TRS data, which was obtained from a NDEQ database. The 2015 data was not yet certified and could be subject to change. The design values (DVs) compared to the NAAQS were calculated as set forth in 40 CFR Part 58. The DVs calculated for sites not operated by NDEQ, DCHD or LLCHD are not official.

Table B-1: Ozone Data

Site	Monitoring Agency	2013	2014	2015	DV	% NAAQS
Omaha MSA and Near-By Montgomery Co., IA (4)						
Omaha NCore (2)	DCHD	0.066	0.063	0.062	0.063	90%%
2411 O St., Omaha	DCHD	0.058	0.059	0.055	0.057	81%%
30th & Fort, Omaha	DCHD	0.061	0.060	nd	na	na
1616 Whitmore St, Omaha	DCHD	nd	nd	0.064	na	na
Harrison Co, IA (3)	IA DNR	0.065	0.062	0.061	0.062	89%
Pisgah, IA (3)	IA DNR	0.065	0.063	0.061	0.063	90%
Montgomery County, IA (3) (4)	IA DNR	0.060	0.059	0.060	0.059	84%
Lincoln MSA						
First & Maple, Davey	LLCHD	0.055	0.061	0.061	0.059	84%
Sioux City MSA and Surrounding Area (6)						
31102 471st Ave, Union Co, SD (5)	SD DENR	nd	0.062	0.061	0.062	89%
31986 475th Ave, Union Co, SD (5)	SD DENR	0.063	nd	nd		
Emmetsburg, IA (6)	IA DNR	0.064	0.063	0.064	0.063	90%
Sioux Falls, SD (6)	SD DENR	0.072	0.066	0.061	0.062	89%
Nebraska Non-MSA						
Santee Indian Reservation (7)	US EPA	0.067	0.063	0.063	0.064	91%

Notes and Explanations: (EPA AQS data retrieval 5/20/15)

(1) Concentrations are in units of ppm. The Design Value (DV) is the truncated 3-year average of the 4th highest max for each year. The NAAQS = 0.070 ppm (promulgated 10/1/2015).

(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(3) The following sites are operated by the IA DNR: Harrison Co, IA, Pisgah, IA, Montgomery Co, IA and Emmetsburg, IA.

(4) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park;~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(5) The Union Co., SD site is in the Sioux City MSA & operated by the SD Dept. of Environment & Natural Resources

(6) The Emmetsburg, IA and Sioux Falls, SD sites are located outside the Sioux City MSA.

(7) Santee Indian Reservation site is 76 mi WNW of Sioux City & is operated by EPA as part of CASTNET.

Table B-2: Carbon Monoxide Data

Comparison of 3-Year Maximum Value for 1-Hour Carbon Monoxide to NAAQS (1) (2)					
Site	**2013**	**2014**	**2015**	**Design Value** (2)	**% NAAQS**
Omaha MSA					
78th & Dodge Sts, Omaha	2.4	1.8	2.2	2.4	6.9%
Omaha NCore (4)	0.9	2.2	0.97	2.2	6.3%
Sioux City MSA					
31986 475th Ave, Union Co, SD (5)	0.5	nd	nd	na	na
Comparison of 3-Year Maximum Value for 8-Hour Carbon Monoxide to NAAQS (1) (3)					
Site	**2013**	**2014**	**2015**	**Design Value** (3)	**% NAAQS**
Omaha MSA					
78th & Dodge Sts., Omaha	1.9	1.5	1.7	1.9	21.1%
Omaha NCore (4)	0.6	1.0	0.7	1.0	11.1%
Sioux City MSA					
31986 475th Ave, Union Co, SD (5)	0.3	nd	nd	na	na

Notes and Explanations:

(1) The CO NAAQS were last revised in 1984. The latest review was concluded in August 2011 when EPA determined no changes in the CO NAAQS were warranted.

(2) The 1-hour NAAQS = 35 ppm. The Design Value is the highest annual 2nd highest maximum value over the last 3 years. The annual values shown are the annual 2nd highest maximum values. Concentrations are in units of ppm.

(3) The 8-hour NAAQS = 9 ppm. The Design Value is the highest annual 2nd highest maximum value over the last 3 years. The annual values shown are the 2nd highest 8-hour maximum values. Concentrations are in units of ppm.

(4) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(5) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources. CO data was not collected in 2014 or 2015.

Table B-3: Sulfur Dioxide Data

Comparison of 1-Hour Sulfur Dioxide Levels to the Primary NAAQS (1)

Site	2013	2014	2015	Design Value (1)	% NAAQS
Omaha MSA					
1616 Whitmore St., Omaha	0.056	0.054	0.057	0.056	75%
Omaha NCore (3)	0.027	0.021	0.038	0.029	38%
Sioux City MSA Sites					
1221 260th St. Sergeant Bluff, IA (4)	0.021	0.011	0.010	0.014	19%
31986 475th Ave, Union Co, SD (5)	0.006	0.004	0.005	0.005	6%
31307 473rd Ave, Union Co, SD (5)	0.005	nd	nd		

Comparison of 3-Hour Sulfur Dioxide Levels to the Secondary NAAQS (2)

Site	2013	2014	2015	Design Value (2)	% NAAQS
Omaha MSA					
1616 Whitmore St., Omaha	0.052	0.047	0.049	0.052	10%
Omaha NCore (3)	0.027	0.018	0.026	0.027	5%
Sioux City MSA					
1221 260th St. Sergeant Bluff, IA (4)	0.014	0.014	0.006	0.014	3%
31986 475th Ave, Union Co, SD (5)	0.005	0. 004	0.002	0.005	1%
31307 473rd Ave, Union Co, SD (5)	0.003	nd	nd		

Notes and Explanations: (EPA AQS data retrieval 5/21/15)

(1) The 1-hour NAAQS is 75 ppb or 0.075 ppm. The Design Value is the three-year average of the annual 99th percentile values. This NAAQS was promulgated on June 22, 2010. The annual values shown are annual 99th percentile values in ppm units.

(2) The 3-hour NAAQS is 0.5 ppm not to be exceeded more than once per year. It is a secondary standard promulgated in 1971, and retained without change in 1996. The Design Value is the highest annual 2nd highest maximum 3-hour reading over the last three years. The annual values shown are 2nd highest maximum values. All concentrations expressed in units of ppm.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The Sergeant Bluff IA site began operation 7/1/12 and is operated by the IA DNR.

(5) The Union Co., SD sites are operated by the South Dakota Department of Environment & Natural Resources.

Table B-3: Sulfur Dioxide Data (continued)

Comparison of 24-Hour Sulfur Dioxide Levels to the Pre-2010 NAAQS (6) (7)					
Site	**2013**	**2014**	**2015**	**Design Value (1)**	**% NAAQS**
Omaha MSA					
1616 Whitmore St., Omaha	0.019	0.016	0.017	0.019	14%
Omaha NCore (3)	0.006	0.006	0.007	0.007	5%
Sioux City MSA					
1221 260th St. Sergeant Bluff, IA (5)	0.003	0.006	0.002	0.006	4%
31986 475th Ave, Union Co, SD (6)	0.002	0.001	0.001	0.002	1%
31307 473rd Ave, Union Co, SD (6)	0.002	nd	nd	na	na

Comparison of Annual Average Sulfur Dioxide Levels to the Pre-2010 NAAQS (8) (9)					
Site	**2013**	**2014**	**2015**	**Design Value (1)**	**% NAAQS**
Omaha MSA					
1616 Whitmore St., Omaha	0.0021	0.0017	0.0009	0.0021	7%
Omaha NCore (3)	0.0007	0.0006	0.0008	0.0008	3%
Sioux City MSA					
1221 260th St. Sergeant Bluff, IA (4)	0.0003	0.0002	0.0003	0.0003	1%
31986 475th Ave, Union Co, SD (5)	0.0003	0.0003	0.0003	0.0003	1%
31307 473rd Ave, Union Co, SD (5)	0.0004	nd	nd	na	na

Notes and Explanations:

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The Sergeant Bluff IA site began operation 7/1/12 and is operated by the IA DNR.

(5) The Union Co., SD sites are operated by the South Dakota Department of Environment & Natural Resources

(6) The 24-hour NAAQS is a primary standard promulgated in 1971 and retained without change in 1996. It will no longer apply once the attainment status to the 1-hour NAAQS is determined per regulations changes in 2010.

(7) The 24-hour NAAQS is 0.14 ppm not to be exceeded more than once per year. The Design Value is the highest annual 2nd highest maximum 24-hour reading over the last three years. The annual values shown are 2nd highest maximum values. The 24-hour NAAQS is a primary standard. All concentrations expressed in units of ppm.

(8) The Annual Average NAAQS is a primary standard promulgated in 1971 and retained without change in 1996. It will no longer apply once the attainment status to the 1-hour NAAQS is determined per regulations changes in 2010.

(9) The Annual Average NAAQS is 0.03 ppm not to be exceeded in a calendar year. The Design Value is the highest annual average over the last 3 years. The Annual Average NAAQS is a primary standard. All concentrations expressed in units of ppm.

Table B-4a: Nitrogen Dioxide Data

Comparison of 1-Hour Maximum Levels of Nitrogen Dioxide to NAAQS (1)(2)(3)					
Site	**2013**	**2014**	**2015**	**Design Value**	**% NAAQS**
Sioux City MSA					
31986 475th Ave, Union Co, SD (4)	0.018	0.021	0.021	0.020	20%
31307 473rd Ave, Union Co, SD (4)	0.040	nd	nd	na	na

Comparison of 3-Year Maximum Annual Average Value for Nitrogen Dioxide to NAAQS					
Site	**2013**	**2014**	**2015**	**Design Value (2)**	**% NAAQS**
Sioux City MSA					
31986 475th Ave, Union Co, SD (4)	0.003	0.003	0.003	0.003	6%
31307 473rd Ave, Union Co, SD (4)	0.004	nd	nd	na	na

Notes and Explanations:

(1) All concentrations expressed in ppm units.

(2) The 1-hour NO_2 NAAQS is 0.100 ppm (promulgated Feb. 2010). NAAQS attainment is achieved if the 3-year average of the annual 98th percentile of the daily maximum 1-hour values does not exceed 0.100 ppm.

(3) The Annual Average NO_2 NAAQS is 0.053 ppm not to be exceeded in a calendar year. It was promulgated 1971, and retained in the 1996 and 2010 reviews. The Design Value is the highest annual average over the 3-year comparison period.

(4) The Union Co., SD sites are operated by the South Dakota Department of Environment & Natural Resources

Table B-4b: 2011-2013 Nitrogen Oxide Data from the Omaha NCore Site (1)(2)

Parameter	2013	2014	2015	Approx. DV (3)	Max % NAAQS
1-Hour Data: Annual Maximum					
NOy (3)	0.104	0.110	0.099	na	na
NO (4)	0.084	0.076	0.063	na	na
NOy-NO (5)	0.040	0.042	0.045	na	na
1-Hour Data: 98th Percentile					
NOy (3)	0.078	0.087	0.0069	na	na
NO (4)	0.051	0.056	0.0042	na	na
NOy-NO (5)	0.035	0.039	0.037	0.037	37%
Annual Average Data					
NOy (3)	0.009	0.008	0.008	na	na
NO (4)	0.002	0.002	0.002	na	na
NOy-NO (5)	0.007	0.007	0.007	0.007	13%

Footnotes:

(1) All concentrations expressed in ppm units.

(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(3) NOy – Reactive oxides of nitrogen, which includes NO, NO_2 and other nitrogen oxides, including organic nitrogen oxide compounds.

(4) NO – Nitrogen oxide

(58) NOy-NO provides an approximation of nitrogen dioxide (NO_2), with some possibility of over-estimating the true NO_2 concentration. For this reason, the NOy-NO parameter can be used to demonstrate attainment, but not non-attainment.

Table B-5a: PM_{10} - Maximum 24-Hour Data [1] [2]

Site	2013	2014	2015	Design Value [1]	% NAAQS
Omaha MSA & Montgomery Co., IA [6]					
Omaha NCore [3]	62	75	60	60	40%
2411 O St, Omaha	67	74	56	50	33%
46th & Farnam Sts, Omaha [4]	94	115	153	97	65%
19th & Burt Sts, Omaha	56	49	52	50	33%
3130 C Ave, Council Bluffs, IA [5]	65	53	50	53	35%
Montgomery Co., IA (outside Omaha MSA) [5] [6]	45	50	42	40	27%
Weeping Water City [7]	45	49	45	44	29%
Weeping Water Farm [7][8]	108	148	166	111	74%
Sioux City MSA Sites					
821 30th St, Sioux City, IA [5]	57	51	49	45	30%
31986 475th Ave, Union Co, SD [9]	103	77	91	77	51%
31307 473rd Ave, Union Co, SD [9]	49	nd	nd	na	na
Other Nebraska Sites					
Cozad	94	62	72	68	45%
Gothenburg	97	69	77	69	46%

Table B-5b: PM_{10} - Annual Average Data [1]

Site	2013	2014	2015	3-Year Average	% Old Std
Omaha MSA and Montgomery Co., IA [4]					
Omaha NCore [2]	207	21.8	20.9	21.1	42%
2411 O St, Omaha	24.0	25.1	23.0	24.0	48%
46th & Farnam Sts, Omaha	31.9	24.3	18.6	24.9	50%
19th & Burt Sts, Omaha	21.4	20.8	19.4	20.5	41%
3130 C Ave, Council Bluffs, IA [3]	23.8	22.1	20.5	22.1	44%
Montgomery Co., IA (outside Omaha MSA) [3] [4]	16.8	17.3	15.9	16.7	33%
Weeping Water City [5]	19.0	19.7	18.4	19.0	38%
Weeping Water Farm [5]	27.7	28.3	31.0	29.0	58%
Sioux City MSA					
821 30th St, Sioux City, IA [3]	18.3	17.6	16.6	17.5	35%
31986 475th Ave, Union Co, SD [6]	19.4	18.0	17.9	18.4	37%
31307 473rd Ave, Union Co, SD [6]	14.1	nd	nd	na	na
Other Nebraska Sites					
Cozad	25.4	21.1	21.6	22.7	45%
Gothenburg	27.2	22.7	20.6	23.5	47%

Notes and Explanations:

(1) There is currently no NAAQS for the annual average PM_{10} concentration. An annual average NAAQS of 50 $\mu g/m^3$ was established in 1987, and then rescinded on December 18, 2006. Comparison to the rescinded NAAQS is provided for informational purposes only. Concentrations are in units of $\mu g/m^3$.

(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(3) The Council Bluffs, Montgomery Co., Emmetsburg and Sioux City IA sites are operated by the IA DNR

(4) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park;~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(5) Weeping Water is a limestone mining and processing area in Cass County, which is located 15 to 20 miles south of the main urbanized area within the Omaha MSA.

(6) The Union Co., SD sites are operated by the South Dakota Department of Environment & Natural Resources.

Table B-6a: $PM_{2.5}$ - 98th Percentile, 24-Hour Data (1) (2)

Site	2013	2014	2015	Design Value (1)	% NAAQS
Omaha MSA & Montgomery Co., IA (5)					
Omaha NCore (3)	22.2	23.1	22.0	22	64%
9225 Berry St.; Omaha	21.0	19.5	17.1	19	55%
2912 Coffey Ave., Bellevue	24.0	22.3	21.7	23	65%
2242 Wright St., Blair	20.6	16.9	16.0	18	51%
3130 C Ave., Council Bluffs, IA (4)	22.4	19.6	18.8	20	58%
Montgomery Co., IA (outside Omaha MSA) (4) (5)	21.0	18.4	18.5	19	55%
Lincoln MSA					
3140 N Street, Lincoln	19.5	19.9	14.7	18	52%
Sioux City MSA & Emmetsburg, IA (7)					
821 30th St, Sioux City, IA (4)	21.5	24.5	19.1	22	62%
31986 475th Ave, Union Co, SD (6)	22.8	23.1	19.9	22	63%
31307 473rd Ave, Union Co, SD (6)	23.5	nd	nd		
Emmetsburg, IA (outside Sioux City MSA) (4)(7)	20.9	20.4	16.1	19	55%
Other Nebraska Sites					
Grand Island Senior High	21.3	13.9	14.8	17	48%
Scottsbluff (8)	12.2	20.4	24.9	19	55%

Notes and Explanations:

(1) The Design Values are the 3-year average of the annual 98th percentile values. To determine attainment status, the Design Values are compared to the 35 µg/m^3 NAAQS. Concentrations are in units of µg/m^3.

(2) NAAQS History: The 24-hour $PM_{2.5}$ NAAQS was initially established at 65μg/m^3 in 1997. It was lowered to 35 mg/m^3 in 2006 and retained at the 35 μg/m^3 level in 2012.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The Council Bluffs, Montgomery Co., Emmetsburg and Sioux City IA sites are operated by the IA DNR

(5) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park;~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(6) The Union Co., SD sites are operated by the South Dakota Department of Environment & Natural Resources

(7) Emmetsburg is located outside the Sioux City MSA, approximately 97 miles northeast of Sioux City. Data from this site is included here for comparison purposes only.

(8) Scottsbluff Data Completeness: Q4-2014 = 71% & CY2014 = 80%
Q1-2015 = 74%, Q4-2015 = 60%, CY2015 =81%.
Data loss issues were associated with power losses and monitor malfunctions.

Table B-6b: $PM_{2.5}$ - Annual Average Data [1] [2]

Site	2013	2014	2015	Design Value [1]	% NAAQS
Omaha MSA & Montgomery Co., IA [4]					
Omaha NCore [3]	9.24	8.85	9.20	9.1	76%
9225 Berry St.; Omaha	8.60	8.08	6.93	7.9	66%
2912 Coffey Ave., Bellevue	10.95	8.67	8.44	9.4	78%
2242 Wright St., Blair	8.25	7.43	6.74	7.5	62%
3130 C Ave., Council Bluffs, IA [4]	9.55	9.05	8.40	9.0	75%
Montgomery Co., IA (outside Omaha MSA) [4] [5]	8.25	7.73	6.95	7.6	64%
Lincoln MSA					
3140 N Street, Lincoln	8.15	7.68	6.55	7.5	62%
Sioux City MSA & Emmetsburg, IA [7]					
821 30th St, Sioux City, IA [4]	9.28	8.42	7.52	8.4	70%
31986 475th Ave, Union Co, SD [6]	8.89	8.59	8.17	8.6	71%
31307 473rd Ave, Union Co, SD [6]	10.5	nd	nd	na	na
Emmetsburg, IA (outside Sioux City MSA) [4][7]	8.05	7.84	7.46	7.8	65%
Other Nebraska Sites					
Grand Island Senior High	7.58	6.52	6.21	6.8	56%
Scottsbluff [8]	5.09	5.24	5.53	5.3	44%

Notes and Explanations:

(1) The Design Values are the 3 year average of the annual average values. To determine attainment status, the Design Values compared to the 12 µg/m^3 NAAQS. Concentrations are in units of µg/m^3.

(2) NAAQS History: The annual average $PM_{2.5}$ NAAQS was initially established in 1997 at15μg/m^3. It was retained at this level in the 2006 review and then lowered to 12 μg/m^3 in December 2012.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The Council Bluffs, Montgomery Co., Emmetsburg and Sioux City IA sites are operated by the IA DNR

(5) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park;~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(6) The Union Co., SD sites are operated by the South Dakota Department of Environment & Natural Resources

(7) Emmetsburg is located outside the Sioux City MSA, approximately 97 miles northeast of Sioux City. Data from this site is included here for comparison purposes only.

(8) Scottsbluff Data Completeness: Q4-2014 = 71% & CY2014 = 80%
Q1-2015 = 74%, Q4-2015 = 60%, CY2015 =81%.
Data loss issues were associated with power losses and monitor malfunctions.

Table B-7: Lead in Total Suspended Particulate (TSP-Pb)

Comparison of 3-Year Maximum Values of 3-Month Average Values [1] [2]					
Site	**2013**	**2014**	**2015**	**DV [1]**	**% NAAQS**
Sioux City MSA					
Auburn	0.03	0.008	0.004	0.03	20%
Fremont	0.11	0.09	0.08	0.11	73%
Omaha NCore	0.006	0.01	0.003	0.01	7%

Notes and Explanations:

(1) Concentrations are in units of $\mu g/m^3$. The 3-month average NAAQS = 0.15 $\mu g/m^3$. The DV or Design Value is the highest 3 month average in the last 3 years.

(2) NAAQS History: The initial NAAQS was promulgated in 1978 and was set at 1.5 $\mu g/m^3$ calendar quarter average. In 2008, it was modified to 0.15 $\mu g/m^3$ 3-month running average.

Table B-8: Total Reduced Sulfur (TRS) Data

Comparison of 3-Year Maximum Value for 1-Minute TRS to the State Standard [1] [2]					
Site	**2013**	**2014**	**2015**	**Maximum Value**	**% NE Std**
Sioux City MSA					
501 Pine St. Dakota City	**0.058**	**0.163**	**0.075**	**0.163**	**2%**

Comparison of 3-Year Maximum Value for 30-Minute TRS to the State Standard [1] [3]					
Site	**2013**	**2014**	**2015**	**Maximum Value**	**% NE Std**
Sioux City MSA					
501 Pine St. Dakota City	**0.042**	**0.088**	**0.035**	**0.088**	**88%**

Notes and Explanations:

(1) Concentrations are in units of ppm.

(2) The 1-minute Nebraska Air Quality Standard is 10 ppm.

(3) The 30-minute Nebraska Air Quality Standard is 0.10 ppm.

Nebraska 2016 Ambient Air Monitoring Network Plan
Attachment C: Population Dynamics

Population related data is reviewed as part of the network planning process because:

- Population growth may be associated with pollution source growth;
- High population density generally correlates with high air pollution potential; and
- Some 40 CFR Part 58 requirements are based on population and/or Federally defined metropolitan statistical definitions.

