UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

April 18, 2016

Terry L. O'Clair, P.E.
Director
Division of Air Quality
Environmental Health Section
Gold Seal Center
918 East Divide Avenue
Bismarck, ND 58501-1947

Dear Director O'Clair:

This letter transmits our approval of North Dakota's request to move the agencies' NCore and Speciation Trends Network (STN) monitoring stations from the Fargo NW site (AQS site ID: 38-017-1004), to an existing site in Bismarck (AQS site ID: 38-015-0003) as required by the Ambient Air Monitoring Regulations. According to these rules (see 40 CFR 58.11(c)), NCore and STN network design changes must be approved by the Environmental Protection Agency's (EPA) Administrator. This authority has been delegated to the Director of the Air Quality Assessment Division in EPA's Office of Air Quality Planning and Standards.

In considering your request to move the NCore and STN stations, we worked with EPA Region 8 on a review of your request, including the rationale why the existing station cannot continue operations and assessed the proposed location and characteristics of the area to be monitored. After careful consideration of your request to move the NCore and STN monitoring stations, we are pleased to approve the new site location as part of the NCore and STN networks.

Thank you for your program's efforts in working through the issues of having to move the NCore and STN station measurements for these monitoring programs. For any technical questions on NCore, you may contact Tim Hanley at hanley.tim@epa.gov and 919-541-4417. For technical questions on STN, you may contact Beth Landis at landis.elizabeth@epa.gov and 919-541-2262.

Sincerely,

Richard A. Wayland

Richard A. Wayland
Director
Air Quality Assessment Division

cc: Albion Carlson, EPA Region 8
Deirdre Rothery, EPA Region 8

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

February 8, 2016

Carl Daly, Director
Air Program, Mail Code 8P-AR
1595 Wynkoop Street
Denver, CO 80305

Re: NCore Site Relocation Proposal – Addendum to: North Dakota 2015 Annual Report

Dear Mr. Daly:

On January 4, 2016 the North Dakota Department of Health (Department) submitted to EPA a draft copy of an addendum to the 2015 ambient air monitoring Annual Report for the State of North Dakota. In that document, the Department included a proposal for relocating the ND NCore site from Fargo to Bismarck.

A thirty day public comment period was held for the proposal from January 5, 2016 to February 5, 2016. During this time, the Department received two requests for clarification (one of which was from EPA).

Please find attached the final copy of the addendum. You will find Errata and Comments Received beginning on Page 20.

Thank you for your consideration of this proposal If you have any questions, please contact Charles Hyatt of my staff at (701)328-5188.

Sincerely,

Terry L. O'Clair, P.E.
Director
Division of Air Quality

TLO/CRH:csc
Attach:

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
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January 4, 2016

Carl Daly, Director
Air Program, Mail Code 8P-AR
1595 Wynkoop Street
Denver, CO 80305

Re: NCore Site Relocation Proposal – Addendum to: North Dakota 2015 Annual Report

Dear Mr. Daly:

The Code of Federal Regulations Title 40 Part 58 states that "(Agencies) shall adopt and submit to the Regional Administrator an annual monitoring network plan". This plan identifies monitoring stations and monitors that make up an air quality surveillance network under authority of the State.

Additionally, the plan may outline any proposed changes or modifications to the network. CFR 40 Part 58 states that the "... final network designs and all changes in design are subject to approval of the Regional Administrator. NCore...changes are also subject to approval of the Administrator."

On September 15, 2015 the North Dakota Department of Health (Department) submitted to EPA Region VIII the 2015 ambient air monitoring Annual Report for the State of North Dakota (Report). The Report satisfies the requirements of the annual monitoring network plan. In section 2.1.3 of the Report, and again in section 2.5.6, it was indicated that the Department is considering the possibility of relocating the ND NCore site from Fargo to Bismarck. After a significant period of review, the Department has determined that this move is one that is in the best interest of the stated goals of the NCore network.

Please find attached an addendum to the 2015 ambient air monitoring Annual Report for the State of North Dakota. This addendum outlines the Department's proposal for relocating the ND NCore site from Fargo to Bismarck. A thirty day public comment period will be held concurrently with the initial period of EPA review and will end on February 5, 2016. Any comments received will be included in the final report and taken into consideration prior to taking any action.

If you have any questions concerning the materials provided or require additional information or clarification, please contact Charles Hyatt of my staff at (701)328-5188.

Sincerely,

Terry O'Clair

Terry L. O'Clair, P.E.
Director
Division of Air Quality

TLO/CRH:csc

Annual Report

NCore Site Relocation Proposal

ADDENDUM TO:
North Dakota
Ambient Air Quality Monitoring Program

Network Plan and
Five Year
Network Assessment

with
Data Summary

2015

NORTH DAKOTA
DEPARTMENT *of* HEALTH

Annual Report

NCore Site Relocation Proposal

ADDENDUM TO:

North Dakota Ambient Monitoring Network Plan/5 Year Assessment With Data Summary 2015

Jack Dalrymple
Governor

Terry L. Dwelle, M.D.
State Health Officer

L. David Glatt
Environmental Health Section Chief

North Dakota Department of Health
Division of Air Quality
Air Quality Monitoring Branch
918 E. Divide Ave.
Bismarck, N.D. 58501-1947

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1.0 INTRODUCTION

A National Core (NCore) multi-pollutant monitoring network site is one in a network of approximately 80 air quality monitoring sites located throughout the United States. The NCore network was established in 2006 by the United States Environmental Protection Agency (EPA) to allow timely reporting of air quality data to the public and provide long-term tracking of criteria and non-criteria pollutants and their precursors. Each state is required to have one or more NCore designated sites. In October 2009[1], the North Dakota Department of Health (Department) was granted approval by the EPA to operate the Fargo NW site (AQS# 38-017-1004) as the required NCore site for the State of North Dakota (Figure 1). Since that time, the site has provided valuable data in support of the NCore mission.