Population trends within Nebraska have remained fairly constant over the last 2 decades. This population dynamic analysis is updated through 2014 and is the same analysis included in the *2015 Ambient Air Monitoring Network Plan and 5-Year Assessment*.

US Census Bureau & US Office of Management and Budget Basics:

The US Census Bureau conducts a comprehensive population census every 10 years referred to as a decennial census. The last decennial census was completed in 2010. In addition, the US Census Bureau conducts annual surveys to provide annual population estimates for each interim year.

The U.S. Office of Management and Budget (OMB) uses the decennial census data to categorize urbanized areas by population and business inter-connections. These urban categories are used to define some Federal program applications, including, in some instances, air monitoring requirements. Four such categories are:

- Metropolitan Statistical Areas (MSAs), which contain an *urbanized area,* where an *urbanized area* is a densely settled territory delineated by the US Census Bureau that contains 50,000 or more people;
- Micropolitan Statistical Areas (MiSAs), which contain an *urban cluster* with a population of 10,000 to 49,999, where an *urban cluster* is a densely settled territory delineated by the US Census Bureau that contains at least 2,500 people, but fewer than 50,000 people.
- Combined Statistical Areas (CSAs), which are adjacent MSAs and MiSAs with social and economic ties.
- Core-Based Statistical Areas (CBSA) is a geographic area defined by the Office of Management and Budget (OMB) that centers on an urban center of at least 10,000 people and adjacent areas that are socioeconomically tied to the urban center by commuting. Both MSAs and MiSAs are CBSAs.

These designations are important from an ambient monitoring perspective because:

- They are sometimes used in defining minimum monitoring requirements, and
- They are often used as the default boundary when defining non-attainment areas.

Figure C-1 (below) shows the location and boundaries of MSAs and MiSAs in Nebraska as delineated following the 2010 decennial census. There are also two CSAs within NE:

- Omaha-Council Bluffs-Fremont NE-IA CSA, which is the Omaha MSA plus Dodge County, NE; and
- Sioux City-Vermillion IA-NE-SD CSA, which is the Sioux City MSA plus Clay County, SD

Population Demographics and Growth Trends:

Most of the area of Nebraska is rural and used for agricultural production (farming and ranching). Conversely, most of the population of Nebraska (59%) resides in the Omaha and Lincoln MSAs, and 82% of the population resides within the boundaries of designated MSAs and MiSAs (see Table C-1). Even within the MSAs and MiSAs, agricultural usage is the predominant land use except for the two most densely populated counties of Douglas and Sarpy.

Figure C-1: Nebraska Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (MiSAs)

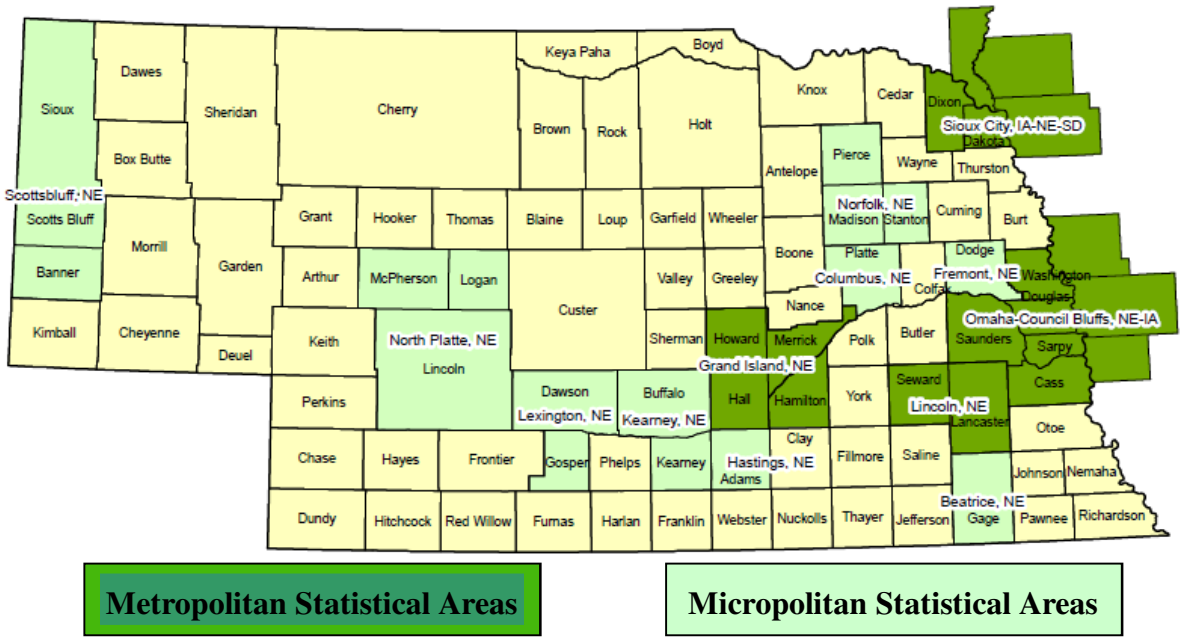


Table C-1: Population within Nebraska's MSAs and MiSAs

Area	Population	% NE (b)	Cum % NE (c)
Nebraska	1,881,503	100%	na
Omaha MSA (a)	782,138	42%	42%
Lincoln MSA	318,945	17%	59%
Grand Island MSA	84,755	5%	63%
Sioux City MSA (a)	26,632	1%	64%
Kearney MiSA	54,868	3%	67%
Norfolk MiSA	48,445	3%	70%
Hastings MiSA	37,772	2%	72%
Scottsbluff MiSA	37,229	2%	74%
North Platte MiSA	37,063	2%	76%
Fremont MiSA	36,744	2%	78%
Columbus MiSA	32,666	2%	80%
Lexington MiSA	26,066	1%	81%
Beatrice MiSA	21,663	1%	82%

(a) Only Nebraska residents within the Omaha and Sioux City MSAs were used in the population counts shown in this table.

(b) ***% NE*** refers to the percent of Nebraska residents residing in each MSA or MiSA.

(c) ***Cum % NE*** refers to the cumulative sum of the ***% NE*** column. Thus 59% of Nebraska's residents live in the Omaha and Lincoln MSAs, while 82% live in an MSA or MiSA.

Attachment C: Population Dynamics

Table C-2 lists the top 10 Nebraska counties with respect to 2014 population, 2010 to 2014 population growth, and 2010 to 2014 percent population growth rate. As shown in Table C-2, the 5 most populated counties (Douglas, Lancaster, Sarpy, Hall and Buffalo counties) also have the fastest growth rate, and they are also among the top 8 counties for percent population growth. The population of these 5 counties accounts for 60% of Nebraska's population and their 2010 to 2014 population growth exceeds the population growth of the entire state by 1,466 people (because 62 of Nebraska's 93 counties lost population, see Table C-6).

Also shown in Table C-2, the 3 most populated and fastest growing counties (Douglas, Lancaster and Sarpy Counties) dominate within these categories with 54% of Nebraska's residents living in these 3 counties and a combined annual population growth rate of 13,209. The 2010-14 population growth in these 3 counties exceeds the population growth of the entire state by 1192 people (because 62 of Nebraska's 93 counties lost population, see Table C-6).

Douglas and Sarpy Counties are in the Omaha MSA and have a combined population of approximately 715,400. This is 79% of the population in the entire MSA (including the IA counties) and 91% of the population within the Nebraska portion of the Omaha MSA. Both of these counties are highly urbanized, and along with Council Bluffs, IA form the urban core of the Omaha MSA. See Figure C-2 for additional information on the Omaha MSA.

Lancaster County is in the Lincoln MSA and 95% of the Lincoln MSA population lives in it. The City of Lincoln is the urbanized core of the Lincoln MSA with a population of approximately 273,000 or 86% of the MSA population. See Figure C-3 for additional information on the Lincoln MSA.

Table C-3 contains population and growth data pertaining to Nebraska's 16 most populated counties in 2000, 2010 and 2014. The counties listed for 2000, 2010 & 2014 did not change and there were only minor ranking changes during the 2000 thru 2014 time frame. These 16 counties include the highest populated counties from each of the 4 MSAs and the 9 MiSAs. This illustrates that the population of Nebraska is located predominantly in the urbanized cores and this has not changed since 2000.

Additional population and population growth data on the Omaha, Lincoln, Sioux City and Grand Island MSA's can be found in Figures C-2 thru C-5.

Table C-4 provides population and population growth information on Nebraska's MiSAs.

Table C-5 provides population and population growth information on 9 additional counties that are outside of the designated MSAs and MiSAs with populations greater than 10,000.

Table C-6 provides 2010 thru 2014 population and population growth data on all 93 Nebraska counties. The counties are ranked using their 2010 thru 2014 population growth with the fastest growing counties at the top of the table.

Table C-6 also has a column for population density which ranges from a high of 1641 persons per square mile in Douglas County to $\leq$ 1 person per square mile in 11 counties. There are also 49 counties (53% of Nebraska's 93 counties) with a population density of $\leq$ 10 persons per square mile. This is indicative of the rural nature of most of Nebraska.

Table C-2: Top Ten Nebraska Counties for Population and Population Growth: 2010 to 2014

2014 Population				Population Growth: 2010 - 2014					Annualized Percent Population Growth				
Rank	County or State	2014 Population	% State Pop.	Rank	County	2014 Population	Pop. Growth per Year	Annual % Pop. Growth	Rank	County	2014 Population	Annual % Pop. Growth	Pop. Growth per Year
1	**Douglas**	543,244	29%	1	**Douglas**	543,244	6163	1.2%	1	Banner	764	2.3%	17
2	**Lancaster**	301,795	16%	2	**Lancaster**	301,795	3915	1.3%	2	**Sarpy**	172,193	1.9%	3111
3	**Sarpy**	172,193	9%	3	**Sarpy**	172,193	3111	1.9%	3	Blaine	504	1.6%	8
4	**Hall**	61,492	3%	4	**Hall**	61,492	674	1.1%	4	Thomas	687	1.4%	9
5	**Buffalo**	48,224	3%	5	**Buffalo**	48,224	513	1.1%	5	**Lancaster**	301,795	1.3%	3915
6	Dodge	36,744	2%	6	Platte	32,666	100	0.3%	6	**Douglas**	543,244	1.2%	6163
7	Scotts Bluff	36,465	2%	7	Seward	17,150	91	0.5%	7	**Hall**	61,492	1.1%	674
8	Lincoln	35,815	2%	8	York	13,917	68	0.5%	8	**Buffalo**	48,224	1.1%	513
9	Madison	35,174	2%	9	Cass	25,524	68	0.3%	9	Kearney	6,644	0.6%	37
10	Platte	32,666	2%	10	Madison	35,174	56	0.2%	10	Seward	17,150	0.5%	91
na	Nebraska	1,881,503	100%	na	Nebraska	1,881,503	12,910	0.7%	na	Nebraska	1,881,503	0.7%	12,910

Observations from data above and from additional data in Table C-3:

(1) The five counties identified with **Bold-Font** & green highlight appeared in all 3 lists: top 10 for population, population growth and % annualized growth. They are **Buffalo, Douglas, Hall, Lancaster,** and **Sarpy** Counties.

(2) The five counties with the highest populations are **Buffalo, Douglas, Hall, Lancaster,** and **Sarpy** Counties and 60% of Nebraska's population lives within these counties.

(3) The five counties with the highest population growth are also **Buffalo, Douglas, Hall, Lancaster,** and **Sarpy** Counties. The total population growth in these 5 counties was 57,501 or 111% of Nebraska's total population gain from 2010 thru 2014 (more than 100% because 62 of Nebraska's 93 counties lost population, a total of 1945 people). These 5 counties also accounted for nearly 96% of the population growth in the 31 counties that had population gains.

(4) The population gain in Nebraska's 3 most populated counties, Douglas, Lancaster & Sarpy, 54% of the state's population and 102 % of the state's population growth. Also 89% of the population growth in Nebraska's 10 fastest growing counties.

(5) Seward County, which is in the Lincoln MSA with Lancaster County, is Nebraska's 18th most populated county, and exhibited the 7th highest population growth from 2010 thru 2014.

(6) Banner, Blaine and Thomas Counties had the high percent growth rate between 2010 and 2014. These are very rural counties with low populations and low population densities (i.e., 0.7 to 1 person/square mile). The population gains in these counties does not appear to be of importance from an air quality perspective (i.e., does not relate to a significant increase in air pollution emissions).

The population data used in this table was obtained from the US Census Bureau. Population estimate data was used for both 2010 and 2014.

Table C-3: Sixteen Most Populated Nebraska Counties: 2000, 2010 & 2014 [(a) (b) (c)]

2000			2010			2014					
Rank	County	Population Estimate 7/1/00	Rank	County	Population Estimate 7/1/10	Rank	County	Population Estimate 7/1/14	% State Pop.	Cum. % State Pop.	MSA or *MiSA*
1	Douglas	464,829	1	Douglas	518,594	1	Douglas	543,244	29%	29%	Omaha
2	Lancaster	251,549	2	Lancaster	286,134	2	Lancaster	301,795	16%	45%	L:incoln
3	Sarpy	123,248	3	Sarpy	159,748	3	Sarpy	172,193	9%	54%	Omaha
4	Hall	53,559	4	Hall	58,797	4	Hall	61,492	3%	57%	Grand Island
5	Buffalo	42,336	5	Buffalo	46,174	5	Buffalo	48,224	3%	60%	*Kearney*
6	Scotts Bluff	37,021	6	Scotts Bluff	37,060	6	Dodge	36,744	2%	62%	*Fremont*
7	Dodge	36,214	7	Dodge	36,701	7	Scotts Bluff	36,465	2%	64%	*Scottsbluff*
8	Madison	35,233	8	Lincoln	36,267	8	Lincoln	35,815	2%	66%	*North Platte*
9	Lincoln	34,649	9	Madison	34,950	9	Madison	35,174	2%	68%	*Norfolk*
10	Platte	31,547	10	Platte	32,268	10	Platte	32,666	2%	69%	*Columbus*
11	Adams	31,180	11	Adams	31,333	11	Adams	31,457	2%	71%	*Hastings*
12	Dawson	24,439	12	Cass	25,254	12	Cass	25,524	1%	72%	Omaha
13	Cass	24,374	13	Dawson	24,354	13	Dawson	24,096	1%	74%	*Lexington*
14	Gage	22,945	14	Gage	22,286	14	Gage	21,663	1%	75%	*Beatrice*
15	Dakota	20,313	15	Dakota	21,029	15	Saunders	20,919	1%	76%	Omaha
16	Saunders	19,811	16	Saunders	20,858	16	Dakota	20,850	1%	77%	Sioux City, IA
NA	Nebraska	1,713,279	NA	Nebraska	1,829,865	NA	Nebraska	1,881,503	100 %	NA	NA

Footnotes:

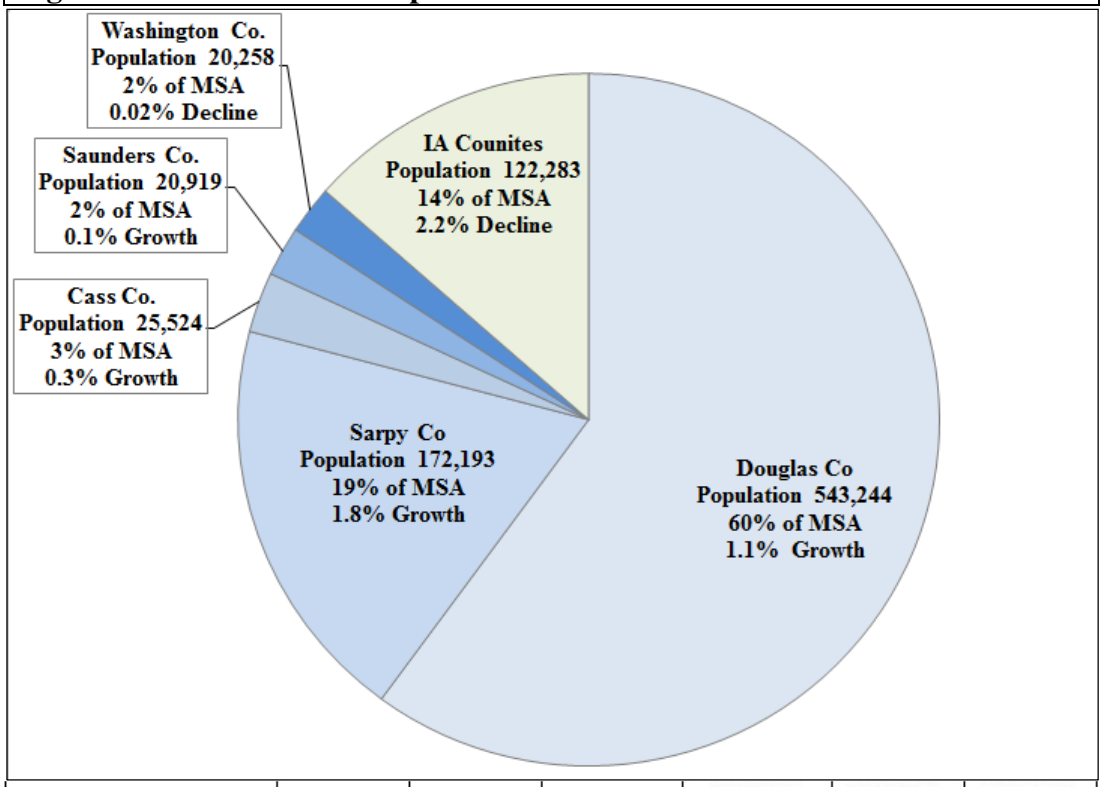
(a) The 16 most populated counties shown in this table are within Metropolitan and Micropolitan Statistical Areas (MSAs/MiSAs) that exist partially or wholly within Nebraska . Counties within all 13 of Nebraska's MSAs/MiSAs are represented in this table, although not all of the counties within the MSAs/MiSAs are in this table.

(b) The **absence of green highlight** indicates a ranking switch in the subsequent time period.

Observations:

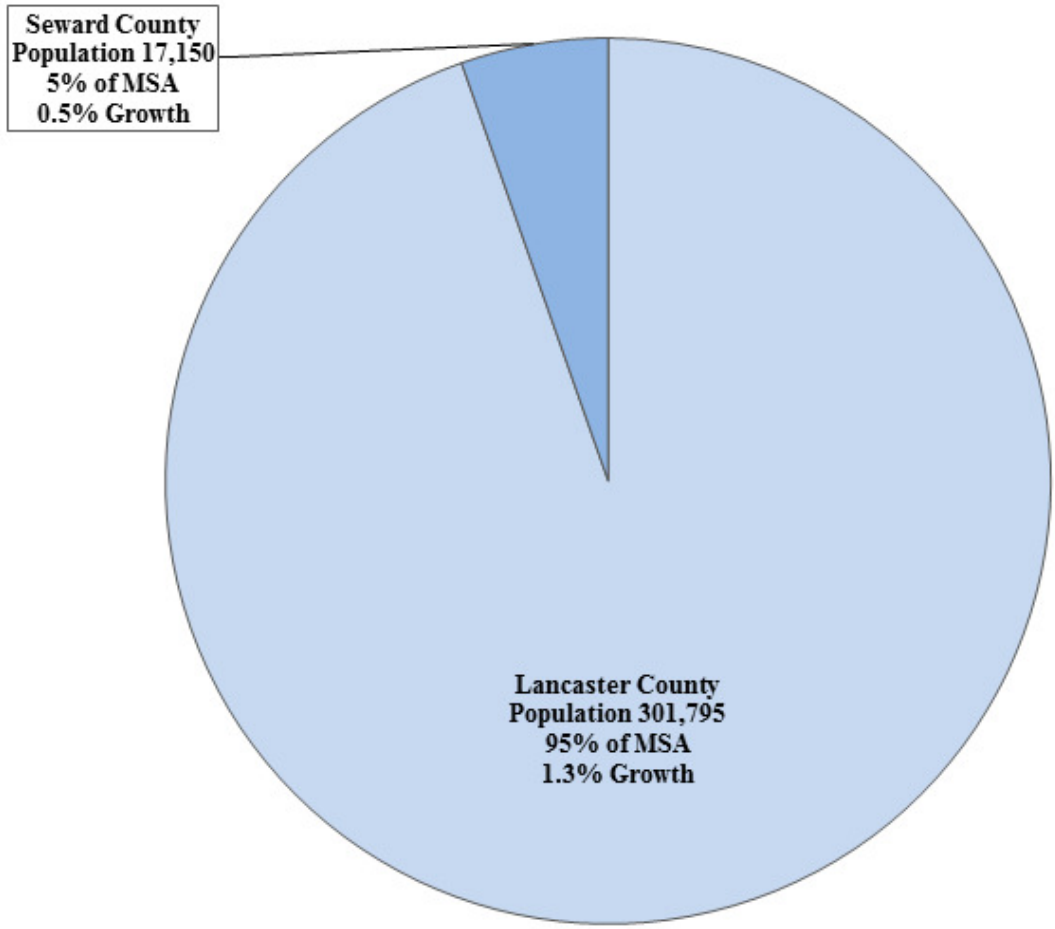
- Over half (54%) of the people in Nebraska live in its 3 most populated counties, 60% live in the 5 most populated counties, and over 75% live in the 16 most populated counties.
- The 16 most populated counties were the same in 2014 as they were in 2010 and 2000.
- There have been only minor ranking changes within this group of 16 counties from 2000 thru 2014.