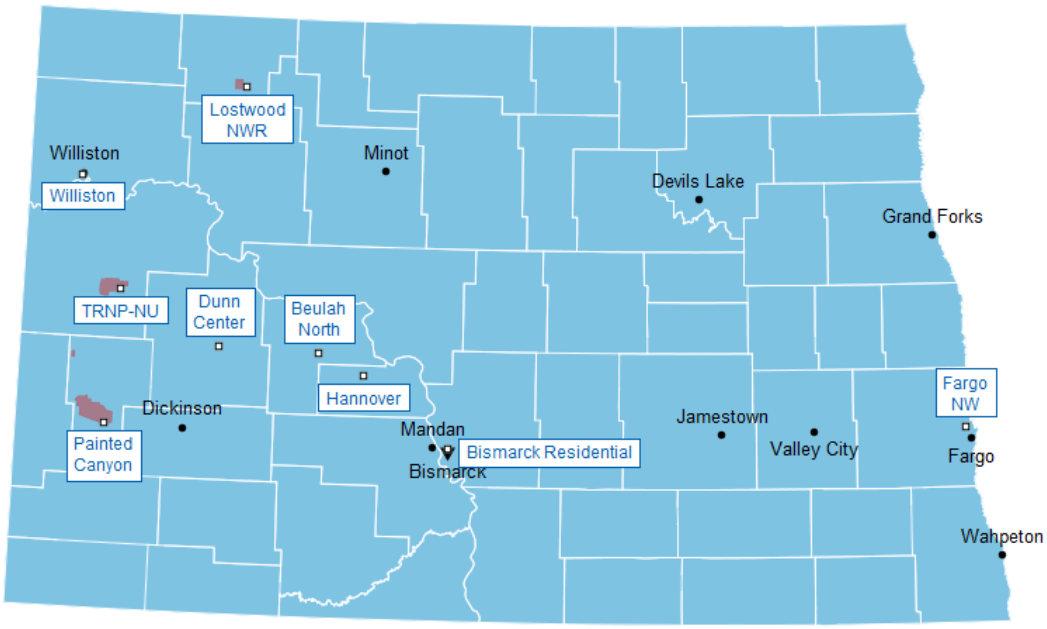


Figure 1. North Dakota Ambient Air Quality Monitoring Sites (White Labels). The Fargo NW site is the designated State NCore site.

Each year, in accordance with 40 CFR 58.10, the Department develops and submits to EPA an annual monitoring network plan (AMNP) which "provide(s) for the establishment and maintenance of an air quality surveillance system". Additionally, every five years, the Department conducts a complete network assessment to determine if the air quality monitoring

[1] 40 CFR 58.13, which specifies the requirements of the NCore network, indicates an approved NCore station is expected to be operating with all required measurements by January 1, 2011. The Fargo NW NCore station was fully operational by that date.

network meets the objectives spelled out in Appendix D of that part.

As part of the 2015 AMNP and network assessment, the Department evaluated the success of the NCore site at Fargo. The Department looked for ways to continue that success, maximizing the amount of high quality air monitoring in the state of North Dakota, while navigating limited financial resources. The Department also considered significant changes in industrial activity that have occurred in the state (primarily in the oil and gas sector) since the NCore station was originally sited.

Based on this analysis, the Department has determined that changing the location of the NCore station from Fargo NW to the Bismarck Residential site (AQS# 38-015-0003) will best achieve the goals stated above. The Bismarck Residential site has been a State and Local Air Monitoring Station (SLAMS) site for over 20 years and is ideally situated to provide valuable long-term data to the NCore network. This supplemental document to the 2015 AMNP proposes the NCore relocation and provides further information in support of the network change.

Additionally, to continue the site leveraging realized by co-locating NCore with $PM_{2.5}$ Speciation Trends (STN)[2], the Department also proposes to relocate the STN equipment from Fargo to Bismarck.

2.0 COST AND RESOURCE CONSIDERATIONS

Both the Bismarck and Fargo sites currently accommodate full twenty-foot monitoring trailers on public land with no associated annual rental or lease costs. Both are supplied with 50 amp electrical service. Fargo is equipped with land-line telephone access while the Bismarck station is a node of the State of ND computer network. The Department, however, is currently evaluating the possibility of transitioning to wireless networking at all of our remote sites. If this were done, communication costs would be comparable among sites.

Once established, the cost of maintaining and operating an air quality monitoring station is relatively consistent throughout the state, especially considering that the Fargo site would continue to operate as a SLAMS site in the event of an NCore relocation. There are a few exceptions to the balanced site costs, however, and the Department has determined that these weigh strongly in favor of relocating the NCore site and STN equipment to Bismarck from Fargo.

[2] Appendix D to 40 CFR 58 under 3. Design Criteria for NCore Sites specifies that: "*(a) Each State … is required to operate at least one NCore site … Any State or local agency can propose additional candidate NCore sites or modifications to these requirements for approval by the Administrator. The NCore locations should be leveraged with other multipollutant air monitoring sites including …STN sites. Site leveraging includes using the same monitoring platform and equipment to meet the objectives of the variety of programs where possible and advantageous.*"

Table 1. Operating costs comparison between NCore relocation to Bismarck and maintaining NCore in Fargo

Location of NCore Site		Fargo NW AQS# 38-017-1004	Bismarck AQS# 38-015-0003
Sample Collection		$20,740 for contract work	Covered by existing staff salaries
Travel	Miles	No Change	No Change (as travel still required for Fargo SLAMS site)
	Lodging	$2,080 (26 visits at ~ $80 per stay)	Minimal to no overnight stays required
Staff Hours		No Change	Slight increase in staff hours to offset loss of contract workers for PM sample collection. Anticipated efficiencies from move result in decrease in NCore maintenance hours required.
Tower Replacement		No Immediate Change – although future plans require tower upgrade	$5,000 (one time cost)
Shelter/Site Cost		No Change	No Immediate Change – although future plans allow for shelter upgrade
Instrument Cost		No Change	No Change
TOTAL COST		**$22,820***	**$5,000****

* Annual cost ** Onetime cost

All Air Quality Monitoring Program field technicians are based out of the Department's Environmental Health Section office located in Bismarck, less than ½ mile from the Bismarck Residential monitoring station site. This is in contrast to the current Fargo NCore site, which requires approximately 185 miles of one way travel for each visit. The Department has committed to visiting each field site a minimum of once every two weeks to complete regularly scheduled quality assurance (QA) checks on the instrumentation. In addition to regular visits, staff travels to sites as necessary to complete maintenance/repair requirements. With the significant travel times and the time requirements of instrument checks, each scheduled visit to the Fargo NCore site involves an overnight stay.

With the NCore station located in Bismarck, trips to the Fargo SLAMS site could be completed in a single day. All required instrument maintenance at the Bismarck NCore station could be completed "as needed" without travel or scheduling delay.

In order to preserve the benefits of collocating the NCore site with the STN samplers, these would also relocate to Bismarck[3]. The current Fargo speciation samplers operate on a 1 in 3 day

[3] When North Dakota was originally determining a location for the $PM_{2.5}$ Speciation Trends Site, Bismarck was identified as an acceptable station. Although Fargo was ultimately chosen to host the primary trends site, Bismarck served as a SLAMS speciation supplemental site from 2001 to 2006.

sampling schedule. Because of the staff travel time requirement stated above, filter changes are performed by contracted particulate matter sampling technicians located in Fargo. If the samplers were located in Bismarck, staff field technicians could complete scheduled filter changes.

First year anticipated costs for the Department resulting from the NCore and STN sampler relocation to Bismarck as compared to status quo are outlined in Table 1. The cost savings of relocating the NCore and STN samplers to Bismarck from Fargo are projected to be over $17,000 in the first year and over $22,000 in subsequent years. Resources saved could be better utilized in meeting other air quality monitoring goals, which may include: paying replacement costs for equipment nearing end of service life; upgrading data collection and management solutions to allow greater access to the public; or covering other budgetary shortfalls.

In addition to the cost benefits outlined above, a Bismarck NCore site with local staff present will experience less equipment downtime as staff technicians are able to quickly respond to equipment failures. Repairs can be initiated nearly immediately, whereas with a Fargo NCore site, response is slowed by extensive travel requirements. Less equipment downtime results in a more complete data set.

3.0 STATE EMISSIONS PROFILE CHANGES

The primary objectives of the NCore network include air quality trends analysis, model evaluation, and tracking metropolitan area statistics. Over the past few years growth in the oil and natural gas sectors within the Bakken has dramatically shifted North Dakota industrial development toward the northwestern quarter of the state. The great majority of new permitted facilities and facility expansions (represented by the number of new construction permits – Figure 2) and all new oil well registrations (Figure 3) are in the oil producing counties.

Despite fluctuations in economic factors, upward trends are expected to continue into the foreseeable future. Urban areas throughout the state are seeing the impact of industrial development through population growth (see Section 4.0) and commercial development. Even though its geographical location is outside of the generally accepted boundaries of the oil fields, Bismarck is in the path of the prevailing winds originating from the Bakken (see Section 8.0).

Additionally, the air-shed observed by the Bismarck monitor includes a number of facilities projected to be affected by new regulations, including the CAA 111(d) Clean Power Plan (Figure 4 and Table 2). The Bismarck site will be extremely useful to identify trends in air quality due to changing energy production practices within the state.

Its geographic location and its position as the seat of state government provides Bismarck a unique opportunity. Compared to Fargo, a Bismarck NCore site will be able to more clearly identify the impact that major changes in the state's industry have on a growing population center.

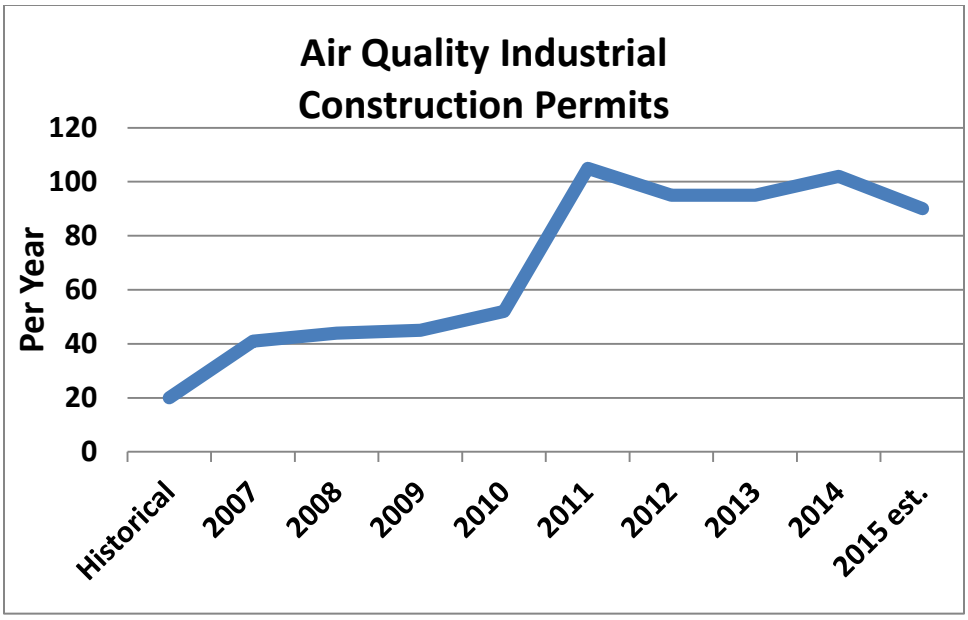


Figure 2. New Industrial Construction Permits (PTCs) Showing Historical Values Compared to the 2007-2015 time period

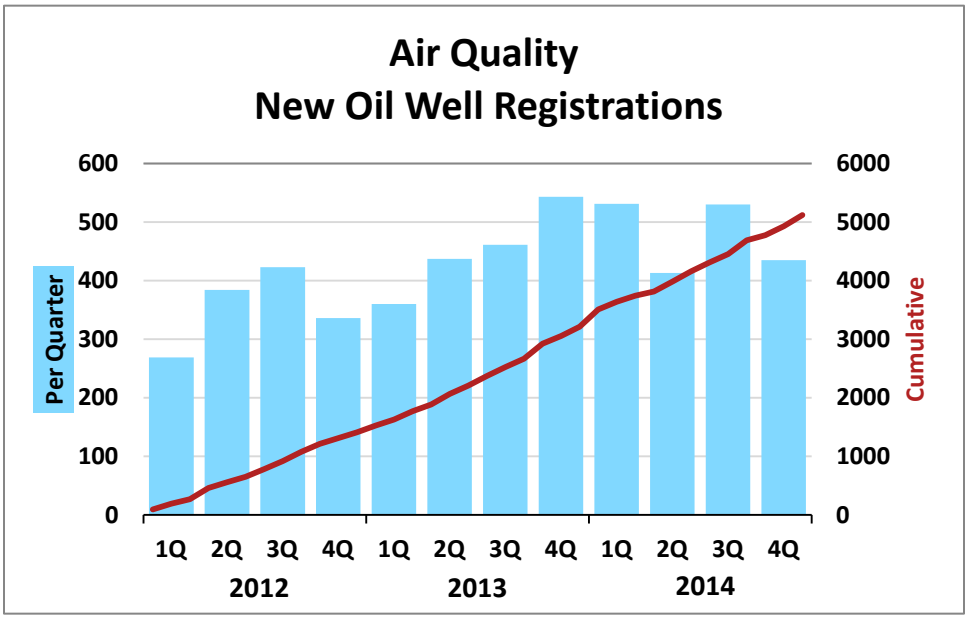


Figure 3. New Air Quality Oil Well Registrations in North Dakota 2012-2014.