Figure C-2: Omaha MSA Population Distribution Chart & Table…….....…



	2000 Population	2010 Population	2014 Population	% MSA Population in 2014	2010-14 Avg. Ann. Growth	2010-14 Avg. Ann. % Growth
Omaha MSA	**769,117**	**868,113**	**904,421**	**100%**	**9077**	**1.0%**
NE Counties	**650,905**	**744,730**	**782,138**	**86%**	**9352**	**1.2%**
Douglas Co.	464,712	518,594	543,244	60%	6163	1.1%
Omaha (city)	390,007	424,687	446,599	49%	5478	1.2%
Sarpy Co.	123,157	159,748	172,193	19%	3111	1.8%
Bellevue (city)	44,382	51,381	53,936	6.0%	639	1.2%
Papillion (city)	16,363	19,398	23,270	2.6%	968	4.2%
LaVista (city)	11,699	16,087	17,636	1.9%	387	2.2%
Cass Co.	24,394	25,254	25,524	2.8%	68	0.3%
Plattsmouth (city)	6887	6,500	6,495	0.7%	-1	-0.02%
Saunders Co.	19,852	20,858	20,919	2.3%	15	0.07%
Wahoo (city)	3,942	4,524	4,485	0.5%	-10	-0.2%
Washington Co.	18,790	20,276	20,258	2.2%	-5	-0.02%
Blair (city)	7512	8,005	7,986	0.9%	-5	-0.06%
IA Counties	**118,212**	**123,383**	**122,283**	**14%**	**-275**	**-0.2%**
Pottawatamie Co.	87,966	93,384	93,128	10.3%	-64	-0.07%
Council Bluffs (city)	58,268	62,386	62,245	6.9%	-35	-0.06%
Carter Lake (city)	3248	3,793	3,766	0.4%	-7	-0.2%
Mills Co.	14,555	15,074	14,831	1.6%	-61	-0.4%
Glenwood (city)	5358	5,276	5,242	0.6%	-9	-0.2%
Harrisson Co.	15,691	14,925	14,324	1.6%	-150	-1.0%
Missouri Valley (city)	2992	2,832	2,692	0.3%	-35	-1.3%
Observation: Most of the population growth is in Douglas and Sarpy Counties						

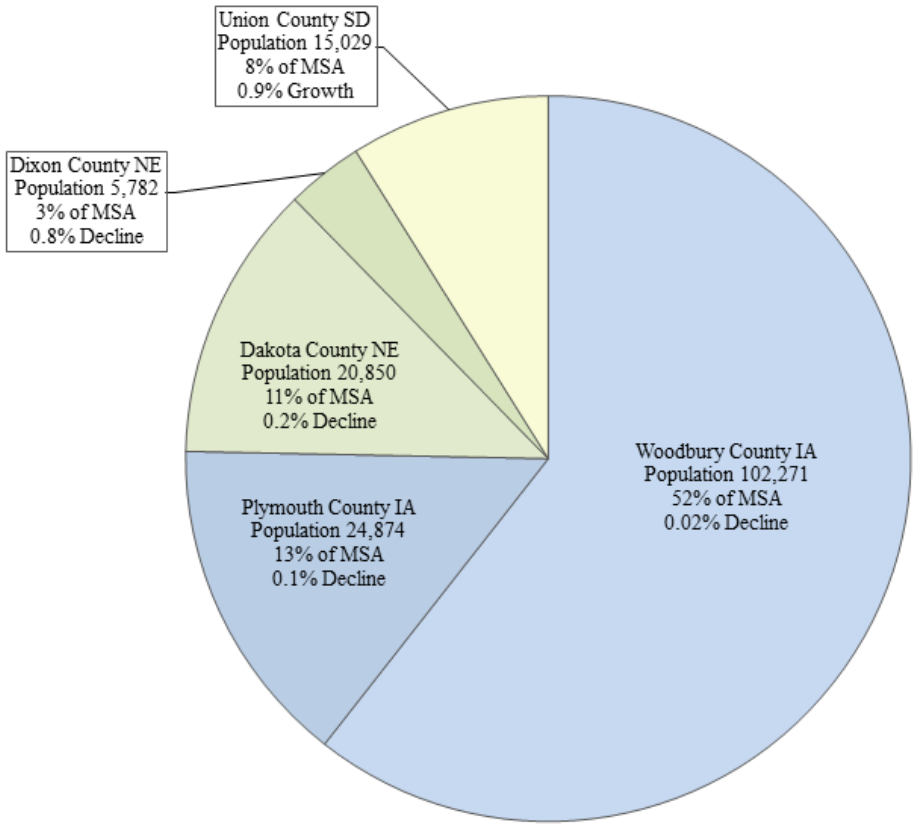
Figure C-3: Lincoln MSA Population Distribution Chart & Table



	2000 Population	2010 Population	2014 Population	% MSA Population in 2014	2010-14 Avg. Ann. Growth	2010-14 Annual % Growth
Lincoln MSA[(a)]	267,955	302,922	318,945	100%	4006	1.3%
Lancaster County	251,425	286,134	301,795	95%	3915	1.3%
Lincoln (city)	225,581	259,102	272,996	86%	3474	1.3%
Waverly (city)	2,448	3,291	3,709	1%	104	2.8%
Seward County	16,530	16,788	17,150	5%	90	0.5%
Seward (city)	6,319	6,982	7,128	2%	36	0.5%

Observation: Most of the population and growth is in Lancaster County and the City of Lincoln.

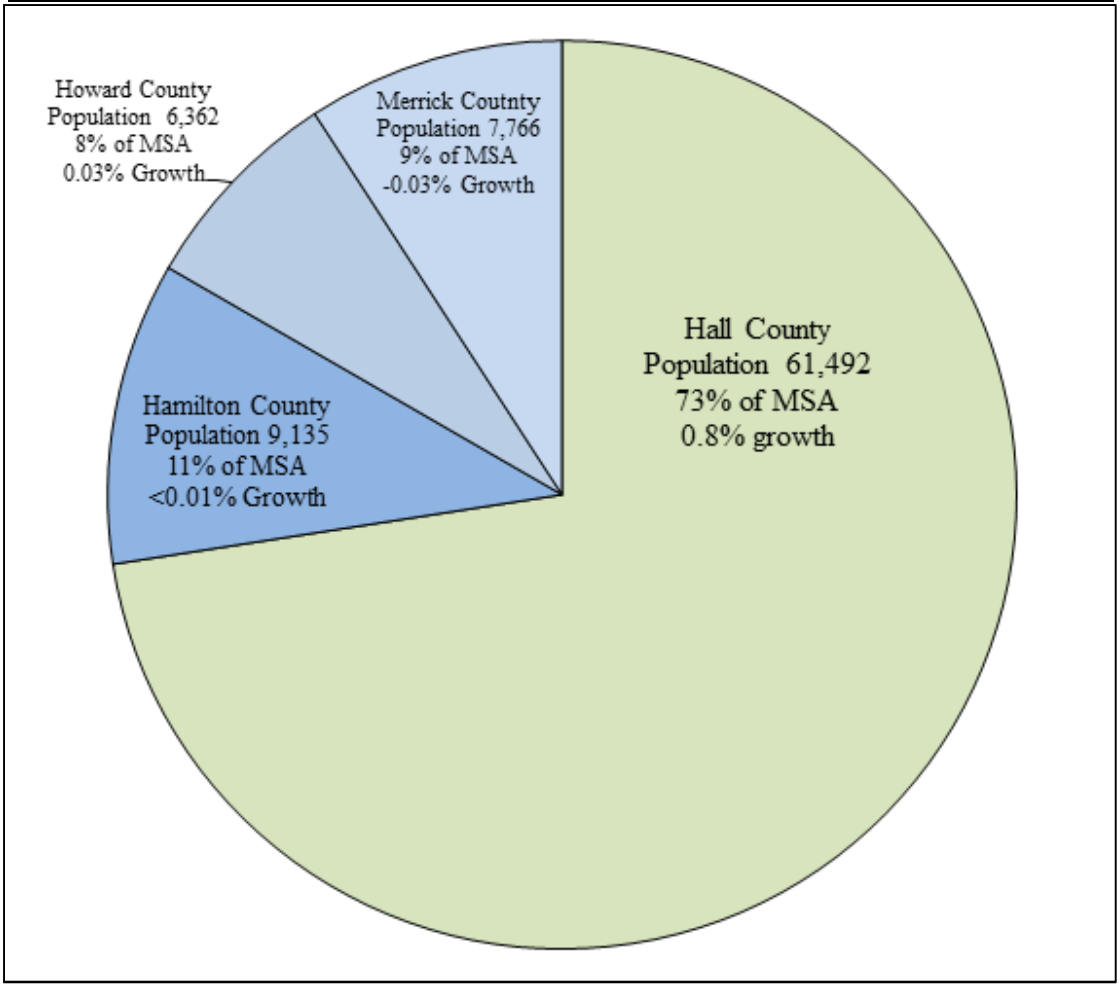
Figure C-4: Sioux City MSA Population Distribution Chart & Table



	2000 Population	2010 Population	2014 Population	% MSA Population in 2014	2010-14 Avg. Ann. Growth	2010-14 Avg. Ann. % Growth
Sioux City MSA	**167,771**	**168,793**	**168,806**	**100%**	**-3**	**-0.00%**
IA Counties & Cities	**128,771**	**127,314**	**127,145**	**75%**	**-42**	**-0.03%**
Woodbury Co	103,786	102,337	102,271	61%	-17	-0.02%
Sioux City	85,000	82,802	82,511	49%	-73	-0.1%
Sargent Bluff (city)	3,411	4,234	4,417	3%	46	1%
Plymouth Co	24,879	24,977	24,874	15%	-26	-0.1%
Lemars (city)	9,258	9,820	9,764	6%	-14	-0.1%
NE Counties & Cities	**26,542**	**26,999**	**26,632**	**16%**	**-92**	**-0.3%**
Dakota Co.	20,296	21,029	20,850	12%	-45	-0.2%
South Sioux City	12,004	13,374	13,360	8%	-4	-0.03%
Dakota City	1,820	1921	1904	1%	-4	-0.2%
Dixon Co.	**6,246**	**5,970**	**5,782**	**3%**	**-47**	**-0.8%**
Wakefield (city)	1,150	1445	1408	1%	-9	-0.6%
SD Counties & Cities	**12,564**	**14,480**	**15,029**	**9%**	**137**	**0.9%**
Union Co.	12,564	14,480	15,029	9%	137	0.9%
North Sioux City	2,237	2,535	2,636	2%	25	1%
Elk Point (city)	1,701	1,975	1,940	1%	-9	-0.4%
Beresford (city)	1,566	1,651	1,634	1%	-4	-0.3%

Observations:
- Most of the population is in Woodbury County, IA and Sioux City, IA.
- There was minimal overall population growth in the Sioux City MSA in the 2010-2014 time frame. Growth did occur in Union County, SD, North Sioux City, SD & Sargent Bluff, IA.

Figure C-5: Grand Island MSA Population Distribution Chart & Table



	2000 Population	2010 Population	2014 Population	% MSA Population in 2014	2010-14 Avg. Ann. Growth	2010-14 Avg. Ann. % Growth
Grand Island MSA[a]	77708 [b]	82,043	84,755	100%	678	0.8%
Hall County	53,534	58,797	61,492	73%	674	0.8%
Grand Island (city)	42,940	48,809	51,236	60%	607	0.7%
Hamilton County	9,403	9,127	9,135	11%	2	0.002%
Aurora (city)	4,225	4,487	4,472	5%	-4	-0.004%
Howard County	6,567	6,265	6,362	8%	24	0.03%
St. Paul (city)	2,218	2,302	2,335	3%	8	0.01%
Merrick County	8,204	7,854	7,766	9%	-22	-0.03%
Central City	2,998	2,936	2,890	3%	-12	-0.01%

Footnotes:
(a) In 2000, Grand Island was a micropolitan statistical area (MiSA) encompassing 3 counties: Hall Howard & Merrick.
(b) The 2000 population of the "Grand Island MSA" includes Hamilton County, although it was not part of the Grand Island MiSA in 2000

Observations: Most of the population of the Grand Island MSA is in Hall County and the City of Grand Island. Population growth is also fastest within these areas.

Table C-4: Micropolitan Statistical Area (MiSA) Population Data: 2010 thru 2014

MiSA	Counties & Cities	2010 Population	2014 Population	Avg. Ann. Population Growth	Annual Percent Growth	Percent of MiSA
Kearney MiSA		52,671	54,868	549	1.0%	100%
	Buffalo County	46,174	48,224	513	1.1%	88%
	Kearney (city)	30,858	32,469	403	1.3%	59%
	Kearney County	6,497	6,644	37	0.6%	12%
Norfolk MSA		48,339	48,445	27	0.1%	100%
	Madison County	34,950	35,174	56	0.2%	73%
	Norfolk (city)	24,263	24,444	45	0.2%	50%
	Pierce County	7,261	7,202	-15	-0.2%	15%
	Stanton County	6,128	6,069	-15	-0.2%	13%
Hastings MiSA		37,875	37,772	-26	-0.1%	100%
	Adams County	31,333	31,457	31	0.1%	83%
	Hastings (city)	25,182	24,915	-67	-0.3%	66%
	Clay County	6,542	6,315	-57	-0.9%	17%
Scottsbluff MiSA		37,758	37,229	-132	-0.4%	100%
	Scotts Bluff County	37,060	36,465	-149	-0.4%	98%
	Scottsbluff (city)	15,077	14,875	-51	-0.3%	40%
	Gering (city)	8,520	8,372	-37	-0.4%	22%
	Banner County	698	764	17	2.3%	2%
North Platte MiSA		37,573	37,063	-128	-0.3%	100%
	Lincoln County	36,267	35,815	-113	-0.3%	97%
	North Platte (city)	24,715	24,327	-97	-0.4%	66%
	Logan County	768	750	-5	-0.6%	2%
	McPherson County	538	498	-10	-1.9%	1%
Fremont MiSA		36,701	36,744	11	0.0%	100%
Part of Omaha CSA	Dodge County	36,701	36,744	11	0.0%	100%
	Fremont (city)	26,419	26,500	20	0.1%	72%
Columbus MiSA		32,268	32,666	100	0.3%	100%
	Platte County	32,268	32,666	100	0.3%	100%
	Columbus (city)	22,216	22,630	104	0.5%	69%
Lexington MiSA		26,402	26,066	-84	-0.3%	100%
	Dawson County	24,354	24,096	-65	-0.3%	92%
	Lexington (city)	10,241	10,146	-24	-0.2%	39%
	Cozad (city)	3,993	3,912	-20	-0.5%	15%
	Gothenburg (city)	3,574	3,542	-8	-0.2%	14%
	Gosper County	2,048	1,970	-20	-1.0%	8%
Beatrice MiSA		22,286	21,663	-156	-0.7%	100%
	Gage County	22,286	21,663	-156	-0.7%	100%
	Beatrice (city)	12,421	12,055	-92	-0.7%	56%

Observation: Four of these 9 MiSAs experienced population growth from 2010 to 2014: Kearney, Norfolk, Fremont & Columbus. Only the Kearney MiSA had an annual population gain $\geq$ 1%.

Table C-5: Nebraska Counties Outside of MSAs and MiSAs that have Populations Greater Than 10,000

Counties & Cities	2010 Population	2014 Population	Avg. Ann. Population Growth	Annual Percent Growth	Percent of MiSA
Otoe Co	15,758	15,797	10	0.1%	100%
Nebraska City	7,299	7,265	-9	-0.1%	46%
Otoe County is adjacent to the Omaha and Lincoln MSAs.					
Saline Co	14,231	14,252	5	0.0%	100%
Crete (city)	6,992	7,034	11	0.1%	49%
Saline County lies SW and is adjacent to the Lincoln MSA					
York Co	13,645	13,917	68	0.5%	100%
York (city)	7,758	7,957	50	0.6%	57%
York County. lies between and abuts the Lincoln and Grand Island MSAs					
Box Butte Co	11,293	11,340	12	0.1%	100%
Alliance (city)	8,480	8,519	10	0.1%	75%
Alliance is the largest Nebraska city outside of an MSA or MiSA. Box Butte County is adjacent to the Scottsbluff MiSA.					
Red Willow Co	11,052	10,867	-46	-0.4%	100%
McCook (city)	7,695	7,611	-21	-0.3%	70%
Custer Co	10,913	10,728	-46	-0.4%	100%
Broken Bow (city)	3,553	3,482	-18	-0.5%	32%
Custer County is adjacent to the North Platte, Lexington & Kearney MiSAs.					
Colfax Co	10,539	10,504	-9	-0.1%	100%
Schuyler (city)	6,228	6,169	-15	-0.2%	59%
Colfax County lies between and abuts the Columbus, Fremont & Norfolk MiSAs.					
Holt Co	10,451	10,403	-12	-0.1%	100%
O'Neill (city)	3,710	3,663	-12	-0.3%	35%
Atkinson (city)	1,247	1,257	3	0.2%	12%
Cheyenne Co	9,961	10,148	47	0.5%	100%
Sidney (city)	6,732	6,914	46	0.7%	68%
Cheyenne Co. is adjacent to the southeast corner of the Scottsbluff MiSA.					

Observations:

- Five of these 9 counties experienced population growth between 2010 and 2014: Otoe, Saline, York, Box Butte & Cheyenne. Population growth rates were < 1% per year.
- Micropolitan Statistical Areas (MiSAs) have a core urban area with a population of 10,000 to 49,999. None of these counties appear to be approaching this threshold.
- Colfax, Otoe, Saline and York Counties are adjacent to other MSAs and or MiSAs.

Table C-6: Population and Population Growth Data for Nebraska & Nebraska Counties Sorted by 2010 to 2014 Population Growth [(a)]

Rank	County	Population Estimate 7/1/10	Population Estimate 7/1/10	Pop. Density (b)	2010-14 Population Growth	2010-14 Ann. % Growth	2013-14 Population Growth	2013-14 Percent Growth
	Nebraska	1,829,865	1,881,503	24.5	51,638	0.69%	12,534	0.67%
1	Douglas	518,594	543,244	1641.3	24,650	1.13%	5,715	1.05%
2	Lancaster	286,134	301,795	359.8	15,661	1.30%	4,510	1.49%
3	Sarpy	159,748	172,193	715.9	12,445	1.81%	2,835	1.65%
4	Hall	58,797	61,492	112.5	2,695	1.10%	569	0.93%
5	Buffalo	46,174	48,224	49.8	2,050	1.06%	166	0.34%
6	Platte	32,268	32,666	48.2	398	0.30%	153	0.47%
7	Seward	16,788	17,150	29.8	362	0.53%	86	0.50%
8	York	13,645	13,917	24.2	272	0.49%	54	0.39%
9	Cass	25,254	25,524	45.6	270	0.26%	143	0.56%
10	Madison	34,950	35,174	40.9	224	0.16%	-77	-0.22%
11	Cheyenne	9,961	10,148	8.5	187	0.46%	69	0.68%
12	Kearney	6,497	6,644	12.9	147	0.55%	91	1.37%
13	Adams	31,333	31,457	55.8	124	0.10%	-124	-0.39%
14	Howard	6,265	6,362	11.2	97	0.38%	21	0.33%
15	Banner	698	764	1.0	66	2.16%	-13	-1.70%
16	Harlan	3,427	3,492	6.3	65	0.47%	-21	-0.60%
17	Saunders	20,858	20,919	27.7	61	0.07%	38	0.18%
18	Box Butte	11,293	11,340	10.5	47	0.10%	30	0.26%
19	Cherry	5,715	5,762	1.0	47	0.20%	-17	-0.30%
20	Dodge	36,701	36,744	68.8	43	0.03%	127	0.35%
21	Otoe	15,758	15,797	25.7	39	0.06%	80	0.51%
22	Thomas	650	687	1.0	37	1.35%	-9	-1.31%
23	Blaine	472	504	0.7	32	1.59%	23	4.56%
24	Saline	14,231	14,252	24.8	21	0.04%	-46	-0.32%
25	Chase	3,963	3,978	4.4	15	0.09%	1	0.03%
26	Thayer	5,218	5,230	9.1	12	0.06%	34	0.65%
27	Hamilton	9,127	9,135	16.8	8	0.02%	13	0.14%
28	Hitchcock	2,893	2,901	4.1	8	0.07%	28	0.97%
29	Grant	612	619	0.8	7	0.28%	-6	-0.97%
30	Deuel	1,937	1,940	4.4	3	0.04%	6	0.31%
31	Phelps	9,185	9,187	17.0	2	0.01%	-10	-0.11%

Footnote:
(a) This table contains population estimates for 7/1/10 and 7/1/14 published by the US Census Bureau.
(b) ***Pop. Density*** is the population of the county divided by its surface area in square miles (people/sq. mile).