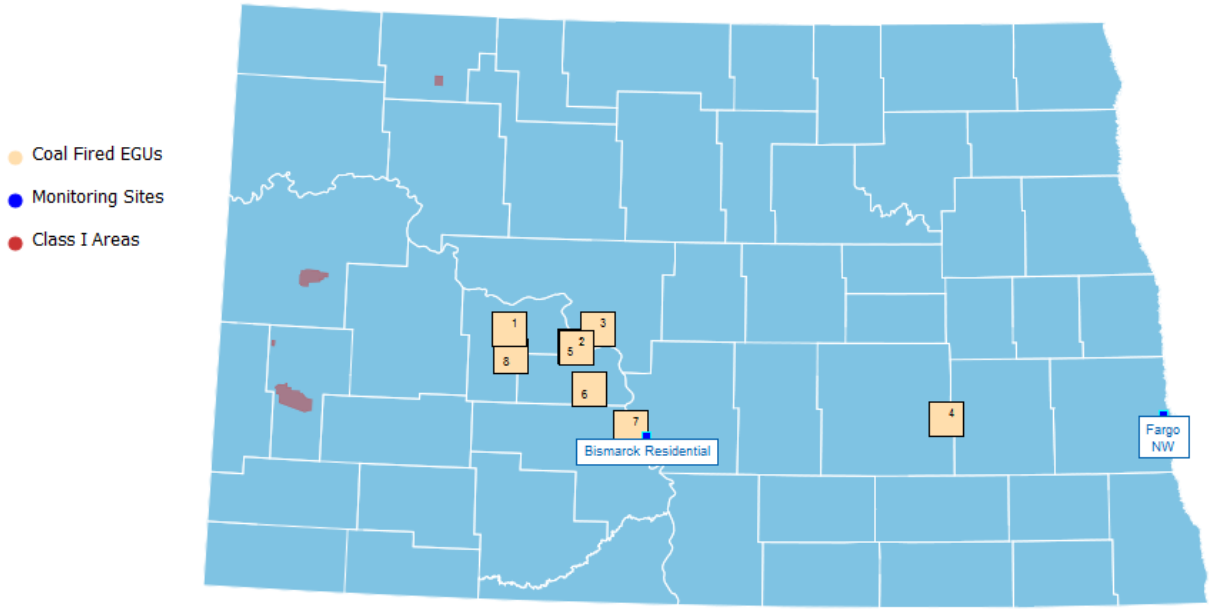


Figure 4. Coal fired Electrical Generating Units (EGUs) in North Dakota.

Table 2. Coal fired Electrical Generating Units (EGUs) in North Dakota.

#	COMPANY	SOURCE	EIS Facility ID
1	Basin Electric Power Cooperative	Antelope Valley Station	8086511
2	Basin Electric Power Cooperative	Leland Olds Station	8086311
3	Great River Energy	Coal Creek Station	8011011
4	Great River Energy	Spiritwood Station	16937511
5	Great River Energy	Stanton Station	8086411
6	Minnkota Power Cooperative, Inc.	Milton R. Young Station	8087911
7	Montana Dakota Utilities Company	RM Heskett Station	8087011
8	Otter Tail Power Company	Coyote Station	8086611

4.0 MONITORING OBJECTIVE AND STANDARDS COMPARISON

NCore supports specific core air quality monitoring objectives in public reporting, emissions trends tracking, and National Ambient Air Quality Standards (NAAQS) compliance evaluation. All monitoring sites, whether part of the NCore network or serving as a standalone SLAMS site, must address the monitoring objectives as described in 40 CFR 58, Appendix D. Population Exposure is one of the six basic monitoring objectives identified with the goal of determining representative concentrations of pollutants in areas of high population density. Both the Fargo and Bismarck sites share the monitoring objective of Population Exposure.

North Dakota is a relatively low population density state with a total statewide population

estimated to be just below 740,000 total residents – 0.2% of the U.S. total[4]. That being said, over the last 4 years, the state has seen a nearly 10% growth in population. Within North Dakota, there are four metropolitan statistical areas with populations above 50,000 residents (see Table 3 below).

Although it is not the fastest growing MSA in the State, Bismarck slightly edges out Fargo as the fastest growing MSA with a population over 100,000. The Fargo MSA is larger than Bismarck by approximately 100,000 residents. Despite this, monitored criteria pollutant levels between the two areas are notably similar (Figure 5; also see Section 10.0 for data comparison).

Table 3. North Dakota MSAs with Populations Greater than 50,000

North Dakota Metropolitan Statistical Areas (MSA) with Populations Greater than 50,000[5]			
MSA	2010 Census Population	2014 Estimated Population	Percent Change per Year[6]
Fargo	208,777	228,291	2.26 %
Bismarck	114,778	126,597	2.48 %
Grand Forks	98,461	101,842	0.85 %
Minot	69,540	77,959	2.90 %

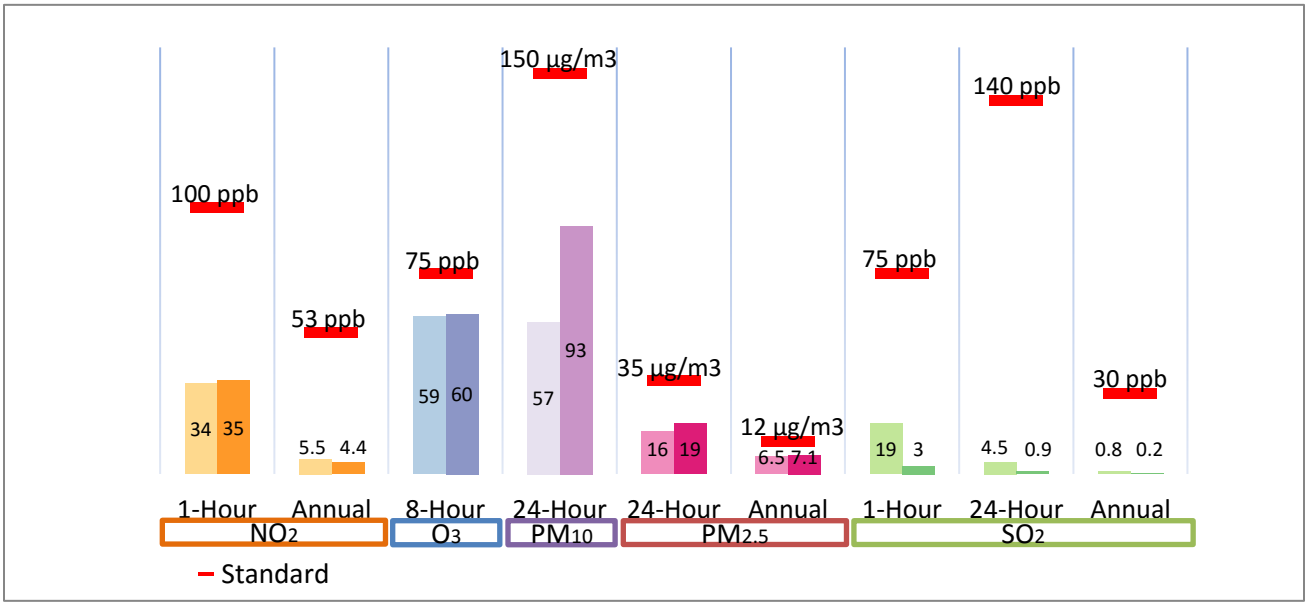


Figure 5. Bismarck (L) Monitored Pollutant Concentrations Compared to Fargo (R) and the NAAQS (2014)

[4] 2014 U.S. Census Bureau Estimate. http://quickfacts.census.gov/qfd/states/38000.html. Oct 14, 2015
[5] 2010 population values and 2014 estimated population values from U.S. Census Bureau. http://www.census.gov/popest/data/metro/totals/2014/. Oct 14, 2015
[6] Calculated based on Census values from 2010 and estimated 2014 values for population of respective MSAs.

For most pollutants the difference between monitored values of the two stations (in the form of the standard) are 5% or less of the value of the standard (Table 4). The exceptions are 24-hour $PM_{2.5}$ (the difference between the two is 9% of the standard), 24-hour PM_{10} (24%), and 1-hour SO_2 (21%).

In the case of SO_2, Bismarck has monitored higher than Fargo, but with a value that is 25% of the standard. For the 24-hour $PM_{2.5}$ and PM_{10} values, Fargo was higher, yet still only 54% and 62% of the standard, respectively.

Table 4. Further Comparison of Monitored Values to the Standards at Bismarck and Fargo as of 2014.

	Period	Bismarck[1]	Fargo[1]	Standard[1]	[1, 2]	[3]	[4]
NO_2	1-Hour	34	35	100	1.0	1%	35%
	Annual	5.5	4.4	53	1.2	2%	10%
O_3	8-Hour	59	60	75	1.0	1%	80%
PM_{10}	24-Hour	57	93	150	36.0	24%	62%
$PM_{2.5}$	24-Hour	16	19	35	3.0	9%	54%
	Annual	6.5	7.1	12	0.6	5%	59%
SO_2	1-Hour	19	3	75	16.0	21%	25%
	24-Hour	4.5	0.9	140	3.6	3%	3%
	Annual	0.8	0.2	30	0.7	2%	3%

1. PM_{10} and $PM_{2.5}$ values and standards in $\mu g/m^3$. All others in parts per billion (ppb).
2. Numerical difference between Bismarck and Fargo.
3. Difference between Bismarck and Fargo as a percentage of the standard.
4. High value (either Bismarck or Fargo) as a percentage of the standard.

5.0 MONITORING PARAMETERS AND CONSIDERATIONS

Bismarck is an appropriate candidate to take on the role of an NCore site as the majority of pollutants required to be monitored for NCore are already part of the Bismarck site's suite of instruments (Table 5). The exceptions are CO, NO_y, $PM_{10-2.5}$ and $PM_{2.5}$ speciation.

The Bismarck site shelter is designed to accommodate the CO and $PM_{10-2.5}$ instruments, so initiating monitoring for these compounds would be a simple matter of relocating the units from Fargo. The same can be said for the $PM_{2.5}$ speciation equipment as appropriate decking is available at the Bismarck site.

To monitor NO_y, or total reactive nitrogen, the probe inlet and a molybdenum-based catalytic converter must be mounted at least 10 meters above ground. This is to minimize the loss of oxidized nitrogen compounds in the sample train. The current 10 meter lightweight aluminum meteorological tower at the Bismarck station does not appear to be able to accommodate the existing meteorological instruments and the NO_y converter and would need to be replaced.

The tower which currently supports the Fargo NCore station provides access to the meteorological instruments via a carriage lift that can be lowered to the ground to allow for maintenance.

Table 5. NCore required Pollutants: Comparison of Current Monitoring Parameters at the Fargo and Bismarck Air Quality Monitoring Stations

NCore Required Pollutant	Sampling Frequency	Fargo	Bismarck[7]
Particulate Matter less than 2.5 microns in size ($PM_{2.5}$)	1 in 3 day sampling frequency 24-hr avg. (FRM)	★	★
	Continuous monitoring (1-hr reporting - FEM)	★	★
$PM_{2.5}$ Speciation[8]	1 in 3 day sampling frequency 24-hr avg.	★	
Particulate Matter between 10 and 2.5 microns in size ($PM_{10-2.5}$)	Continuous monitoring	★	
Carbon Monoxide (CO)	Continuous monitoring (trace levels where needed)	★	
Nitrogen Oxide (NO)	Continuous monitoring (trace levels where needed)	★	★
Ozone (O_3)	Continuous monitoring	★	★
Sulfur Dioxide (SO_2)	Continuous monitoring (trace levels where needed)	★	★
Total Reactive Nitrogen (NO_y)	Continuous monitoring (trace levels where needed)	★	

Unfortunately, the lift cannot accommodate the NO_y converter unit. Because of this the converter is hard mounted to the top of the tower. Any work on the converter requires field staff to either climb the tower or acquire a bucket lift to rise to the appropriate height. It is the Department's goal that any new tower at the Bismarck site would allow the entire instrument package, including the converter, to be lowered to the ground easily without specialized equipment. This would permit inspection, and repair/replacement if necessary, of all equipment on a regular basis.

6.0 AREA OF REPRESENTATIVENESS

Appendix D of 40 CFR 58 specifies the design criteria for NCore sites as well as pollutant-specific design criteria. NCore sites are established in order to "provide representative concentrations" either of a metropolitan area or a given region, but not be affected by any single given pollutant source and represent as much as possible the ambient conditions of the area.

[7] Although the Bismarck site is not currently a designated NCore site, many of the NCore required parameters are being monitored at Bismarck. If the relocation of the NCore site to Bismarck is approved, the remaining monitors would be relocated from Fargo to meet all applicable requirements.
[8] Includes organic carbon, elemental carbon, and trace metals.

Because of this, special consideration of the spatial scale of the site is important.