Table C-6: Population and Population Growth Data for Nebraska & Nebraska Counties Sorted by 2010 to 2014 Population Growth [(a)]

Rank	County	Population Estimate 7/1/10	Population Estimate 7/1/10	Pop. Density (b)	2010-14 Population Growth	2010-14 Annual Percent Growth	2013-14 Population Growth	2013-14 Percent Growth
32	Thurston	6,973	6,969	17.7	-4	-0.01%	72	1.03%
33	Hooker	734	728	1.0	-6	-0.21%	-4	-0.55%
34	Sioux	1,312	1,303	0.6	-9	-0.17%	-16	-1.23%
35	Arthur	464	453	0.6	-11	-0.61%	2	0.44%
36	Keya Paha	821	810	1.0	-11	-0.34%	13	1.60%
37	Logan	768	750	1.3	-18	-0.60%	-14	-1.87%
38	Washington	20,276	20,258	51.9	-18	-0.02%	27	0.13%
39	Hayes	960	933	1.3	-27	-0.72%	-40	-4.29%
40	Johnson	5,216	5,185	13.8	-31	-0.15%	56	1.08%
41	Colfax	10,539	10,504	25.4	-35	-0.08%	98	0.93%
42	Garfield	2,041	2,003	3.5	-38	-0.47%	-30	-1.50%
43	Loup	626	588	1.0	-38	-1.62%	7	1.19%
44	McPherson	538	498	0.9	-40	-2.01%	-25	-5.02%
45	Frontier	2,753	2,705	2.8	-48	-0.44%	-7	-0.26%
46	Holt	10,451	10,403	4.3	-48	-0.12%	-35	-0.34%
47	Valley	4,258	4,204	7.4	-54	-0.32%	7	0.17%
48	Wheeler	821	766	1.3	-55	-1.80%	8	1.04%
49	Pierce	7,261	7,202	12.5	-59	-0.20%	38	0.53%
50	Stanton	6,128	6,069	14.1	-59	-0.24%	-15	-0.25%
51	Greeley	2,544	2,482	4.4	-62	-0.62%	-1	-0.04%
52	Furnas	4,954	4,888	6.8	-66	-0.34%	32	0.65%
53	Boyd	2,100	2,033	3.8	-67	-0.82%	14	0.69%
54	Nemaha	7,247	7,175	17.5	-72	-0.25%	-3	-0.04%
55	Pawnee	2,775	2,702	6.3	-73	-0.68%	-24	-0.89%
56	Sherman	3,149	3,074	5.4	-75	-0.61%	-36	-1.17%
57	Gosper	2,048	1,970	4.3	-78	-0.99%	-4	-0.20%
58	Rock	1,524	1,443	1.4	-81	-1.40%	26	1.80%
59	Merrick	7,854	7,766	16.0	-88	-0.28%	-35	-0.45%
60	Perkins	2,987	2,891	3.3	-96	-0.83%	-19	-0.66%
61	Kimball	3,827	3,713	3.9	-114	-0.77%	26	0.70%
62	Cuming	9,144	9,027	15.8	-117	-0.32%	22	0.24%
63	Polk	5,389	5,271	12.0	-118	-0.56%	21	0.40%

Footnote:
(a) This table contains population estimates for 7/1/10 and 7/1/14 published by the US Census Bureau.
(b) ***Pop. Density*** is the population of the county divided by its surface area in square miles (people/sq. mile).

Table C-6: Population and Population Growth Data for Nebraska & Nebraska Counties Sorted by 2010 to 2014 Population Growth [(a)]

Rank	County	Population Estimate 7/1/10	Population Estimate 7/1/14	Pop. Density (b)	2010-14 Population Growth	2010-14 Annual Percent Growth	2013-14 Population Growth	2013-14 Percent Growth
64	Butler	8,370	8,249	14.1	-121	-0.37%	-75	-0.91%
65	Dundy	2,008	1,886	2.1	-122	-1.62%	-83	-4.40%
66	Dawes	9,172	9,042	6.5	-130	-0.36%	-51	-0.56%
67	Nuckolls	4,507	4,369	7.6	-138	-0.79%	-26	-0.60%
68	Boone	5,496	5,353	7.8	-143	-0.67%	-22	-0.41%
69	Franklin	3,231	3,076	5.3	-155	-1.26%	-15	-0.49%
70	Webster	3,814	3,658	6.4	-156	-1.07%	-17	-0.46%
71	Nance	3,729	3,570	8.1	-159	-1.11%	-30	-0.84%
72	Garden	2,078	1,911	1.1	-167	-2.18%	7	0.37%
73	Wayne	9,600	9,431	21.3	-169	-0.45%	-6	-0.06%
74	Morrill	5,040	4,862	3.4	-178	-0.92%	-20	-0.41%
75	Dakota	21,029	20,850	79.0	-179	-0.21%	-94	-0.45%
76	Custer	10,913	10,728	4.2	-185	-0.43%	-68	-0.63%
77	Red Willow	11,052	10,867	15.2	-185	-0.43%	-156	-1.44%
78	Knox	8,668	8,482	7.7	-186	-0.55%	-75	-0.88%
79	Dixon	5,970	5,782	12.1	-188	-0.81%	-53	-0.92%
80	Sheridan	5,457	5,259	2.2	-198	-0.94%	7	0.13%
81	Jefferson	7,534	7,335	12.8	-199	-0.68%	-212	-2.89%
82	Brown	3,144	2,941	2.4	-203	-1.73%	17	0.58%
83	Richardson	8,343	8,128	14.7	-215	-0.66%	3	0.04%
84	Cedar	8,829	8,610	11.6	-219	-0.64%	-76	-0.88%
85	Clay	6,542	6,315	11.0	-227	-0.90%	-68	-1.08%
86	Fillmore	5,889	5,661	9.8	-228	-1.01%	-24	-0.42%
87	Keith	8,359	8,121	7.7	-238	-0.73%	0	0.00%
88	Dawson	24,354	24,096	23.8	-258	-0.27%	-56	-0.23%
89	Antelope	6,658	6,398	7.5	-260	-1.02%	-58	-0.91%
90	Burt	6,838	6,573	13.3	-265	-1.01%	-10	-0.15%
91	Lincoln	36,267	35,815	14.0	-452	-0.32%	-277	-0.77%
92	Scotts Bluff	37,060	36,465	49.3	-595	-0.41%	-405	-1.11%
93	Gage	22,286	21,663	25.3	-623	-0.72%	-153	-0.71%

Footnote:

(a) This table contains population estimates for 7/1/10 and 7/1/14 published by the US Census Bureau.

(b) ***Pop. Density*** is the population of the county divided by its surface area in square miles (people/sq. mile).

This attachment reviews compliance with applicable requirements in 40 CFR Part 58 Appendixes A through E, including revisions effective 4/27/16. Nebraska Ambient Monitoring activities and network are in compliance with these requirements with one exception: the PM_{10} filter-based monitoring network using 2025 samplers lacks a collocated sampler. This non-compliance with Appendix A collocation requirements is explained below.

I. Appendix A Review

40 CFR Part 58 Appendix A sets forth quality assurance requirements for the collection, calculation and reporting of air monitoring data. The *Quality Assurance Project Plan (QAPP) for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, PM2.5 Speciation, and Total reduced Sulfur* (EPA approved November 2014) was developed to comply with Part 58 requirements and the provisions of the EPA *Quality Assurance Handbook for Air Pollution Measurement Systems Volume II* (May 2013). The DCHD, LLCHD and NDEQ all use this QAPP. Actual procedures for operating monitors, as well as for collecting, reviewing and submitting data, are set forth in Standard Operating Procedures (SOPs) that comply with the QAPP.

40 CFR Part 58 Appendix A also sets forth requirements specifying the number of collocated monitors required for $PM_{2.5,}$ $PM_{10,}$ $PM_{10\text{-}2.5}$ and Lead (Pb) monitors. Table D-1 summarizes the collocated sites in Nebraska. All PM and Pb sub-networks operated by DCHD, LLCHD and NDEQ met collocation requirements except the NDEQ PM_{10} network using 2025 filter-based samplers.

NDEQ Collocation Deficiency: In March 2015, the collocated monitor at the Weeping Water City site suffered an electronic failure that was not readily repairable. Taking into consideration that the Weeping Water site was to be re-equipped with a continuous MetOne BAM sampler and that the Cozad and Gothenburg sites were going to be proposed for closure, the determination was made not to take extra-ordinary measures to get the collocated sampler re-started. There were two options for re-establishing the collocated sampler.

a) Attempt to locate electronic boards for the obsolete R&P sampler; or
b) Purchase a new or used 2025 sampler.

Neither option was deemed feasible to pursue.

The Cozad and Gothenburg monitors were shut-down March 8, 2016. The MetOne BAM sampler will be installed in 2016. At that point there will no longer be a 2025 filter-based sampler network and collocation will not be required.

II. Appendix C Review

Appendix C contains requirements for approved ambient air monitoring methodologies. Any monitor that is used to evaluate NAAQS compliance must be a Federal Reference Method (FRM) or a Federal Equivalent Method (FEM) or an alternatively approved method as defined in Appendix C. The network description tables in Attachment A of the network plan identify the monitoring method used by each monitor in the Nebraska ambient air monitoring network. All monitors used to evaluate compliance with the NAAQS are FRM or FEM certified. The only monitors that are not FRM/FEM certified are those not subject to 40 CFR Part 58 requirements; i.e., TRS, NADP, IMPROVE, RadNet, etc.

Table D-1: Compliance Summary: Collocation Requirements of Appendix A[1]

Parameter	Method	Percent Collocation Required	NDEQ/LLCHD [2]			DCHD [2]		
			# of Sites	# Collocated	% Collocated	# of Sites	# Collocated	% Collocated
PM_{10}	Hi-Vol Sampler	15%	0	0	na	2	1	50%
PM_{10}	Sequential 2025 Sampler	15%	1	0	0% [3]	0	0	na
PM_{10}	Continuous Monitor	None	1	0	(4)	1	0	(4)
$PM_{2.5}$	Sequential 2025 Sampler	15%	3	1	33%	2	1	50%
$PM_{2.5}$	Met One BAM Method [5]	15%	1	1	100% [5]	2	1	50%
$PM_{10-2.5}$	Met One BAM Method	None	0	0	na	1	0	(6)
TSP-Lead	Hi-Vol Sampler	15% except NCore	2	1	50%	1	0	(7)

Footnotes:

(1) Collocation Requirements: Appendix A requires 15% of the sites in each parameter/method category to have collocated monitors with certain exceptions and additional requirements.

(2) Collocation requirements apply to each Primary Quality Assurance Organization (PQAO) separately. There are two PQAO's in Nebraska: DCHD and NDEQ/LLCHD.

(3) In March the collocated sampler at the Weeping Water City site malfunctioned and it was determined it would not be replaced or repaired as the 2025 filter-based network was being phased out: the Cozad and Gothenburg sites were closed in March 2016 and Weeping Water primary will be replaced with a MetOne BAM in 2016.

(4) Collocated monitors are not required for continuous PM_{10} monitors.

(5) LLCHD operates a MetOne BAM $PM_{2.5}$ sampler for AirNow and AQI reporting. It is collocated with the primary and collocated sequential samplers at the site.

(6) DCHD operates 2 MetOne BAM samplers at the NCore site. One is set-up to sample $PM_{2.5}$ and the other samples PM_{10}. $PM_{10-2.5}$ is calculated using the results from these 2 samplers. There is a sequential $PM_{2.5}$ collocated sampler at the NCore site, but not a collocated PM_{10} sampler. Collocated PM_{10} samplers are not required in Appendix A for continuous PM_{10} samplers. EPA has designated some NCore sites to have collocated samplers for $PM_{10-2.5}$; the Omaha NCore site is not one of them.

(7) Collocated TSP-Lead monitoring is not required at NCore sites unless specifically required by EPA; and EPA has not designated the Omaha NCore site to have a collocated TSP-Lead sampler.

Network Descriptions	
NDEQ Sequential 2025 PM_{10}: Weeping Water (collocated), Cozad & Gothenburg	DCHD Hi-Vol PM_{10}: 19& Burt (collocated) and South Omaha
NDEQ Continuous PM_{10}: Weeping Water Farm (collocation not required)	DCHD Continuous PM_{10}: 46th & Farnam (collocation not required)
NDEQ TSP-Lead: Fremont (collocated) & Auburn	DCHD Sequential 2025 $PM_{2.5}$: Berry St & Blair (collocation at NCore)
NDEQ & LLCHD Sequential 2025 $PM_{2.5}$: Lincoln (collocated), Grand island & Scottsbluff	DCHD MetOne BAM $PM_{2.5}$: NCore (collocated) & Bellevue
	DCHD Met MetOne BAM $PM_{10-2.5}$: NCore (collocation not required)
	DCHD TSP-Lead: NCore (collocation not required)

III. Appendix D Review

Appendix D sets forth monitoring objectives and minimum monitoring site requirements that must be met. The review that follows demonstrates that the Nebraska ambient air monitoring network meets the Appendix D requirements in effect on February 28, 2013.

EPA periodically re-evaluates the NAAQS and monitoring requirements. Regulatory modifications may impact the minimum monitoring requirements in one of two ways:

- Appendix D minimum monitoring requirements may be changed (i.e., more or less monitoring could be required); or
- Monitoring needs may change as a result of a NAAQS modification (e.g., when the annual average $PM_{2.5}$ NAAQS was lowered from 15 ug/m^3 to 12 ug/m^3, the 85% of NAAQS threshold set forth in 40 CFR Part 58 Appendix D Sec. 4.7 Table D.5 was crossed, and the minimum number of $PM_{2.5}$ monitoring sites for the Omaha MSA increased from 1 to 2).

III.A: Appendix D - Objectives Review

Appendix D Section 1.1 sets forth 3 objectives that ambient air monitoring networks must be designed to meet:

- Provide air pollution data to the general public in a timely manner.
- Support compliance with ambient air quality standards and emissions strategy development.
- Support for air pollution research studies.

Each of these objectives is discussed below.

1. Timely Dissemination of Data - Met

Air monitoring data is made available to the public and other parties in several ways.

a. Ambient air monitoring data is reviewed quarterly and entered into the national EPA-operated AQS database. The AQS database is available to federal, state and local monitoring agency personnel, as well as some other public agencies and researchers. AQS data cannot be directly accessed by the general public, but the NDEQ does respond to data requests.

b. Air Quality Index reporting is performed by DCHD and LLCHD for their respective jurisdictions. The AQI information is made available on their respective city websites.

c. Monitoring data from continuous particulate, ozone and CO monitors in the Omaha and Lincoln MSAs report directly to the EPA AirNow system. The general public can access air quality index information on-line at www.airnow.gov.

d. Daily maximum TRS monitoring data is available to the public on the NDEQ web site. This data is typically entered on a monthly basis. The NDEQ also responds to telephone or email requests for more timely or detailed information.

e. The NDEQ publishes an annual Air Quality Report. This report is available on-line and upon request. Similarly the annual Network Plan reports are also available to the public on-line or upon request.

2. Support compliance with ambient air quality standards and emissions strategy development – Met

The NDEQ reviews all of the data collected by DCHD, LLCHD and NDEQ during the previous year as part of the annual data certification process, which is submitted to EPA by May 1st.. At this time design values are calculated and compared with the NAAQS. This design value information is then incorporated into the annual Network Plan. The annual Network Plans discuss attainment/non-attainment status and monitoring strategies that may be related.

The NDEQ, DCHD and LLCHD also perform data validation reviews at least once each quarter and in many instances monthly. Any potential non-attainment or near non-attainment circumstances will be recognized during these reviews. If such conditions are identified, efforts are made to ascertain the cause and to the extent possible bring about corrective action through regulatory and/or voluntary mechanisms.

An Air Now summary report for ozone & $PM_{2.5}$ is emailed daily to an NDEQ member. When elevated ozone or $PM_{2.5}$ levels are reported, this information is passed on to air quality managers at DCHD, LLCHD and NDEQ.

The examples below illustrate how state and local air quality programs have recognized air quality issues and reacted to them.

a. In the fall of 2011, the 3-month average lead concentration at the Fremont site exceeded the NAAQS. EPA and Magnus Farley, the one known source, were notified. The data was discussed and presented to EPA for review. NDEQ and the source conducted an on-site review of the facility and potential emission sources (see Section V.B.2 in this network plan for additional information).

   In 2012, NDEQ continued to calculate daily and 3-month average lead monitoring data as the data became available; and to disseminate this information to Magnus Farley. High daily lead levels in May thru early July brought the 3-month average within 93% of the NAAQS, and these lead levels were discussed with Magnus Farley. Lower lead levels were seen beginning in July and continuing thereafter. The impact of this information exchange with the source is difficult to evaluate, but it may have played an important role in facilitating the source in remaining diligent with their control efforts.

   The NDEQ continues to inform Magnus Farley of lead levels as the data becomes available. Lead levels have remained in attainment with the current DV at 73% of the NAAQS. See Attachment B Table B-7 for 2013-2015 maximum 3-month average data.

b. From September 2011 thru June 2012, the 46th & Farnam site recorded four (4) 24-hour average PM_{10} values greater than the 150 $u g/m^3$ standard. The 46th & Farnam site is source-oriented with respect to Omaha Steel Castings Company, and the company had initiated a move to a new location in Wahoo, NE.

   Douglas County Health Department made Omaha Air Quality and Omaha Steel aware of the high values in a timely manner. Omaha Air Quality met with Omaha Steel to discuss potential PM_{10} sources and controls. Omaha Steel proceeded with process-handling and housekeeping changes intended to reduce PM_{10} emissions. These efforts were effective in reducing PM_{10} levels. Omaha Steel completed their move to their new facility in 2014 and closed the 46th & Farnam site.

c. In the summer of 2012, Nebraska monitoring sites began reporting ozone levels above those seen in recent years. The NDEQ began using Air Now data to track the current 4th highest values for sites in and around Nebraska as the ozone season progressed. Although the 4th high values at 2 sites in the Omaha MSA exceeded 0.075 ppm 8-hour ozone NAAQS, the 3-year average design values did not exceed the NAAQS (i.e., the maximum unofficial 2010-2012 DVs = 0.069 ppm).

d. In the spring of 2014 and 2016, smoke from controlled grassland fires in the Flint Hills area of Kansas was impacting Nebraska. AirNow data was used to track the degree and extent of the impact on ambient ozone and $PM_{2.5}$. At times, the impact from these controlled burns raised ozone and $PM_{2.5}$ levels in Nebraska. Both DCHD and LLCHD issued air quality alerts related to these burns.

3. Support for air pollution research studies – Met

The NDEQ, DCHD and LLCHD operate the Nebraska SLAMS network in accordance with the monitor specifications, site placement and QA requirements set forth in 40 CFR Part 50 and 58. EPA R7 provides oversight to ensure that regulatory requirements are met with respect to methodology and QA.

Data is reviewed quarterly before being submitted to EPA's AQS database. Once in AQS, the data is available for pollution research studies.

Near real-time data is also reported to the EPA AirNow data from the continuous PM, CO and ozone monitors operating in the Omaha and Lincoln MSA. This data is also available for research purposes.

III.B: Appendix D – Minimum Monitoring Site Requirements

Nebraska has the minimum number of monitoring sites required by Appendix D. The minimum monitoring site requirements for each of the four MSAs are examined separately and documented in Tables D-2.a thru D-2.d below.

The review for non-MSA areas of the state was performed on a pollutant specific basis. This review is documented in narrative form in Section III.C below.

It should be noted that the number of monitoring sites required in a network generally needs to be greater than the minimum number required by Appendix D. This is stated in Appendix D Section 1.1.2: "… total number of monitoring sites that will serve the variety of data needs will be substantially higher than these minimum requirements provide…"

III.C: Appendix D Minimum Monitoring Requirements for non-MSAs

NCore – (40 CFR Part 58 App. D Sec. 3) None required or operated.

At this time there is no requirement or plan to develop an NCore site in Nebraska, other than the current site in Omaha.

Ozone (O_3) – (40 CFR Part 58 App. D Sec. 4.1) No sites required or operated.

At this time there is no requirement or plan to deploy ozone monitoring sites outside of the MSAs.

Carbon Monoxide (CO) – (40 CFR Part 58 App. D Sec. 4.2) No sites required or operated.

At this time there is no requirement or plan to conduct CO monitoring outside the MSAs. Elevated CO levels are primarily associated with vehicle emissions and congested traffic areas. Highest levels would be anticipated in the Omaha and Lincoln MSAs. Highest concentration site monitoring in Lincoln and Omaha has consistently found CO levels well below the NAAQS. Thus, there is not a need for additional monitoring sites in less populated communities.

Nitrogen Dioxide (NO_2) – (40 CFR Part 58 App. D Sec. 4.3) No sites required or operated.

At this time there is no requirement or plan to conduct NO_2 monitoring outside the MSAs.

Sulfur Dioxide (SO_2) – (40 CFR Part 58 App. D Sec. 4.4) No sites required or operated .

There are no Part 58 requirements to operate SO_2 monitoring sites in non-MSA areas. However, pursuant to Part 51, Subpart BB, monitoring may be used to demonstrate attainment with the 1-hour SO_2 NAAQS. Nebraska is proposing SO_2 monitoring pursuant to Part 51 in the Omaha and Lincoln MSA, but not in non-MSA areas.

Lead (Pb) – (40 CFR Part 58 App. D Sec. 4.5)

Three source-oriented sites required; 2 operating and 1 waived

40 CFR Part 58 Appendix requires source-oriented monitoring near sources with lead emissions of 0.5 tpy or more. Three sources initially met this threshold: Magnus Farley in Fremont, Magnolia Metals in Auburn and Nucor Steel in Norfolk.

Monitoring near Magnus Farley in Fremont and Magnolia Metals in Auburn was initiated in 2010.

A waiver pursuant to Part 58 Appendix D Section 4.5 was sought fro Nucor Steel. EPA R7 granted the waiver in April 2014. The waiver expires in April 2019.

In 2012 and 2013 Magnolia Meetals installed pollution-control equipment that reduced their lead emissions to 0.1 tpy. Ambient lead levels dropped to below 5% of the NAAQS in 2015. The 2015 Network Plan included a proposal for no longer requiring lead monitoring near Magnolia Metals. The Auburn lead site will be shut-down in 2016 in accordance with the 2015 Network Plan.

Thus, by the end of 2016, one source-oriented monitor, the one in Fremont, will be operating.

PM_{10} Particulate Matter (40 CFR Part 58 App. D Sec. 4.6) No sites required. No sites operated.

There are no minimum PM_{10} monitoring requirements for areas outside of MSAs.

NDEQ operated PM10 sites in Cozad and Gothenburg that were shut-down on March 8, 2016 in accordance with the 2015 Network Plan.

Fine Particulate Matter: $PM_{2.5}$ (40 CFR Part 58 Appendix D Section 4.7 & 4.7.3) Two (2) sites required and 2 operated.

States are required to operate a background site and a transport site for $PM_{2.5}$. Nebraska's background site is in Scottsbluff, and the transport site is in Grand Island.

Coarse Particulate Matter: $PM_{10-2.5}$ (40 CFR Part 58 App D Sec 4.8) No sites required or operated.

Photochemical Assessment Monitoring Stations (PAMS) (40 CFR Part 58 Appendix D Section 5) No sites required or deployed.