The appropriate spatial scale for a given parameter is one where pollutant concentrations throughout the air parcel whose physical dimensions are defined by the scale are reasonably similar. For both the Bismarck and Fargo stations, the spatial scale selected for all monitored pollutants was the urban scale (4 km to 50 km; Table 6). This ensures that the majority of each respective metropolitan area was covered in response to meeting the monitoring objective of population exposure and reflects that a given air-shed is relatively uniform.

Table 6. Spatial Scales for Each Pollutant

Parameter	Monitoring Objective	Spatial Scale
Sulfur Dioxide	Population Exposure	Urban
Nitrogen Dioxide	Population Exposure	Urban
Carbon Monoxide	Population Exposure	Urban*
NO_y	Population Exposure	Urban
Ozone	Population Exposure	Urban
$PM_{2.5}$	Population Exposure	Urban
$PM_{2.5}$ Speciation	Population Exposure	Urban
PM_{10}	Population Exposure	Urban
$PM_{10-2.5}$	Population Exposure	Urban

* 40 CFR 58 Appendix D does not identify an urban spatial scale (4 to 50 kilometers) for Carbon monoxide because this pollutant is primarily associated with automobile traffic on a neighborhood or smaller scale. However, because the CO monitor at the Fargo site is present to satisfy NCore requirements, it has historically been considered by the Department to be an urban scale station/monitor. This will also be the case if relocation to Bismarck is approved.

A circle centered on the Bismarck station which illustrates the maximum 50 km (radius) urban area of representativeness is shown in Figure 6. Seven counties contribute, in part, to the monitored air-shed and there are 42 permitted facilities within the circle bounds.

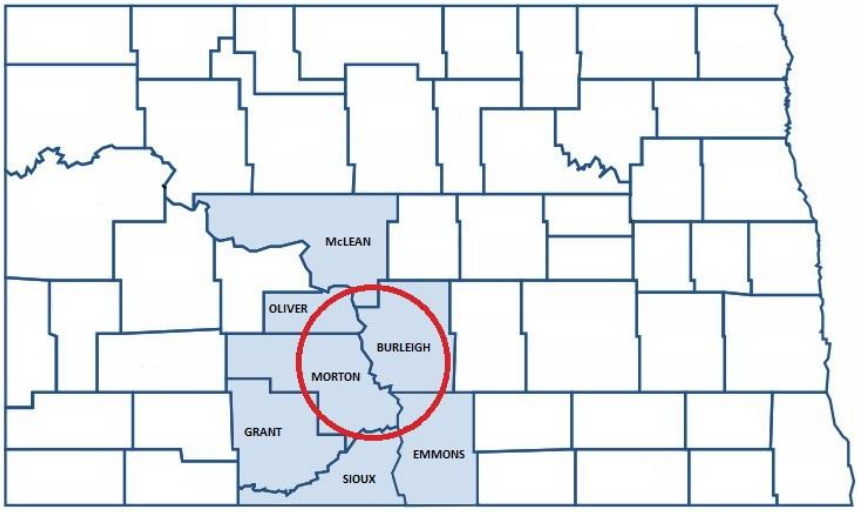


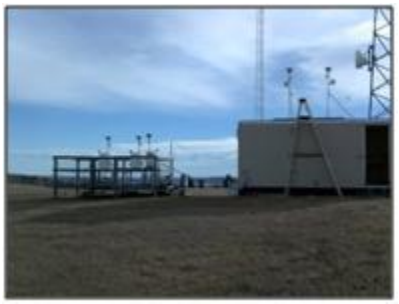
Figure 6. Area of Representativeness for Bismarck Station – Urban Scale (50 km)

7.0 SITE DESCRIPTION

Station Name:	**Bismarck Residential**
Station Type:	SLAMS (Proposed NCore)
AQS #:	38-015-0003
Address:	1810 N 16th Street Bismarck, ND 58501
County:	Burleigh
MSA:	Bismarck, ND
Latitude:	+46.825425
Longitude:	-100.768210
Established:	1995

Centrally located within the state and representing the second largest metropolitan area, Bismarck is ideally suited to host the state's NCore site. The Bismarck air monitoring station is located on City of Bismarck water reservoir property at 16th Street and Divide Avenue. The station is positioned at the northwestern corner of the reservoir property, bounded on the south by chain link fence surrounding the perimeter of the reservoir property and on the east by N 16th Street.

The shelter is a modified 8' x 20' Wells Cargo work wagon single axle trailer. The inside of the trailer contains 28" wide x 36" high countertops for bench-top monitor mounting and can accommodate a full NCore suite of instruments[9]. The shelter is climate controlled with a 10,000 BTU wall mounted air conditioner and a 1,500 watt electric heater with fan. Temperature is controlled by individual line switching thermostats to maintain 75°F ± 5°F. Electricity is provided to the trailer through a 50 amp main service.



To the east of the shelter, the station includes a wooden FRM manual particulate monitor deck approximately 6' x 15' in size. A lightweight aluminum 10-m meteorological instrument tower is currently located on the southeast corner of the trailer; however if the NCore relocation is approved, this will be replaced with a heavier 10-m tower with the ability to easily lower the instruments (including an NO_y converter).

[9] This trailer set-up is identical to the one present at the current Fargo NCore Station.

Site Pictures: Bismarck Residential

North

South

8.0 PREVAILING WINDS

Figure 7 shows the hourly average wind direction and speed as measured at the Bismarck station from 2005-2015. Figure 8 breaks the wind data down into seasonal quarters. Winds in Bismarck are typically out of the northwest/southeast, roughly following the Missouri River valley. In the winter months (December, January, and February), there is a preponderance of stronger winds from the northwest. In the other three seasons, northwesterly winds are somewhat balanced by winds from the SSE. The location of the Bismarck site in the Northern 1/3 of the Bismarck urban area provides a good location for monitoring pollutant concentrations and transport consistent with those experienced by the majority of the population in Bismarck.