PAMS are only required in areas classified as serious, severe, or extreme non-attainment for O_3. No such areas exist in Nebraska at this time.

IV: Appendix E Review

This appendix sets forth requirements for probe and monitoring path placement, including: horizontal and vertical placement, spacing from minor sources, spacing from obstructions, spacing from trees, spacing from roadways, cumulative interferences on a monitoring path, maximum monitoring path length, and probe material and sample residence time. Compliance with these criteria is verified when the site is set-up and periodically thereafter. Compliance is evaluated using review sheets developed for that purpose.

Tables D-2.a thru D-2.c: Minimum Monitoring Reviews for Each Nebraska MSA

Table D-2.a: 40 CFR Part 58 Appendix D Review: Omaha MSA (MSA Population ~ 904,000) *

Pollutant	App. D Citation	Review Criteria & *Comments*	Sites Required	Sites Operated	Criteria Met?
Ozone	Sec. 4.1 Table D-2	The Omaha MSA population is between 350K to 4M and O_3 levels are ≥ 85% of NAAQS (*See Design Values in Attachment B).*	2	3 Includes NCore	Y
CO	Sec. 4.2	The population threshold for requiring a near-road CO monitoring site in a CBSA is 1 million. The population of the Omaha MSA is below this threshold.	0	2 Includes NCore	Y
NO_2	Sec. 4.3.2	The Omaha MSA has a populations of 500K to 1M and is currently required to have a near-road NOx site by 1/1/2017. However EPA has proposed a modification to eliminate this requirement.	0	0	Y
	Sec.4.3.3	Area-Wide monitoring only required if CBSA ≥ 1M (Omaha MSA population < 1 M)	0	1 @ NCore	Y
	Sec. 4.3.4	Regional Administrator required monitoring: None at this time.	0	0	Y
SO_2	Sec. 4.4	The need for SO_2 sites is based on the *Population Weighted Emissions Index* (PWEI). Omaha's PWEI = 27,747, which falls within the 5000 to 100000 range requiring 1 site. *The current network of one highest concentration site and one NCore site exceeds the minimum requirements. No changes are proposed.*	1	2 Includes NCore	Y
		Regional Administrator required monitoring: None at this time.	0	0	Y
Lead	Sec. 4.5 (a)	There are no sources emitting ≥ 0.5 tpy of lead in the Nebraska portion of the Omaha MSA.	0	0	Y
	Sec. 4.5 (b)	One community-based lead monitor was required at NCore site. Revised regulations effective 4/27/16 eliminated this requirement. DCHD will continue to operate the lead monitor through 2017. Or until closure is approved in the 2017 Network Plan.	1	1	Y
	Sec. 4.5 (c)	Regional Administrator required monitoring: None at this time.	0	0	Y
PM_{10}	Sec. 4.6 Table D-4	The Omaha MSA has a population between 500K – 1M. and a high PM_{10} concentration range with 1 max value > 120% of NAAQS at 46th & Farnam St Site in 2012. With the closing of the Omaha Steel facility at 46th & Farnam, the only sites with PM_{10} exceeding 80% of NAAQS may be in the Weeping Water area (sites operated by NDEQ). See Attachment B for PM_{10} data.	4-8	6 Includes NCore & 2 sites @ Weeping Water	Y
$PM_{2.5}$	Sec 4.7 Table D-5	The Omaha MSA has a population between 500K – 1M. and $PM_{2.5}$ levels < 85% of NAAQS range (*See Design Values in Attachment B).*	1	4 Includes NCore	Y
	Sec 4.7.2	Continuous monitor required.	1	1 @ NCore	Y
	Sec. 4.7.4	$PM_{2.5}$ Speciation Trends Network monitoring required (included SASS and URG samplers as one)	1	1 @ NCore	Y
PAMS	Sec. 5	Only required for areas classified as serious, severe, or extreme non-attainment for O_3.	0	0	NA
NCore	Sec. 3	Omaha has been designated to operate an NCore site with lead and NOx/NOy monitoring.	1	1	Y

* Unless noted otherwise, this analysis does not count monitors located in IA toward meeting the minimum monitoring requirements. It does consider pollutant levels measured at IA sites, when determining minimum monitoring needs for ozone and $PM_{2.5}$.

Table D-2.b: 40 CFR Part 58 Appendix D Review: Lincoln MSA (Population ~ 319,000)					
Pollutant	App. D Citation	**Review Criteria & *Comments***	Sites Required	Sites Operated	Criteria Met?
Ozone	Sec. 4.1 Table D-2	The Lincoln MSA population is between 50K to 350K and O_3 levels < 85% of NAAQS (*See Design Values in Attachment B).*	0	1	Y
CO	Sec. 4.2	No minimum requirement	0	0	Y
NO_2	Sec. 4.3.2	Near-road monitoring: No requirement for CBSA < 500K.	0	0	Y
	Sec.4.3.3	Area-Wide monitoring only required if CBSA ≥ 1M (Lincoln MSA population < 1 M).	0	0	Y
	Sec. 4.3.4	Regional Administrator required monitoring: none.	0	0	Y
SO_2	Sec. 4.4	The number of SO_2 sites required is based on the *Population Weighted Emissions Index* (PWEI). Lincoln's PWEI = 1,371, which falls below 5000. Thus no sites are required.	0	0 (1)	Y
		Regional Administrator required monitoring: none.	0	0	Y
Lead	Sec. 4.5 (a)	There are no sources emitting ≥ 0.5 tpy of lead.	0	0	Y
	Sec. 4.5 (b)	Community-based monitor only required if CBSA population ≥ 500K.	0	0	Y
	Sec. 4.5 (c)	Regional Administrator required monitoring: none.	0	0	Y
PM_{10}	Sec. 4.6 Table D-4	The Lincoln MSA population is between 250K – 500K. Monitoring is only required if current monitoring indicates PM_{10} ≥ 85% of NAAQS. *Also the highest 24-hr value found from 1988-98 was 102 $\mu g/m^3$* or 68% of the NAAQS.	0-1	0	Y
$PM_{2.5}$	Sec 4.7 Table D-5	The Lincoln MSA population is between 50K – 500K and $PM_{2.5}$ levels < 85% of NAAQS (*See Design Values in Attachment B).*	0	1	Y
	Sec 4.7.2	Continuous monitor not required.	0	1	Y
	Sec. 4.7.4	$PM_{2.5}$ Speciation Trends Network monitoring not required.	0	0	Y
PAMS	Sec. 5	Only required for areas classified as serious, severe, or extreme non-attainment for O_3.	0	0	Y
NCore	Sec. 3	Lincoln has not been designated to operate an NCore site.	0	0	Y

Footnote:
(1) NDEQ & LLCHD are proposing to establish a source-oriented SO_2 site at NPPD's Sheldon Station near Hallam, NE to comply with data requirements within Part 51. See Attachment E for proposal details.

Table D-2.c: 40 CFR Part 58 Appendix D Review: Sioux City MSA (Population ~ 169,000) **					
Pollutant	App. D Citation	**Review Criteria & *Comments***	Sites Required	Sites Operated	Criteria Met?
Ozone	Sec. 4.1 Table D-2	Sioux City MSA population is between 50K -350K. There is one ozone monitor in the MSA and it is located in a rural area of Union County, SD. It operated at 471st Ave in 2014 & 2015 and at 475st Ave in 2013. The 3-year average from these sites was 62 ppb or 89% of the NAAQS, but this is not a Design Value (DV), since it uses data from 2 different sites. Appendix D Sec. 4.1, Table D-2 says that for MSAs of this size 1 ozone site is required if the DV ≥ 85% of the NAAQS, but an ozone site is not required in the absence of a DV. Thus an ozone site in Nebraska is not required, and SD operates an ozone site in Union County.	0	0	Y
CO	Sec. 4.2	No minimum requirement.	0	0	Y
NO_2	Sec. 4.3.2	Near-road monitoring: No requirement for CBSA < 500K.	0	0	Y
	Sec.4.3.3	Area-Wide monitoring only required if CBSA ≥ 1M (Sioux City MSA population < 1 M)	0	0	Y
	Sec. 4.3.4	Regional Administrator required monitoring; none.	0	0	Y
SO_2	Sec. 4.4	The number of SO_2 sites required is based on the *Population Weighted Emissions Index* (PWEI). Sioux City MSA's PWEI = 5033, which falls within the 5000 to 100000 range requiring 1 site. *Two sites exist in the MSA: one in Union County, SD & one near Sergeant Bluff, IA.*	1	0	Y See comment
		Regional Administrator required monitoring: none	0	0	Y
Lead	Sec. 4.5 (a)	There are no sources emitting ≥ 0.5 tpy of lead in the Nebraska portion of the Sioux City MSA.	0	0	Y
	Sec. 4.5 (b)	Community-based lead monitoring is only required when CBSA population ≥ 500K.	0	0	Y
	Sec. 4.5 (c)	Regional Administrator required monitoring: none.	0	0	Y
PM_{10}	Sec. 4.6 Table D-4	The Sioux City MSA population is between 100K – 250K and PM_{10} levels are < 80% of NAAQS (*See Design Values in Attachment B).*	0	0	Y
$PM_{2.5}$	Sec 4.7 Table D-5	The Sioux City MSA population is between 50K – 500K and $PM_{2.5}$ levels are < 85% of NAAQS (*See Design Values in Attachment B).*	0	0	Y
	Sec 4.7.2	Continuous monitor not required	0	0	Y
	Sec. 4.7.4	$PM_{2.5}$ Speciation Trends Network monitoring not required	0	0	Y
PAMS	Sec. 5	Only required for areas classified as serious, severe, or extreme non-attainment for O_3	0	0	Y
NCore	Sec. 3	The Nebraska portion of the Sioux City MSA has not been designated to operate an NCore site.	0	0	Y

* Unless noted otherwise, this analysis does not count monitors located in IA and SD toward meeting the minimum monitoring requirements. It does use pollutant levels measured at IA and SD monitoring sites, when determining minimum monitoring needs for ozone and PM.

Table D-2.d: 40 CFR Part 58 Appendix D Review: Grand Island MSA (Population ~ 84,800) **					
Pollutant	App. D Citation	**Review Criteria & *Comments***	Sites Required	Sites Operated	Criteria Met?
Ozone	Sec. 4.1 Table D-2	Grand Island MSA population is between 50K -350K. Monitoring is only required if current monitoring finds O_3 > 85% of NAAQS as set forth in Part 58 Appendix D Table D-2.	0	0	Y
CO	Sec. 4.2	No minimum requirement.	0	0	Y
NO_2	Sec. 4.3.2	Near-road monitoring: No requirement for CBSA < 500K.	0	0	Y
	Sec.4.3.3	Area-Wide monitoring only required if CBSA ≥ 1M (Grand Island MSA population < 1 M)	0	0	Y
	Sec. 4.3.4	Regional Administrator required monitoring: none	0	0	Y
SO_2	Sec. 4.4	*Population Weighted Emissions Index* (PWEI) = 210, which falls below 5000. No minimum number of sites required. See Table D-3 below for PWEI calculation data.	0	0	Y
		Regional Administrator required monitoring	0	0	Y
Lead	Sec. 4.5 (a)	There are no sources emitting ≥ 0.5 tpy of lead	0	0	Y
	Sec. 4.5 (b)	Community-based lead monitoring is only required when CBSA population ≥ 500K.	0	0	Y
	Sec. 4.5 (c)	Regional Administrator required monitoring: none	0	0	Y
PM_{10}	Sec. 4.6 Table D-4	PM_{10} monitoring is not required if MSA population < 100,000	0	0	Y
$PM_{2.5}$	Sec 4.7 Table D-5	Grand Islands's CBSA population is between 50K – 500K and $PM_{2.5}$ levels are < 85% of NAAQS (*See Design Values in Attachment B)*	0	1 (1)	Y
	Sec 4.7.2	Continuous monitoring is not required	0	0	Y
	Sec. 4.7.4	$PM_{2.5}$ Speciation Trends Network monitoring is not required	0	0	Y
PAMS	Sec. 5	Only required for areas classified as serious, severe, or extreme non-attainment for O_3	0	0	Y
NCore	Sec. 3	The Grand Island MSA has not been designated to operate a NCore site	0	0	Y

Footnote:
(1) The $PM_{2.5}$ site operated in Grand Island is Nebraska's transport site.

Table D-3: Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs) [(a) (b) (c)] Page 1 of 3

CBSA	County	Population 7/1/14 [(c)]	SO_2 Emissions (tons/year)		SO_2 Emissions (% Change)	PWEI [(a) (b)]	
			2008 EI	2011 EI		2008 EI	2011 EI
Omaha MSA	Douglas Co., NE	543,244	15,288	14,311	-6%	37,159	**27,747**
	Sarpy Co., NE	172,193	58	29	-50%		
	Cass Co., NE	25,524	1,226	1,094	-11%		
	Saunders Co. NE	20,919	179	20	-89%		
	Washington Co., NE	20,258	25	60	140%		
	Pottawattamie Co., IA	93,128	22,243	15,101	-32%		
	Mills Co., IA	14,831	27	22	-19%		
	Harrison Co., IA	14,324	41	43	5%		
	Totals	**904,421**	**41,086**	**30,679**	**-25%**		
Lincoln MSA	Lancaster Co., NE	301,795	5,027	4,254	-15%	1,616	**1,371**
	Seward Co., NE	17,150	40	43	8%		
	Totals	**318,945**	**5,067**	**4,297**	**-15%**		
Sioux City MSA	Woodbury Co., IA	102,271	35698	29,693	-17%	6,045	**5,033**
	Plymouth Co., IA	24,874	35	18	-49%		
	Dakota Co., NE	20,850	17	14	-18%		
	Dixon Co., NE	5,782	25	13	-48%		
	Union Co., SD	15,029	17	74	335%		
	Totals	**168,806**	**35,808**	**29,813**	**-17%**		

Observation: The EPA's emission inventory data indicates that SO_2 emissions from all 4 of Nebraska's MSA decreased 15% to 25% from 2008 to 2011. See Grand Island MSA data on next page.

Footnotes at bottom of page 3 of this table.

Table D-3: Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs) [(a) (b) (c)] Page 2 of 3

CBSA	County	Population 7/1/14 [(c)]	SO_2 Emissions (tons/year)		SO_2 Emissions (% Change)	PWEI [(a) (b)]	
			2008 EI	2011 EI		2008 EI	2011 EI
Grand Island MSA	Hall Co.	61,492	3,146	2,378	-24%	275	**210**
	Hamilton Co.	9,135	33	29	-12%		
	Howard Co.	6,362	18	40	122%		
	Merrick Co.	7,766	44	33	-25%		
	Total	**84,755**	**3,241**	**2480**	**-23%**		
Kearney MiSA	Buffalo Co.	48,224	87	89	2%	6	**6**
	Kearney Co.	6,644	17	15	-12%		
	Totals	**54,868**	**104**	**104**	**0%**		
Norfolk MiSA	Madison Co.	35,174	25	24	-4%	16	**13**
	Pierce Co.	7,202	35	30	-14%		
	Stanton Co.	6,069	264	206	-22%		
	Totals	**48,445**	**325**	**260**	**-20%**		
Hastings MiSA	Adams Co.	31457	2547	3324	31%	97	**126**
	Clay Co.	6315	25	17	-32%		
	Totals	**37772**	**2572**	**3341**	**30%**		
Scottsbluff MiSA	Banner Co.	764	3	1	-67%	8	**8**
	Scotts Bluff Co.	36465	205	203	-1%		
	Totals	**37229**	**208**	**204**	**-2%**		

Footnotes at bottom of page 3 of this table.

Table D-3: Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs) [(a) (b) (c)] Page 3 of 3

CBSA	County	Population 7/1/14 ()	SO_2 Emissions (tons/year)		SO_2 Emissions (% Change)	PWEI [(a) (b) (d)]	
			2008 EI	2011 EI		2008 EI	2011 EI
North Platte MiSA	Lincoln Co.	35,815	31,470	29,246	-7%	1166	**1085**
	Logan Co.	750	2	37	1750%		
	McPherson Co.	498	1	2	100%		
	Totals	**37,063**	**31,473**	**29,285**	**-7%**		
Fremont MiSA	Dodge Co.	**36,744**	**1,999**	**1426**	**-29%**	73	**52**
Columbus MiSA	Platte Co.	**32,666**	**42**	**330**	**686%**	1	**11**
Lexington MiSA	Dawson Co.	24,096	78	64	-18%	2	**2**
	Gosper Co.	1970	5	14	180%		
	Totals	**26,066**	**83**	**78**	**-6%**		
Beatrice MiSA	Gage Co.	**21,663**	**49**	**87**	**78%**	1	**2**

Footnotes:
(a) Population Weighted Emission Index (PWEI) = (CBSA Population) x (SO2 Emissions (tpy))/1,000,000
(b) SO2 Emission data was obtained from the EPA Emission Inventory database for 2008 and 2011. The 2011 EI data is the most recent data available from EPA at the time this table was created (July 2015).
(c) US Census population estimate data for 7/1/2014 was used in this table and the PWEI calculations.
(d) The PWEI was calculated using 2008 and 2011 Emission Inventory (EI) data. The PWEI calculated with 2011 EI data is currently applicable. The PWEI was also calculated with 2008 EI data to document any change that might have occurred.

Introduction

On August 21, 2015 EPA finalized changes to 40 CFR Part 51 Subpart BB, §51.1200 - §51.1205 (a.k.a. the Data Requirements Rule or DRR). The DRR requires air agencies to provide data to characterize current air quality in areas surrounding sources of SO_2 emitting 2,000 tpy or more, to identify maximum 1-hour concentrations of SO_2 in ambient air. To address these requirements, air agencies may either submit modeling or monitoring data in the areas of DRR-affected sources, or assign permit limits to these sources. Nebraska Public Power District (NPPD)'s Sheldon Station near Hallam, NE is one of the DRR-affected sources for which NDEQ proposes to submit monitoring data to satisfy the requirements of the DRR.

Site Selection

Emission Sources

The only major SO_2 emission source in the vicinity of Sheldon Station is Sheldon Station itself, located in a rural area near Hallam, NE. Sheldon Station is a coal-fired electrical generating unit (EGU) capable of generating 225 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, Sheldon Station's total SO_2 emissions (for Units 1 and 2) have ranged from approximately 2,600 tpy to 5,400 tpy with the average being approximately 3,800 tpy. For 2015, the Units 1 and 2 total SO_2 emissions were 2,598 tons. Figure E-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

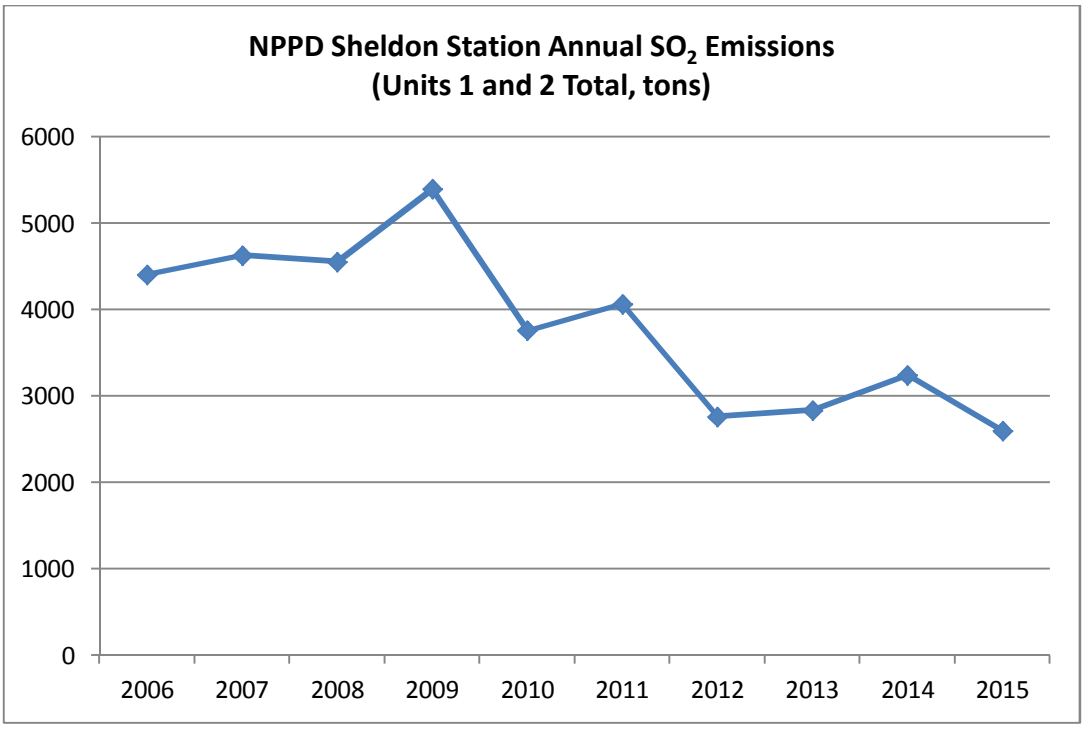


Figure E-1: NPPD Sheldon Station Annual SO_2 Emissions

Quarterly Acid Rain Program data from the past 10 years indicate that, in general, the highest SO_2 emissions from the facility occur during the 3rd quarter. This is to be expected during the hottest

months of the year due to increased demand on power stations for cooling needs. Figure E-2 demonstrates these trends.

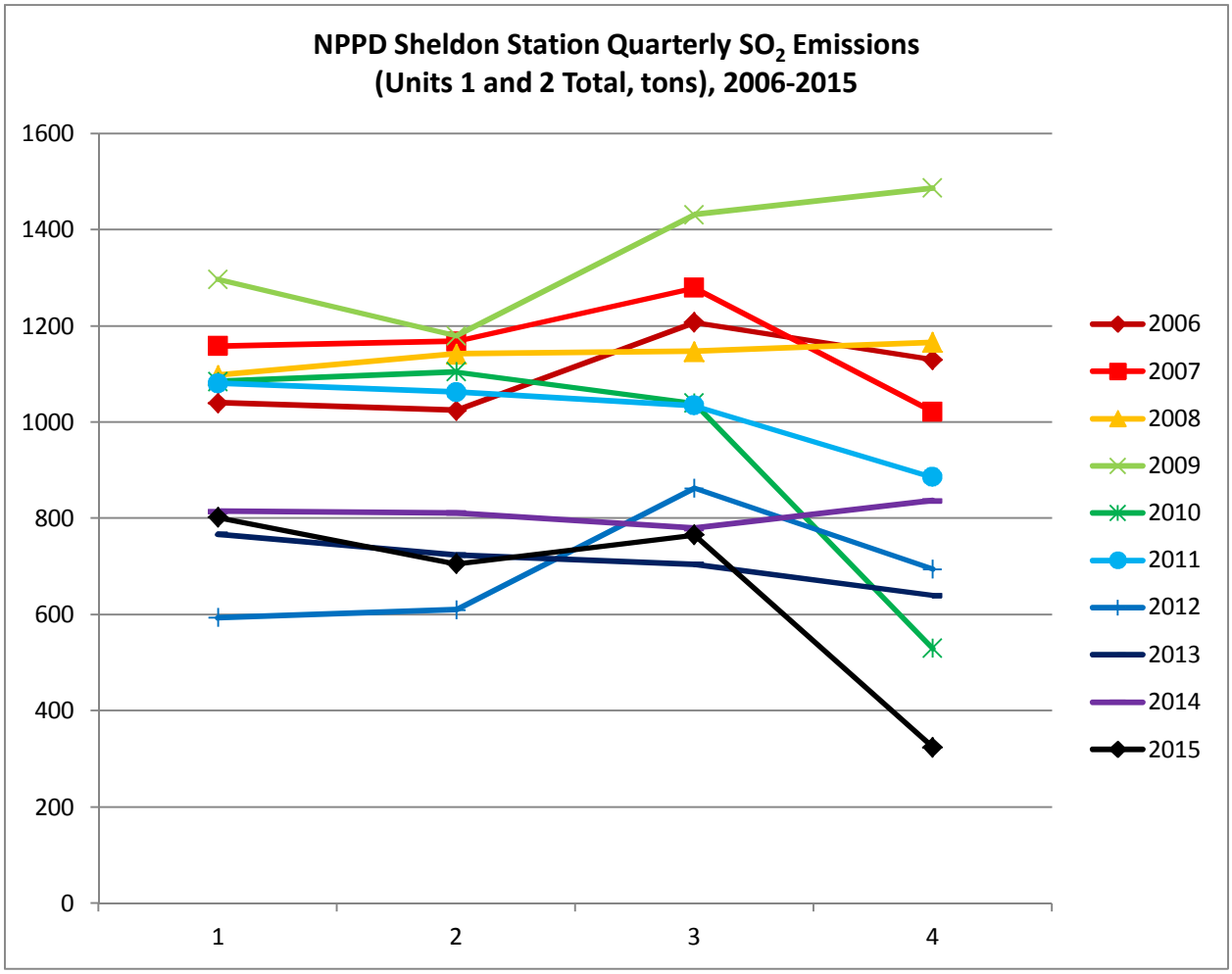


Figure E-2: NPPD Sheldon Station Quarterly SO_2 Emissions

As of this writing, NPPD is in the process of raising the stacks on both Units 1 and 2. According to PSD permit modifications effective April 15, 2016, NPPD ceased operation of both units at Sheldon Station on April 18, 2016 until stack construction is completed, with the stack height at Unit 1 scheduled to be completed by July 2, 2016 per a consent order between NDEQ and NPPD. Modeling conducted to help determine necessary stack heights to, at a minimum, ensure attainment with the 2010 1-hour SO_2 NAAQS was conducted by NPPD's consultant – HDR, Inc. – and is discussed below in *Existing Modeling*.

Additionally, NPPD has entered partnership with Monolith Materials – soon to be building a natural gas-based carbon black production facility adjacent to Sheldon Station – to utilize hydrogen, a co-product of Monolith's carbon black process, to replace coal as a fuel source for Unit 2 at Sheldon Station with an expected completion date for the conversion by the end of 2019. Conversion of Unit 2 to hydrogen fuel will essentially eliminate SO_2 (and other) emissions from this unit. Upon assessing the success of conversion at Unit 2 and sufficient hydrogen supply from Monolith, NPPD also intends to convert Unit 1 to hydrogen fuel in the following years.

Existing Air Quality Data
There are no previous or existing SO_2 monitors in the vicinity of Sheldon Station.

Existing Modeling
While conducting modeling in support of determining necessary stack heights at Sheldon Station, HDR, Inc. produced maps showing the areas receiving the highest levels of SO_2 from Sheldon Station, following the completion of the stack height adjustments at Units 1 and 2. The model is based on the extended stack heights as well as actual hourly emissions data, reflecting actual measured stack exhaust temperatures and exhaust flows and thus best representing where plumes have maximum impact at ground level. The modeling protocol was developed to be consistent with the DRR modeling TAD, and is included at the end of this attachment. Figures E-3 and E-4 show these areas in relation to the location of Sheldon Station and greater detail of the area modeling the highest SO_2 concentrations as it overlaps NPPD-owned and adjacent private property, respectively.

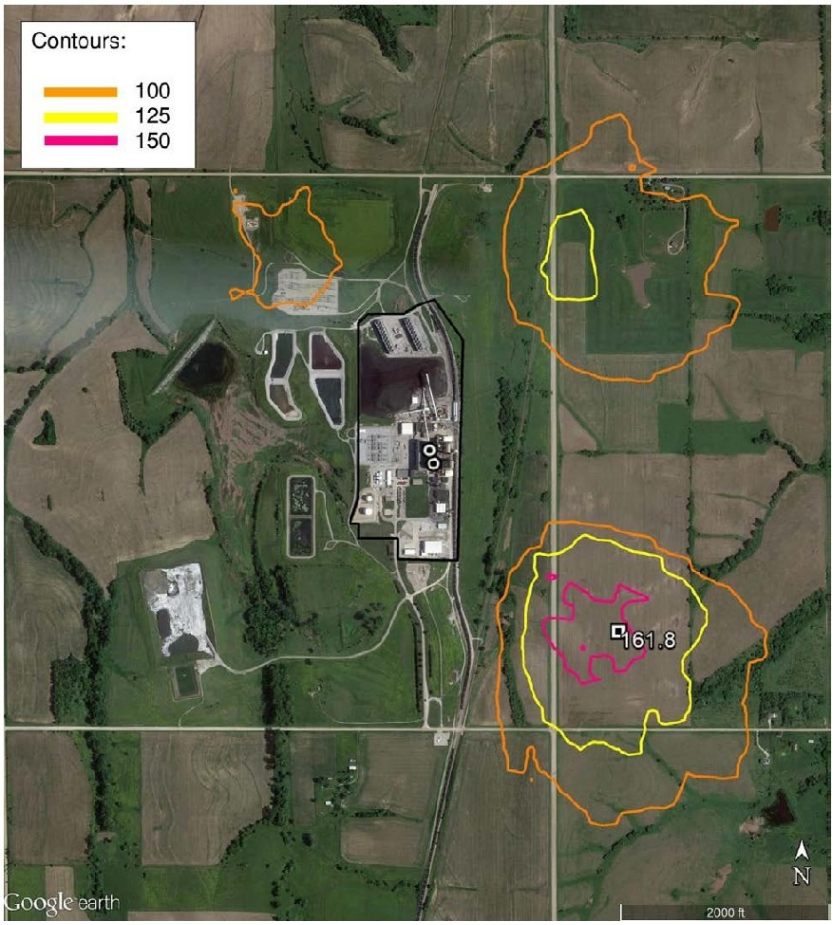


Figure E-3: NPPD Sheldon Station Vicinity and Modeled Highest SO_2 Impact Areas (SO_2 values as µg/m3)

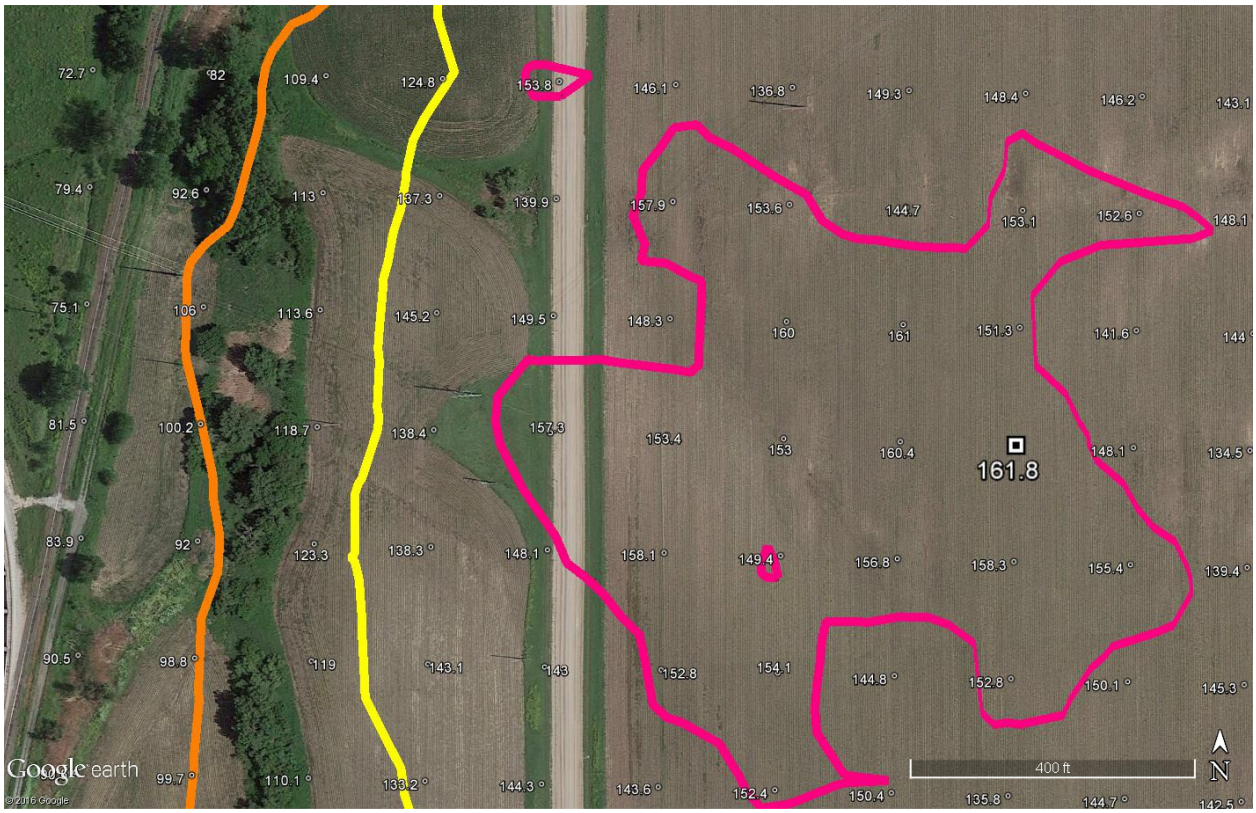


Figure E-4: Close-up of Highest Modeled SO_2 Impact Area, NPPD Sheldon Station

Meteorological Data

Relevant meteorological data has been taken into consideration in the modeling conducted by HDR, Inc., as outlined below in the modeling protocol utilized by HDR.

Geographic Influences

While there is some relief in the vicinity of Sheldon Station, the overall landscape of this part of the state is generally flat, i.e., there are no mountain ranges or other geographic characteristics of the area that would greatly influence dispersion. Any geographic influence has been accounted for in the modeling conducted by HDR, Inc., as outlined below in the modeling protocol utilized by HDR.

Site Determination

Because modeling conducted by HDR, Inc. maps areas of greatest influence from SO_2 emissions from Sheldon Station, NDEQ was able to narrow down possible monitoring site locations with relative ease. When also considering that the area of highest influence is modeled to overlay a portion of NPPD property where power to the monitoring station is feasible and access is fairly simple, determination of a monitoring site to meet DRR requirements for Sheldon Station is straightforward. It is also noted that the modeled SO_2 concentration at the edge of NPPD's property is only 4.5 $\mu g/m^3$ lower than the highest modeled concentration.

NDEQ therefore proposes the installation of an SO_2 monitor within the cross-hatched area on the west side of the road in Figure E-5, on NPPD property.

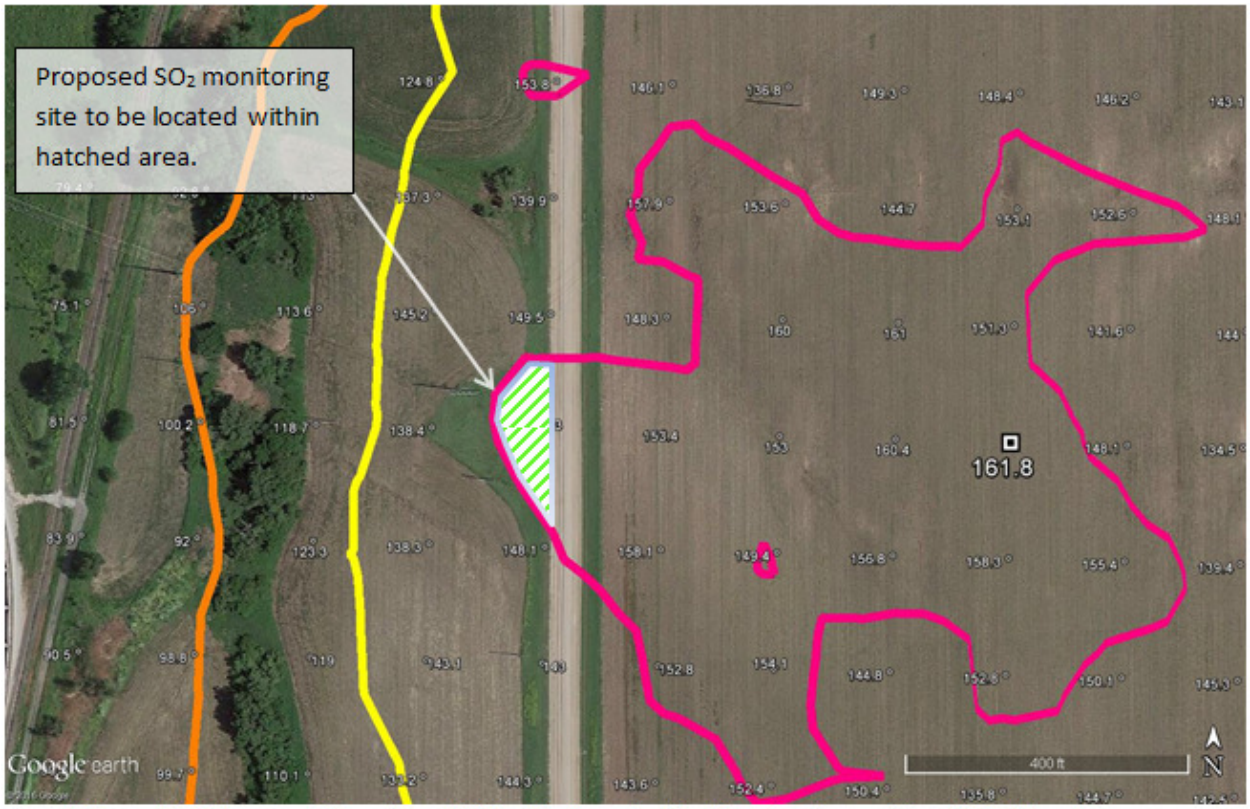


Figure E-5: Proposed Location of SO_2 Monitor for Sheldon Station to Meet DRR Requirements

The proposed site is fairly level and poses no major concerns for placement of the monitor and supporting equipment. There are power lines and associated guy wires present in the vicinity, but proper placement of the monitor trailer will prevent concerns associated with these. Figure E-6 provides photos of the proposed site and its surroundings.

Proposed monitoring site as seen from county road east of Sheldon Station (view looking west)

View looking north from proposed monitoring site for Sheldon Station

View looking east from proposed monitoring site for Sheldon Station

Figure E-6: Photos of proposed monitoring site for Sheldon Station (continued on following page)

View looking south from proposed monitoring site for Sheldon Station

View looking toward Sheldon Station (northwest) from proposed monitoring site

Figure E-6 (cont'd): Photos of proposed monitoring site for Sheldon Station

Because Sheldon Station is the only major SO_2 source in the vicinity and is in a rural area with limited impact on human health in the vicinity, the NDEQ feels confident that the single proposed monitoring location will suffice to satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility, in addition to stack height extensions already underway, NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding.

While fine details are yet to be determined, it is expected at this time that NDEQ will provide funds to Lincoln-Lancaster County Health Department (LLCHD) through their Section 105 agreement to partially cover capital costs for installation of this monitor, with the remainder of expenses being covered by LLCHD and NPPD. It is anticipated that LLCHD will operate the monitor and bear associated operation and maintenance costs with further assistance from NDEQ as funds allow.

Proposed SO_2 Monitoring Site: Additional Information and Part 58 Compliance Review

The proposed SO_2 monitoring location is to be a micro-scale, source-oriented site with respect to NPPD's Sheldon Station, a coal-fired electrical generating unit north of Hallam, NE. The site is in a rural area of Lancaster County in a grassed area on NPPD property. It is west and adjacent to SW 42nd Street and approximately 935 feet north of W Pella Road. The approximate Lat/Long coordinates are 40° 33' 17" N and 96° 46' 49" W. The location of the proposed site is shown in Figure E-5. Also see photos of site location in Figure E-6.

The proposed site will meet applicable requirements of 40 CFR Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: LLCHD will operate the site, and NDEQ will provide technical and audit support. Both agencies have experience operating gaseous samplers and meeting Appendix A QA requirements. Operating, maintenance and QA requirements will comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This will not be a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: The proposed site will utilize a continuous FEM SO_2 analyzer capable of taking 1-minute SO_2 readings.

Other equipment will include a data logger or computer capable of storing the 1-minute analyzer data; and two sets of calibration equipment (i.e., a calibrator, a zero air system and EPA-protocol SO_2 calibration gas). One set is for annual calibration and biweekly zero/span/precision checks and the other is for audits.

The make and model of the FEM analyzer, calibrator and zero air system have not been finalized. The FEM analyzer will be either purchased as a new unit or be no more than 5 years old. The calibrator and zero air system used will meet the specifications required for the FEM analyzer. All equipment will meet 40 CFR Part 58 Appendix C requirements.

Analytical equipment will be housed in a temperature-controlled enclosure that maintains interior temperatures between 20° to 30° C.

Appendix D – Network Design Criteria: Modeling was performed to identify the highest concentration area for the site. The proposed location meets the criteria for a microscale site as set forth in Appendix E Section 4.4.

Appendix E - Probe and Monitoring Path Siting Criteria: The preliminary site review sheet (below) demonstrates that the site will meet Appendix E requirements.

Nebraska NAMS/SLAMS Siting Criteria Review Sheet for Sulfur Dioxide

Pre-Siting Review for proposed SO_2 site at NPPD's Sheldon Station

Agency: Nebraska Department of Environmental Quality :

Location: Approximately 935 feet north of W Pella Road on the west side of SW 42 Street in Lancaster County at NPPD's Sheldon Station

City & State: Rural area north of Hallam, NE

AIRS Site ID: Proposed site - To be assigned (31-109-nnnn)

Date: May 11, 2016

Reviewer: Jim Yeggy

Monitoring Objective: Source-oriented		Scale: Micro-scale
40 CFR Part 58 Appendix E Criteria	**Requirements**	**Review Comments**
Section 2: Horizontal & vertical probe placement	2 to 15 m above ground	Analyzer will be housed within an enclosed trailer or dedicated enclosure structure. Inlet will be constructed to comply with inlet placement criteria. Anticipated inlet height ~3 m.
	At least 1 m from supporting structure	
	If on side of building, should be on side of prevailing winter wind	Not applicable.
Section 3: Spacing from minor sources	No furnace or other minor SO_2 sources nearby	OK
Section 4: Spacing from obstructions	Distance from obstacle to probe at least 2x the obstacle height above the probe	OK
	Exceptions for street canyon or building mounted inlets	Not applicable
Section 5: Spacing from trees	At least 10 m from tree drip-line	OK. The closest trees are ~ 80 M form proposed site.
	Microscale sites: no trees between source and probe	OK. The source is the 176 ft high stacks. The trees between the stacks and proposed site are ~ 30 ft tall. Also the modeling inputs included these trees.
Section 6: Spacing from Roadways	Not applicable to SO_2	Not applicable
General Comments: None		

Sulfur Dioxide 1-Hour NAAQS Designations Modeling Protocol
Nebraska Public Power District, Sheldon Station (Facility ID #33563)
Hallam, NE
July 15, 2015

INTRODUCTION

This modeling protocol addresses proposed dispersion modeling for the Nebraska Public Power District (NPPD) Sheldon Station, in Lancaster County, near Hallam, Nebraska. The protocol summarizes the information that will be used to conduct dispersion modeling with respect to the National Ambient Air Quality Standard (NAAQS) for 1-hour average sulfur dioxide (SO_2) concentration, which is equal to 75 parts per billion (ppb) or approximately 196.5 micrograms per cubic meter ($\mu g/m^3$)

This protocol has been prepared for 1-hour SO_2 State Implementation Plan (SIP) dispersion modeling and is being submitted to the Nebraska Department of Environmental Quality (NDEQ) for review and approval. The results of the dispersion modeling analysis will be used by the NDEQ to formulate recommendations to EPA on the NAAQS attainment/nonattainment area designations for SIP purposes. EPA will review and use this information, along with any available monitoring data, to propose and finalize attainment/nonattainment designations for affected areas with respect to the 1- hour SO_2 NAAQS.