Figure 7. Hourly average wind direction and speed at Bismarck Station, 2005 - 2015[10]

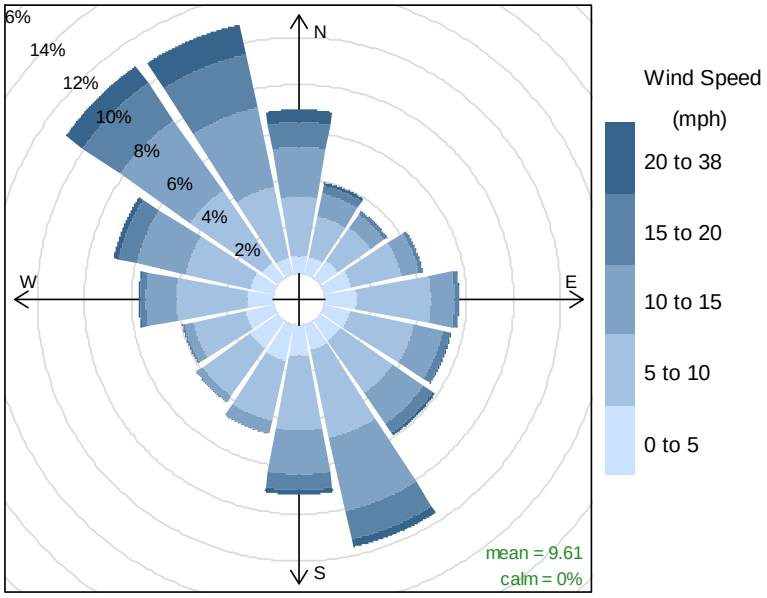
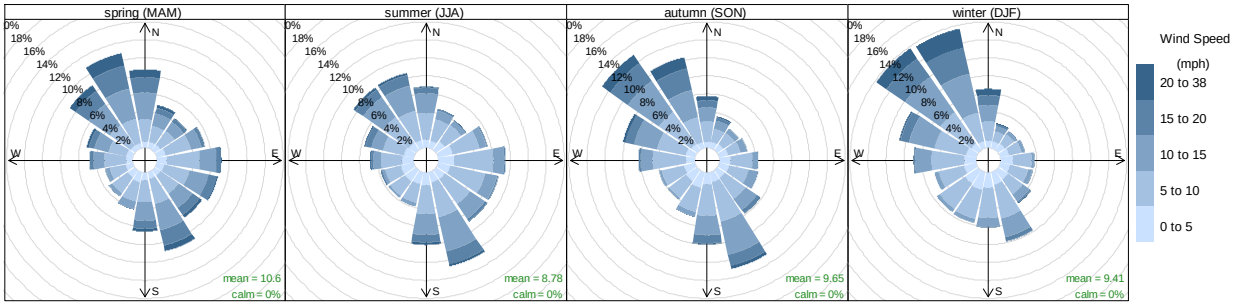


Figure 8. Hourly average wind direction and speed at Bismarck Station, per season in 2005-2015[9]



9.0 SITING CRITERIA

9.1 Probe Horizontal and Vertical Placement

The sample probe inlet for the gaseous samples (excluding NO_y) at the Bismarck station is located at the monitoring shelter at 1 meter above the roof line and approximately 4 meters above the ground. Continuous particulate monitor sample inlets are placed on the roof of the shelter at approximately the same height at the gas probe inlet. Manual particulate sampler inlets are 2-3 meters from the ground located adjacent to the shelter on a sampler deck. The input for the NO_y sampler and the converter unit will be located on the instrumentation tower at no less than 10 meters above ground level. Each inlet is located more than 1 meter away from any structure, etc. as defined.

[10] Figures 4 and 5 produced using the openair package: Carslaw, D.C. and K. Ropkins, (2012). openair — an R package for air quality data analysis. Environmental Modelling & Software. Volume 27-28, pp. 52–61.

9.2 Spacing from Minor Sources and Roadways

Table 7. Three true minor sources nearest the Bismarck ambient air quality monitoring station.

Facility	ND Permit Number	Approximate Site Distance (m)	Permit Type	Unit Type
Basin Electric Power Cooperative – Bismarck Emergency Generator Set	O02001	800	True Minor	Generator Engines
State of North Dakota – State Capitol Grounds	F97001	1,000	True Minor	Boilers and Generator Engines
Missouri Slope Lutheran Care Center – Heating Plant	F94006	1,300	True Minor	Boilers and Generator Engines

Table 8. Three Title V sources nearest the Bismarck ambient air quality monitoring station.

Facility	EIS[11] Facility ID	Approximate Site Distance (m)	2014 NEI Emissions Estimates (tpy)*					
			CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
Tesoro Refining and Marketing Company LLC – Mandan Refinery	7923611	9,000	2,760	589	96	129	257	509
Montana Dakota Utilities Company – RM Heskett Station	8087011	9,800	1,296	1,336	11	18	3,369	8
Northern Border Pipeline Company – Compressor Station #7	10612111	34,000	74	76	5	5	4	10

* Rounded to the nearest ton.

The Bismarck station is located on city land in a residential area and has been determined by the Department to be a reasonable distance from any minor source of SO_2 or NO_x such that the air quality data will not be inappropriately impacted. The nearest permitted (true minor) emission source is located ½ mile (800 m) from the station and the Bismarck site is over 5 miles from the nearest Title V source. Table 7 shows the three closest permitted sources while Table 8 shows the three closest Title V sources with 2014 emissions estimates.

Additionally, the station is ¼ mile (400 m) from a roadway with approximately 32,000 vehicles per day in 2014 (Table 9). There are no roadways with notable traffic counts within 50 meters and no roadways with 10,000 vehicles per day within 200 meters. The station exceeds all roadway minimum distance requirements specified in Appendix E to 40 CFR 58 and has been identified as one that can provide an accurate representation of area-wide concentrations without being significantly impacted by direct emission sources.

[11] EPA Emissions Inventory System

Table 9. Roadways in the vicinity of the Bismarck Ambient Air Quality Monitoring Station with Average Daily Traffic (ADT) counts.

Roadway	ADT[12]	Approximate Site Distance (m)
State Street between Interstate Avenue and the I-94 Ramp*	42,865	1000
State Street at I-94	38,455	750
State Street at Divide Avenue	31,975	450
Divide Avenue at 17th Street	9,660	250
Divide Avenue at 15th Street	9,465	210

* Busiest section of road in the Bismarck metropolitan area per measured ADT.

9.3 Spacing from Obstructions

In order to prevent possible airflow restrictions or pollutant scavenging, the Bismarck site is located in an area relatively free of obstructions. No buildings within 85 meters appear to exceed the continuous sampler intake inlet height. Just beyond 85 meters, a water tower is approximately 40 meters tall or 35 meters above the inlet (38 meters above the manual PM sampler inlets). The 85 meter distance is greater than twice the height that the obstacle protrudes above the inlet. Inlets have unrestricted airflow in an arc of at least 180 degrees and particulate sampler inlets meet the separation requirements set forth in Part 58 of 40 CFR.