MODELING SOFTWARE

The following EPA modeling software will be used for this analysis.

- AERMOD (Version 15181)
- BPIP-Prime (Version 04274)
- AERMAP (Version 11103)

The AERMOD model will be executed using the rural dispersion mode, given the predominantly rural character of the land surrounding the subject facility.

METEOROLOGICAL DATA

Meteorological data for this analysis will be provided by NDEQ in preprocessed format, based on the most recent versions of AERMET (Version 14134), AERMINUTE (Version 14337), and AERSURFACE (Version 13016).

The surface meteorological will be from Lincoln, Nebraska and the upper air data will be from Omaha, Nebraska, which are considered representative of the Hallam area. This analysis will use three years of meteorological data for the years 2012 through 2014.

POLLUTANT AND AVERAGING PERIOD

The AERMOD model will be executed for SO_2 for 1-hour averages. By selecting SO_2 as the pollutant and 1-hour as the averaging period, AERMOD will automatically average the results over the three years of meteorology. The model result for comparison with the 1-hour SO_2 NAAQS of 196.5 $\mu g/m^3$ (75 parts per billion) will be the maximum of the 3-year average of the 4^{th} highest (99^{th} percentile) daily 1-hour maximum concentration, as automatically output by AERMOD from the multiyear (3-year) model run.

POINT SOURCES

Emission points to be modeled for Sheldon Station will include only the Unit 1 and 2 coal boiler stacks. The NDEQ and EPA have reviewed the other emissions sources in the region and determined that there are no nearby sources with large enough emissions to be included in a modeling analysis together with Sheldon Station. Thus, total impact for comparison with the NAAQS will consist of Unit 1 for Scenario 1, and Unit 1 and Unit 2 combined for Scenario 2, plus the background concentration (see below). The AERMOD output will be set up to produce source contributions for each unit, plus the total ("ALL" source group) concentrations.

The actual, hourly SO_2 emissions measured by the continuous emissions monitoring system (CEMS) on the Unit 1and 2 stacks will be used for this analysis, by using the optional hourly emissions input file for input to AERMOD. The single hourly emissions file will correspond with the same period of record represented by the three year period of meteorological data (2012-2014) input to AERMOD.

In addition to hourly SO_2 emissions in grams/second, the hourly emissions file will include hourly average stack gas exhaust temperature and exhaust gas exit velocity. These additional hourly parameters will be based on measurements recorded by the same CEMS systems being used to track hourly SO_2 emissions for each stack, in accordance with the routine monitoring requirements under 40 CFR 60 (New Source Performance Standards) and 40 CFR 75 (Continuous Emission Monitoring under the Acid Rain program).

In addition to the stack heights and the hourly emissions and stack parameters described above, the only other stack parameters needed by AERMOD are the stack exit diameters. The stack diameters to be input for Units 1 and 2 will be identical at 11.6 feet (3.536 m), based on the current design of these stacks.

BUILDING DOWNWASH INPUTS

The AERMOD input will include building downwash parameters calculated using the EPA's Building Profile Input Program "PRIME" (BPIPPRIME) software (Version 04274). The BPIPPRIME input and output (I/O) files will be provided along with all the other modeling I/O files on CD with the final modeling report.

TERRAIN ELEVATIONS

Terrain data will be processed to determine receptor elevations and "hill heights" for input to AERMOD using AERMAP, Version 11103. The AERMAP input will include terrain elevation data from the National Elevation Dataset (NED). The NED data available on-line in 1 arc-second spacing from the US Geological Survey will be used for this analysis. The receptor grid (extent defined below) will include receptors only in UTM Zone 14. The NED data for this analysis will be based on North American Datum (NAD) 83 for horizontal locations and NAD88 for vertical locations (elevations).

The NED terrain file downloaded from the USGS will be provided on CD along with all other model I/O files.

RECEPTOR GRID

Given there will be no nearby facilities included in this analysis, the receptor grid can be focused on just Sheldon Station. The receptor grid will include the following spacing on the fence lines and at downwind distances from the nearest fence lines.

- 50 meter spacing on the fence line
- 50 meter spacing from the fence to 1 kilometer from the fence
- 100 meter spacing from 1 kilometer to 2 kilometers from the fence
- 250 meter spacing from 2 kilometer to 5 kilometers from the fence
- 500 meter spacing from 5 kilometer to 7 kilometers from the fence
- 1000 meter spacing from 7 to 10 kilometers from the fence

The extent of this receptor grid is shown in the figure at the end of this protocol, and based on prior modeling experience, is expected to encompass areas of maximum 1-hour SO_2 concentration.

Any hot spots in the 250 meter and coarser receptor spacing will be refined by performing a separate model run centered on the hot spot, with a 1000-meter by 1000-meter grid of 50-meter spacing centered on the highest impact receptor from the initial model run.

BACKGROUND CONCENTRATION

The background 1-hour SO_2 concentration will be based on data from the rural monitor located at Cedar Bluff Reservoir (EPA Site ID number 201950001) in Trego County in western Kansas. This monitor is far from any nearby large SO_2 sources, so is representative of background concentrations in rural areas of Nebraska exclusive of nearby major source impacts.

Given that there are apparent monitor operational problems evidenced in the data for the most recent year of complete data, 2014, the background concentration will be based on the next most recent three years of available data, those being 2011-2013. The table below shows the calculated average of the
99th percentile daily maximum 1-hour value as 8.7 µg/m^3 across the three years. Therefore, a background 1-hour SO_2 concentration of 9 µg/m^3 will be used for this analysis.

Year	Daily Maximum 1-hour,	
	(ppm)	(µg/m^3)
2011	3	7.9
2012	4	10.5
2013	3	7.9
Average	**3.3**	**8.7**

MODELING REPORT

A final modeling report will be submitted to NDEQ for review, describing modeling procedures (attaching this protocol), mitigation features (design changes), if any, proposed by the utility, and including all model and preprocessor input and output files on CD/DVD, with the exception of the meteorological data preprocessing files given that the NDEQ performed the meteorological data preprocessing. The data on CD/DVD will include all the hourly emissions (CEM) data files used to input actual emissions to AERMOD.

The modeling report will contain graphics displaying, at a minimum,

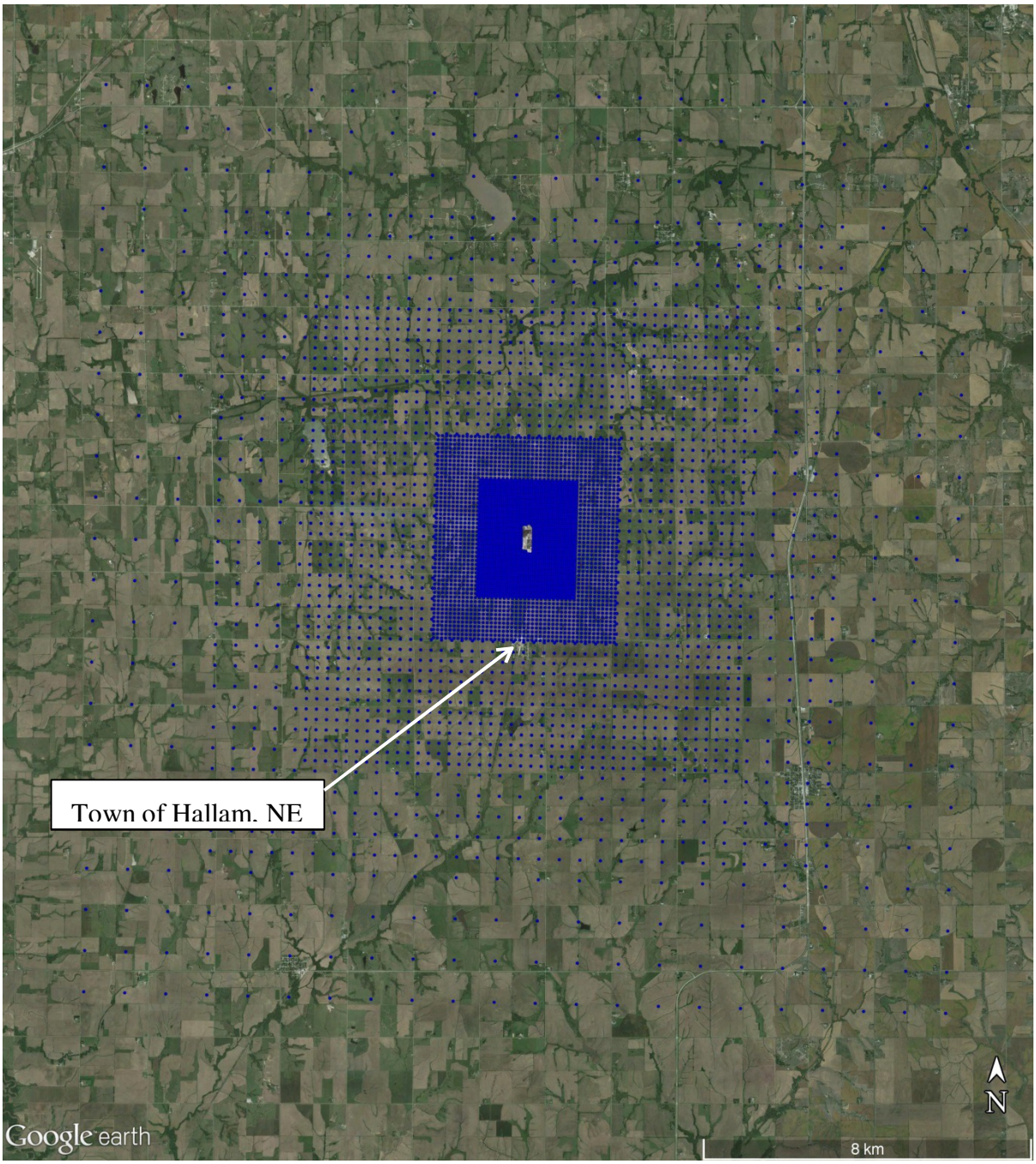
- source locations,
- receptor locations,
- meteorological data locations,
- background monitor location,
- contour plots displaying modeled design values (for general receptor grid and any refined grid model runs), and
- a bar chart showing background plus source impact for comparison with the NAAQS.

A copy of the final modeling files used to support the analysis will be provided on CD/DVD

to: Lisa Alam
c/o Records Management
Nebraska Department of Environmental Quality
1200 "N" Street, Suite 400
P.O. Box 98922
Lincoln, Nebraska 68509-8922

The data and graphics files included on the CD/DVD will include as a minimum:

- AERMOD input and output files (source and receptor input data file, hourly emissions file, output listing file, and output graphics/plot file)
- Contour plot and bar chart graphics file(s)
- Source location graphic file (*.kml) from Google Earth
- Source, met data and background monitor location map/graphic
- AERMAP terrain data processor input file
- Preprocessed meteorological data (*.sfc and *.pfl) files provided by NDEQ
- BPIP-PRIME preprocessor input and output files


Town of Hallam, NE
N
8 km
Google earth

Introduction

On August 21, 2015 EPA finalized changes to 40 CFR Part 51 Subpart BB, §51.1200 - §51.1205 (a.k.a. the Data Requirements Rule or DRR). The DRR requires air agencies to provide data to characterize current air quality in areas surrounding sources of SO_2 emitting 2,000 tpy or more, to identify maximum 1-hour concentrations of SO_2 in ambient air. To address these requirements, air agencies may either submit modeling or monitoring data in the areas of DRR-affected sources, or assign permit limits to these sources. Omaha Public Power District (OPPD)'s North Omaha Station in Omaha, NE is one of the DRR-affected sources for which NDEQ proposes to submit monitoring data to satisfy the requirements of the DRR.

Site Selection

Emission Sources

The main major SO_2 emission sources in the vicinity of North Omaha Station are the Station itself, Eppley Airfield in Omaha, and Mid-American Power Plant near Council Bluffs, IA. North Omaha Station has historically been a coal-fired electrical generating unit (EGU), and is capable of generating approximately 650 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, North Omaha Station's total SO_2 emissions (for Units 1 through 5) have ranged from approximately 10,500 tpy to 15,000 tpy with the average being approximately 13,000 tpy. For 2015, the total SO_2 emissions for all units were 13,892 tons. Figure F-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

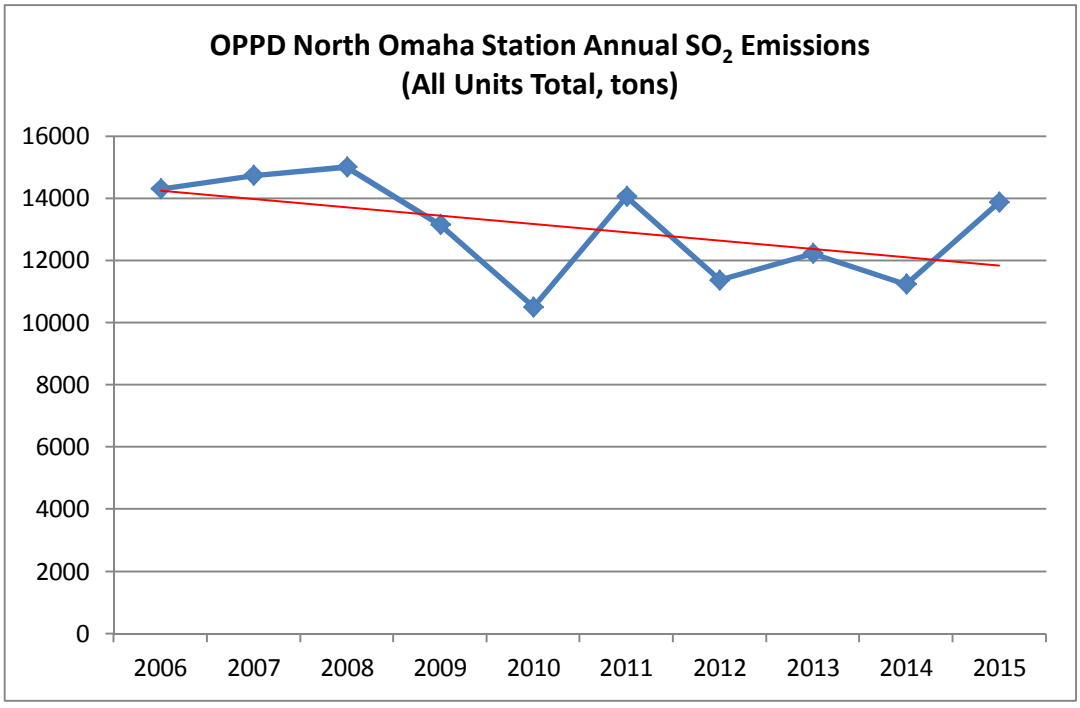


Figure F-1: OPPD North Omaha Station Annual SO_2 Emissions

Quarterly Acid Rain Program data from the past 10 years indicate that, in general with few exceptions, the highest SO_2 emissions from the facility occur during the 3rd quarter and sometimes 4th quarter. This is to be expected during the hottest months of the year due to increased demand on power stations for cooling needs. Figure F-2 demonstrates these trends.

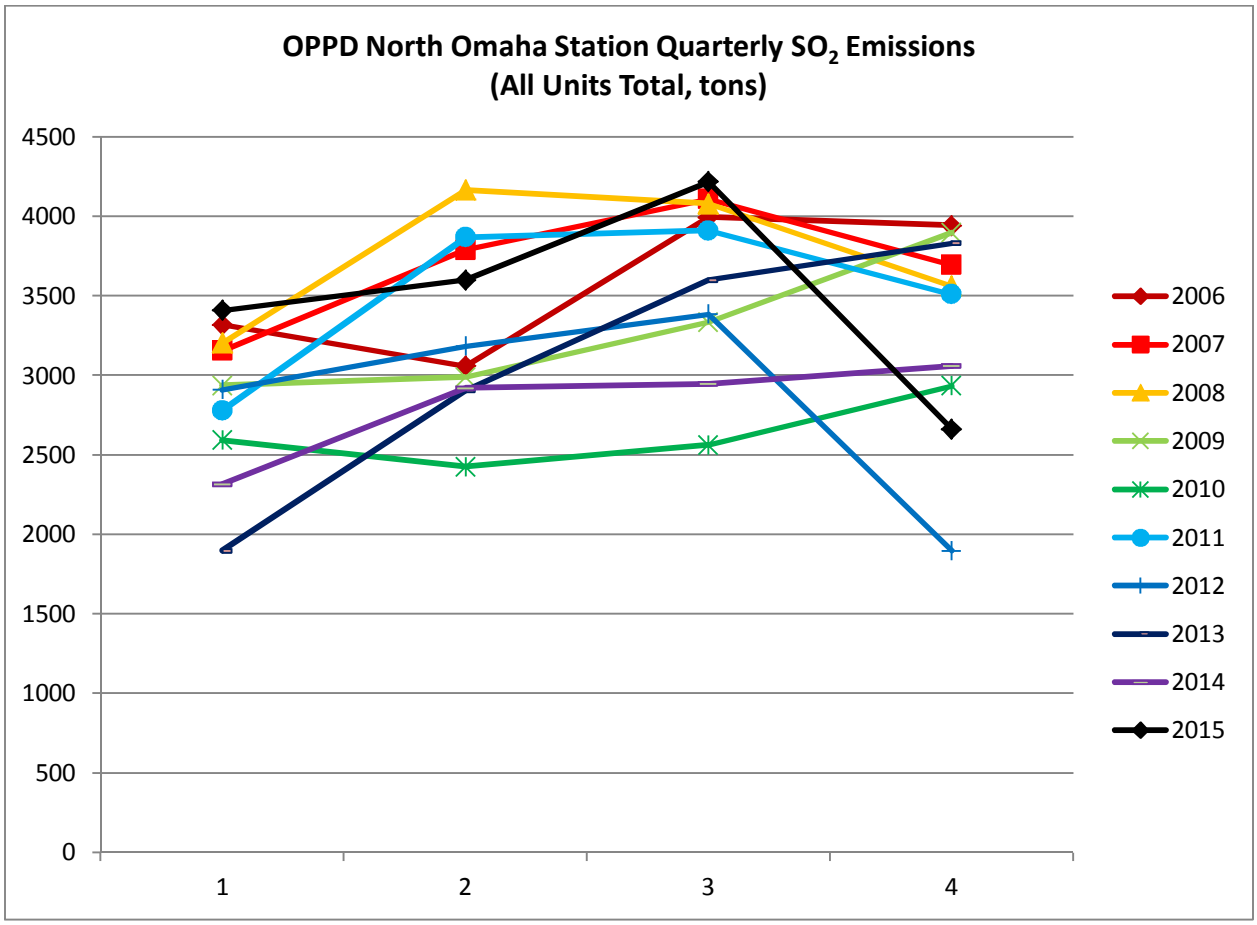


Figure F-2: OPPD North Omaha Station Quarterly SO_2 Emissions

In 2014, the OPPD board of directors approved a plan to retire three of the five coal-burning units at North Omaha Station, and to install emissions controls on the remaining two units which will be refueled in 2023 with natural gas. OPPD ceased coal operation of the first three coal-burning units in April 2016 (these units are still capable of firing natural gas); these three units accounted for approximately 47% of the facility's annual SO_2 emissions, on average, while burning coal.

Existing Air Quality Data

Due to existing SO_2 monitors in the Omaha area, including the Whitmore monitor, data are available to characterize air quality with respect to SO_2 for an extended period of time. As demonstrated in Figure F-3, excerpted from NDEQ's *2015 Ambient Air Monitoring Network Plan & Assessment*, there is a significant overall downward trend in maximum annual average SO_2 in the Omaha MSA since measurement collection began, and also a significant decline in the range of maximum annual values in more recent years.

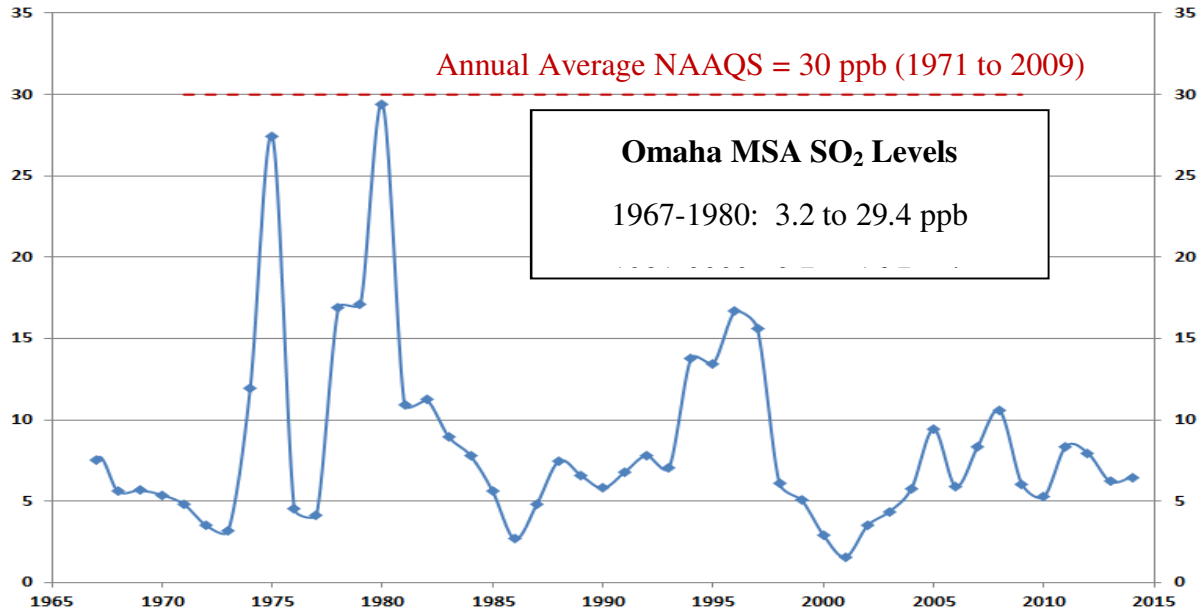


Figure F-3: Maximum Annual Average SO2 in Omaha MSA: 1967-2014

As demonstrated in Figure F-4, the Whitmore monitor has recorded an overall downward trend in annual 99th percentile SO_2 values since 2006, as well as declines in the three-year design values. No design values have exceeded the 2010 1-hour SO_2 NAAQS since 2009.

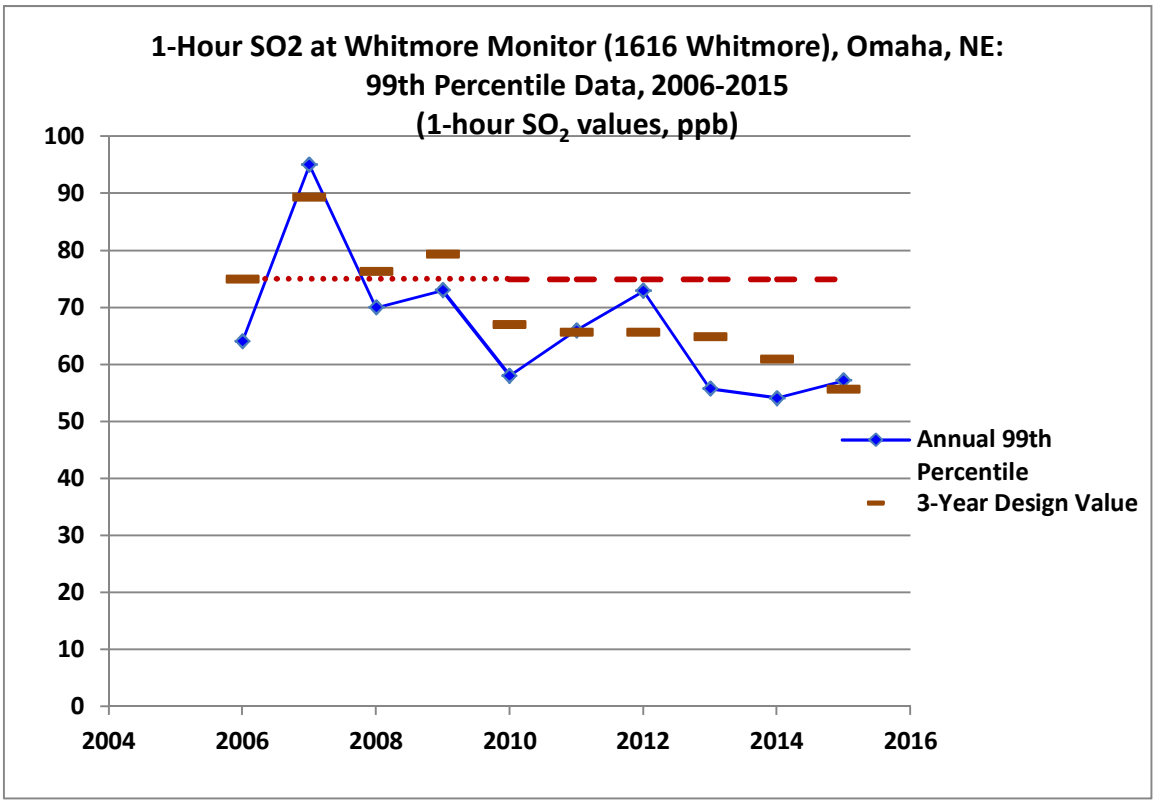


Figure F-4: 99th Percentile and Design Values of 1-hour SO_2 at Whitmore Monitor, 2006-2015

Existing Modeling and Studies

A 1997 University of Nebraska master's thesis (*Examination of SO_2 Ambient Air Monitoring Location Using Air Dispersion Modeling* by Eitan Tsabari) examined SO_2 concentrations in the north Omaha area and the use of an air dispersion model to appropriately identify monitoring locations. The study identified the highest 1-hour SO_2 concentrations to the southeast of North Omaha Station, and modeled SO_2 concentrations (while consistently higher than measured concentrations) also fell within this area.

NDEQ conducted AERMOD modeling in June 2016 in support of considering monitor placement for North Omaha Station for DRR purposes. This more recent modeling indicates the highest average 1-hour SO_2 concentrations fall to the southeast and west of North Omaha Station, as indicated in Figure F-5.

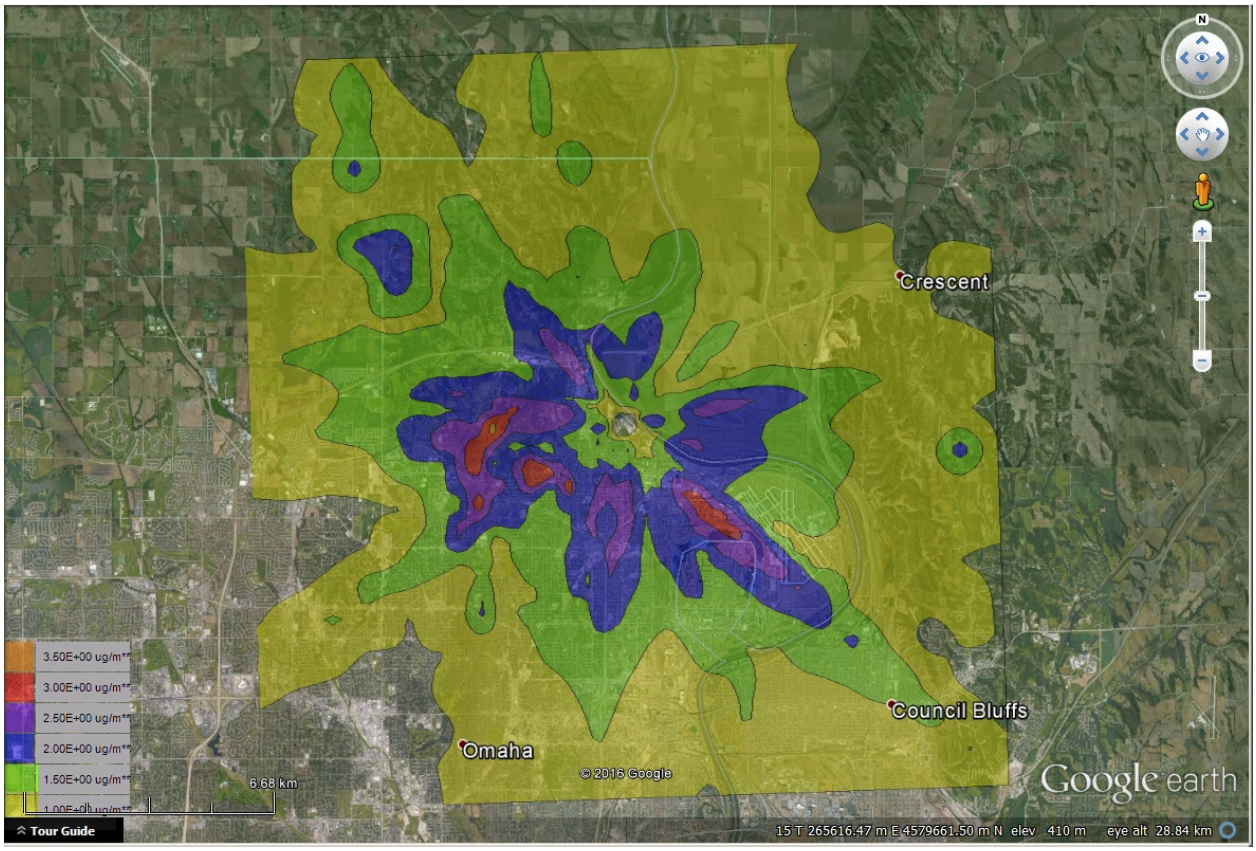


Figure F-5: NDEQ-modeled First-high Average 1-hour SO_2 Concentrations, 2016

Meteorological Data

As shown in Figure F-6, wind roses from the nearest meteorological stations (OMA and CBF) indicate general prevalent wind direction in the area as NW/NNW or S/SSE.

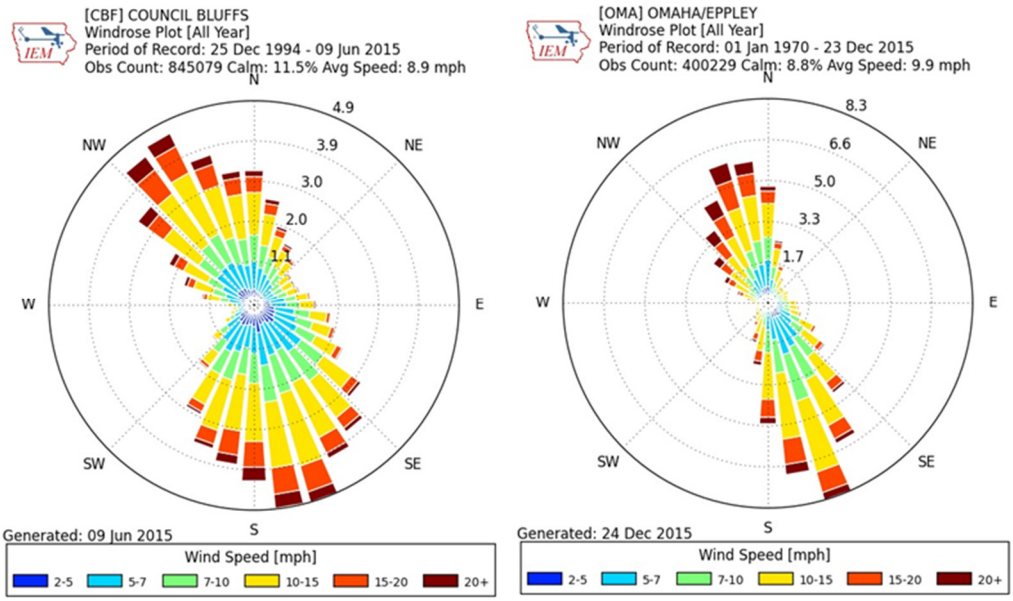


Figure F-6: Omaha Area Wind Roses

As shown in Figure F-7, the current Whitmore monitor is positioned to record ambient SO_2 concentrations impacted by OPPD's North Omaha Station; the monitor was also originally specifically sited in a socioeconomically disadvantaged area due to environmental justice concerns. An analysis of 2012 wind speed and direction data recorded at Eppley Air Field, confirmed with 2010 and 2011 data, show that all high 1-hour SO_2 impacts at the Whitmore monitor coincide with wind speeds in excess of 8 m/s and wind direction from OPPD's North Omaha Station. These data are summarized in Table F-1.

Figure F-7: Whitmore SO_2 Monitor Location Related to OPPD North Omaha Station.

Table F-1: Hourly Wind and SO_2 Data: Impacts at Whitmore Monitor (*)

						concentration	
Year	Month	Day	Hour	Ws	Wd	ppb	µg/m^3
2012	1	1	1	12.06	326	63.8	167.159
2012	1	1	2	12.23	323	80.6	211.175
2012	1	1	3	11.85	324	82.8	216.939
2012	1	1	4	10.19	322	71.1	186.285
2012	1	1	5	8.62	319	51.8	135.718
2012	1	1	13	12.69	311	65.8	172.399
2012	1	1	14	13.88	312	88.3	231.350
2012	1	1	15	13.25	312	63.3	165.849
2012	1	1	16	11.8	314	87.2	228.468
2012	1	1	21	8.54	321	53.7	140.696
2012	1	23	5	9.68	313	70.3	184.189
2012	1	23	6	10.12	318	53.9	141.220
2012	2	24	10	10.29	315	63.5	166.373
2012	2	24	11	9.56	321	52.9	138.600
2012	3	4	14	12.28	316	62.1	162.705
2012	3	4	15	13.26	322	76.9	201.481
2012	3	4	16	15.33	321	89.7	235.018
2012	3	4	17	14.95	321	93.5	244.974
2012	3	4	18	13.11	325	59.4	155.630
2012	4	7	15	9.92	321	62.3	163.229
2012	4	16	2	11.55	312	71.8	188.119
2012	4	16	3	11.16	312	93.6	245.236
2012	4	16	4	12.69	309	56.9	149.080
2012	4	16	6	10.49	313	72.7	190.477
2012	4	16	7	8.88	321	63.2	165.587
2012	4	21	16	10.77	319	61.5	161.133
2012	4	21	18	11.16	319	61.3	160.609
2012	9	30	12	1.38	226	65.3	171.089
2012	10	17	15	11.14	309	52.6	137.814
2012	10	17	17	10.51	313	63.7	166.897
2012	10	19	2	11.19	314	63.4	166.111
2012	10	19	3	11.16	316	72.9	191.001
2012	10	19	4	10.94	316	61.6	161.395
2012	10	19	5	10.55	322	63.6	166.635
2011	1	7	9	10.8	316	58.4	152.958
2011	1	7	10	11.11	317	64.9	169.910
2011	1	7	11	11.46	319	51.3	134.303

Table F-1: Hourly Wind and SO_2 Data: Impacts at Whitmore Monitor (*)

						concentration	
Year	Month	Day	Hour	Ws	Wd	ppb	µg/m^3
2011	1	7	13	11.8	322	68.4	179.263
2011	2	13	21	10.32	313	55.4	145.019
2011	2	13	22	10.44	312	55.3	144.862
2011	3	11	16	12.02	314	92.3	241.725
2011	4	1	15	10.56	308	52.9	138.574
2011	4	1	16	11.65	311	53.7	140.670
2011	4	4	1	13.16	333	52.8	138.391
2011	4	4	2	11.06	322	59.8	156.783
2011	4	16	7	8.33	316	65.2	170.879
2011	4	23	8	7.46	315	63.8	167.132
2011	10	14	10	8.49	317	60.7	159.141
2011	10	14	12	10.44	319	53.9	141.168
2011	10	30	14	10.22	304	53.0	138.731
2011	10	30	17	8.42	314	56.3	147.508
2011	11	9	15	10.15	313	66.0	173.028
2011	12	27	5	9.1	313	60.7	159.063
2011	12	27	6	9.34	317	59.5	155.840
2011	12	31	22			60.4	158.119
2011	12	31	24			54.0	141.325
2010	11	29	21	10.78	318	56.7	148.635
2010	11	29	24	11.09	320	57.3	150.155
2010	12	11	14	14.4	313	53.3	139.701
2010	12	11	15	15.24	316	64.6	169.150
2010	12	11	16	15.8	320	74.1	194.119
2010	12	11	17	16.29	323	52.3	137.028

(*) Data were filtered to only show instances where the hourly SO_2 concentration exceeded 50 ppb. Note, no readings above 50 ppb were recorded in 2010 aside from those listed for November and December.

Geographic Influences

As indicated in Figure F-7, much of the area south of OPPD's North Omaha Station consists of metropolitan development, while much of the area north and west of North Omaha Station is wooded or farmland. It should be noted that an SO_2 monitor was previously placed in the wooded area north of North Omaha Station, but was decommissioned in 2010 due to consistently low recordings; it is likely that this monitor was impacted by tree canopy.

Site Determination

The foregoing information, taken together, provides a strong basis for the use of the existing Whitmore monitor to satisfy DRR requirements for the area around OPPD's North Omaha Station.

The monitor is currently placed in an area of prevalent wind direction from the facility, and a wind study has demonstrated that the days with highest SO_2 impacts at Whitmore monitor coincide with wind speeds above 8 m/s from the direction of the facility. Current air dispersion modeling also indicates that the Whitmore monitor lies within the area indicated to have the highest 1-hour SO_2 concentrations. Further, this monitor was specifically placed in a socioeconomically disadvantaged area in recognition of the disproportionately negative health and environmental impacts that these communities experience related to various environmental regulations. It is therefore most critical to monitor ambient SO_2 concentrations in this area. Finally, it is important to consider the overall downward trends in ambient SO_2 in the Omaha area and the significant decreases in SO_2 emissions already expected from the shutdown of three coal-fired units and conversion of the remaining two units within three years of the end of the monitoring period required under the DRR. For these reasons, the NDEQ justifies the use of the existing Whitmore monitor for DRR purposes for North Omaha Station and does not propose to place additional monitors.

1616 Whitmore Street SO_2 Monitoring Site in Omaha , NE: Additional Information

Detailed information on this existing site can be found in Attachment A (see above in this network plan), including purpose, scale and monitor specifications. This site is operated by DCHD in accordance with the requirements of Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: Operating, maintenance and QA requirements comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This is not a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: This site is equipped with a Thermo 43c-tle (EPA Method EQSA-0486-060) SO_2 analyzer. Environics 6100 calibrators, Teledyne API Model 701 Zero Air System, and EPA –protocol SO_2 calibration gas (cal-gas) are used to perform calibrations, zero/span/precision checks (z/s/pc)and audits. Audits are performed with a different Environics 6100 calibrator and cal –gas tank and by a different person than calibrations and z/s/pcs. There is a Teledyne API Model 751H Portable Zero Air System for audits.

Analytical equipment is housed in a temperature-controlled enclosure that maintains interior temperatures between 20^o to 30^o C.

Appendix D – Network Design Criteria: The site meets the criteria for a neighborhood-scale site as set forth in Appendix E Section 4.4. It is located in a socioeconomically depressed area.

Appendix E - Probe and Monitoring Path Siting Criteria: The site review sheet from November 2015, reprinted below, verifies that the site meets Appendix E requirements.

DCHD Siting Criteria Review Sheet for Gaseous Pollutant Monitoring Sites Except Near-Road and Microscale sites

(Also not applicable to open path monitors)

Site Location: 1616 Whitmore (street address & city)

AIRS Site ID: 31-055-0054 (include POC #)

Pollutant(s): 5-Min SO2, SO2, Ozone **Scale:** Neighborhood (Middle, Neighborhood, Urban, etc.)

Observed by: Russell Hadan **Date:** 11/25/15

Agency: Douglas County Health Department

This review sheet was designed to pursuant to the requirements set forth in 40 CFR Part 58 Appendix E. Familiarity with Appendix E is required for proper use of this review sheet.

Criteria	Requirements	Observed	Criteria Met	
			Yes	No
Horizontal and Vertical Probe Placement (Appendix.E Sec. 2)	Probe at least 1 meter horizontally and vertically from any support structure, wall, parapet, penthouse, etc.; & away from dust or dirty areas.		X	
	Probe located 2 to 15 meters above the ground		X	
Spacing from Minor Sources (Appendix.E Sec. 3)	Probe located away from furnace, incinerator and other similar vents. Distance dependent upon stack height and pollutant potential of minor source(s)		X	
Spacing from Obstructions (Appendix.E, Sec. 4)	Probe must be at least twice the distance of the height of any object that protrudes above the probe. Exceptions may be made for street-canyon and source-oriented sites.		X	
	Probe must have unrestricted air flow in an arc of at least 270°, and the arc must include the predominant wind direction.		**X**	
	Exception if a probe is on the side of building: Must be an unrestricted air flow in an arc of at least 180°, and the arc must include the predominant wind direction.			
	Note: Having a probe mounted on the side of a building is most typical for microscale sites, but might have limited applications for neighborhood sites.			
Spacing from Trees (Appendix.E Sec. 5)	Trees may absorb or react with O_3, SO_2 & NO_2, with O_3 being the most impacted. Thus, trees should receive extra-consderation for these pollutants.			
	Probe should be at least 20 meters from dripline of trees		**X**	
	Probe must be at least 10 meters from dripline of trees that could be considered an obstacle		**X**	
	Must be at least twice the distance of the height of any tree that protrudes above the probe			
Spacing from Roadways (Appendix.E Sec. 6)	Roadway spacing criteria are dependent upon gases and scale. There are no set-back criteria for middle scale sites (all gases) and for SO_2 (all scales).			
	O_3 & NOx: See Table E-1 (next page)		**X**	
	CO: See Table E-2 (next page)			
Probe Materials (Appendix.E Sec. 9)	Inlet lines and all lines/apparatus involved in delivering test gases must be FEP Teflon or borosilicate glass (i.e., Pyrex)		**X**	

Conitnued on next page

Nebraska Siting Criteria Review Sheet for Gaseous Pollutant Monitoring Sites Except Near-Road and Microscale sites

(Also not applicable to open path monitors)

Criteria	Requirements	Observed	Criteria Met	
			Yes	No
Residence Time (Appendix E Sec. 9)	Residence time from inlet to detector is not to exceed 20 seconds (≤ 10 sec is preferred) for O_3 & NOy		X	

** Record inlet tubing length, and residence time using the following calculation: $RT = (Dt)^2 (Lt) (47.1) / Q$
where RT = Residence Time (sec), Dt = Tubing Diameter (mm), Lt = Tubing Length (m) and Q = Flow (cc/m)
To determine the maximum allowable inlet tubing length use: $Lt = (RT)(Q)/(Dt)^2 (47.1)$
Example: RT = 20 sec, Q= 500 cc/m & Dt = 6.4 mm ($^1/_4$") => maximum inlet tubing length is 5.2 m.

Comments: Ozone added to site location in 2015 from closed 30th and Fort Location

TABLE E-1 TO APPENDIX E OF PART 58—MINIMUM SEPARATION DISTANCE BETWEEN ROADWAYS AND PROBES OR MONITORING PATHS FOR MONITORING NEIGHBORHOOD AND URBAN SCALE OZONE (O_3) AND OXIDES OF NITROGEN (NO, NO_2, NO_X, NO_Y)

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)	Minimum distance[1 2] (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

[1]Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

[2]Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

TABLE E-2 OF APPENDIX E TO PART 58—MINIMUM SEPARATION DISTANCE BETWEEN ROADWAYS AND PROBES OR MONITORING PATHS FOR MONITORING NEIGHBORHOOD SCALE CARBON MONOXIDE

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)
≤10,000	10
15,000	25
20,000	45
30,000	80
40,000	115
50,000	135
≥60,000	150

[1]Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

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