10.0 DATA COMPARISON

When evaluating the possibility of relocating the NCore site from Fargo to Bismarck, data comparability between the two sites was a primary consideration for the Department. As discussed in the sections above, the positive aspects of relocation are clear with respect to financial impacts and staff response time. A Bismarck NCore site would benefit from nearly on-site service personnel and rapid response times which will minimize equipment down time and potential data loss. Based on siting review, the Department believes that a Bismarck NCore site will offer a clearer picture of how long term trends in statewide development affect state population centers. However, if air quality data between the two sites were significantly different showing non-correlating trends, justification for the move would be more of a challenge. Fortunately the data show otherwise.

[12] http://www.dot.nd.gov/road-map/traffic/. Verified December 30, 2015

10.1 Nitrogen Dioxide

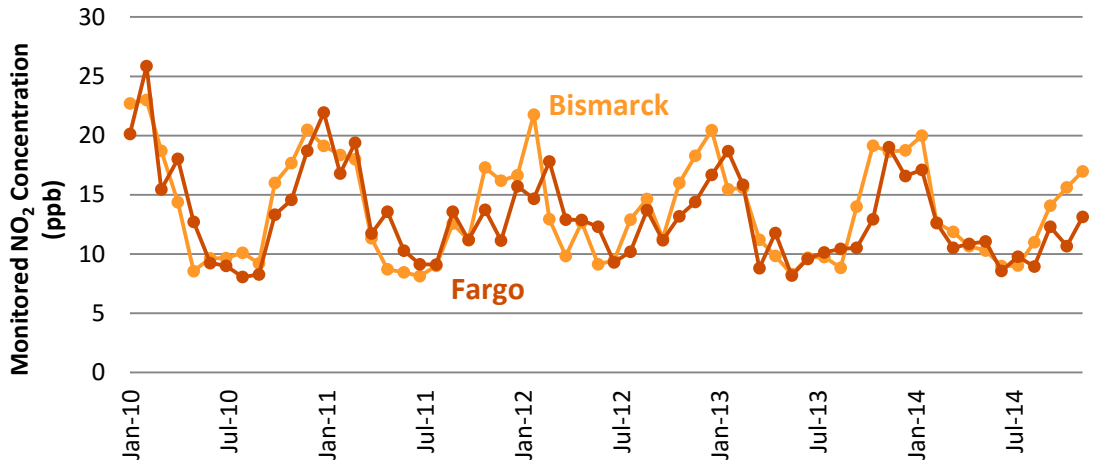


Figure 9. Time series comparison of monthly average monitored NO_2 concentrations at the Fargo and Bismarck ambient air quality monitoring sites.

10.2 Ozone

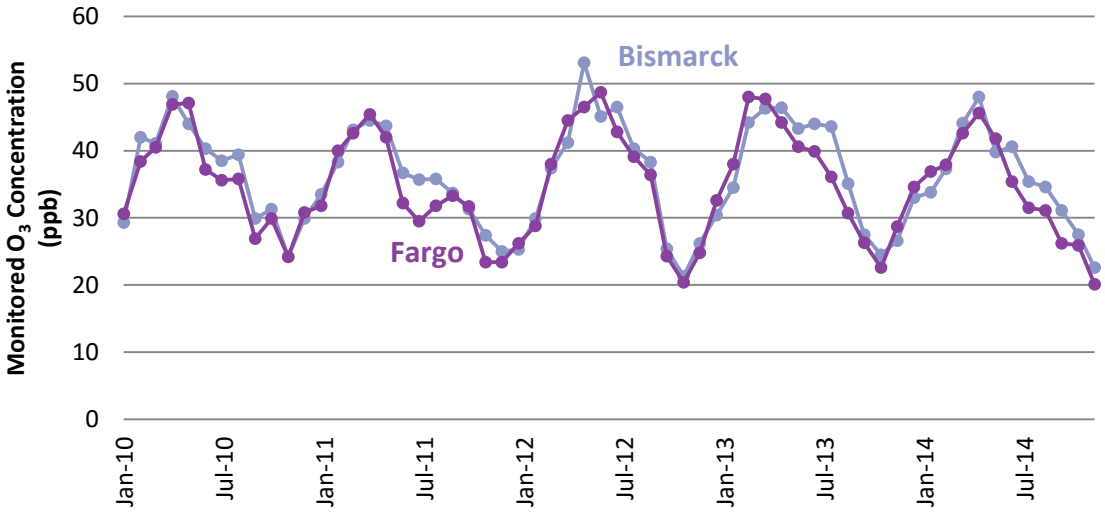


Figure 10. Time series comparison of monthly average monitored O_3 concentrations at the Fargo and Bismarck ambient air quality monitoring sites.

10.3 Particulate Matter

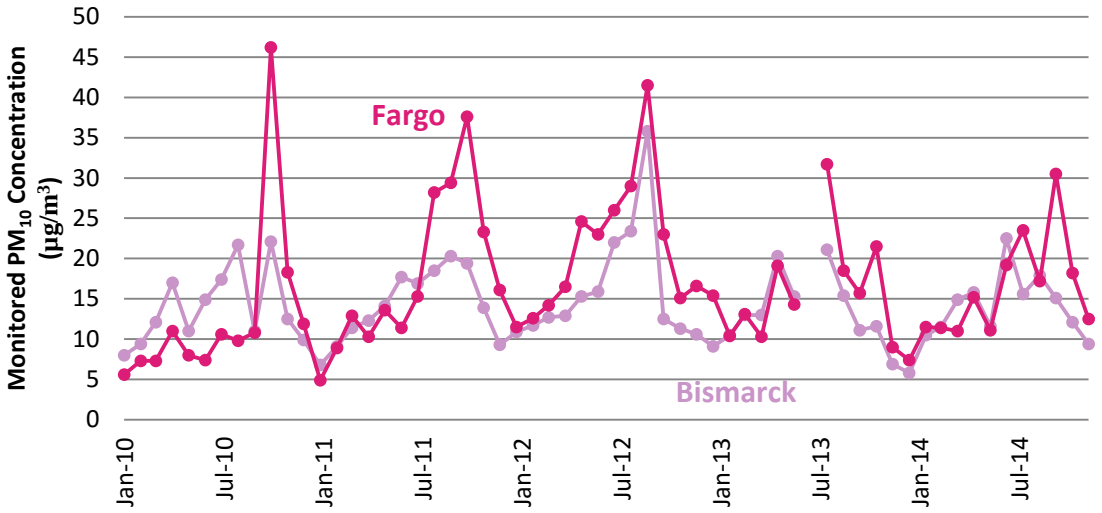


Figure 11. Time series comparison of monthly average monitored PM_{10} concentrations at the Fargo and Bismarck ambient air quality monitoring sites.

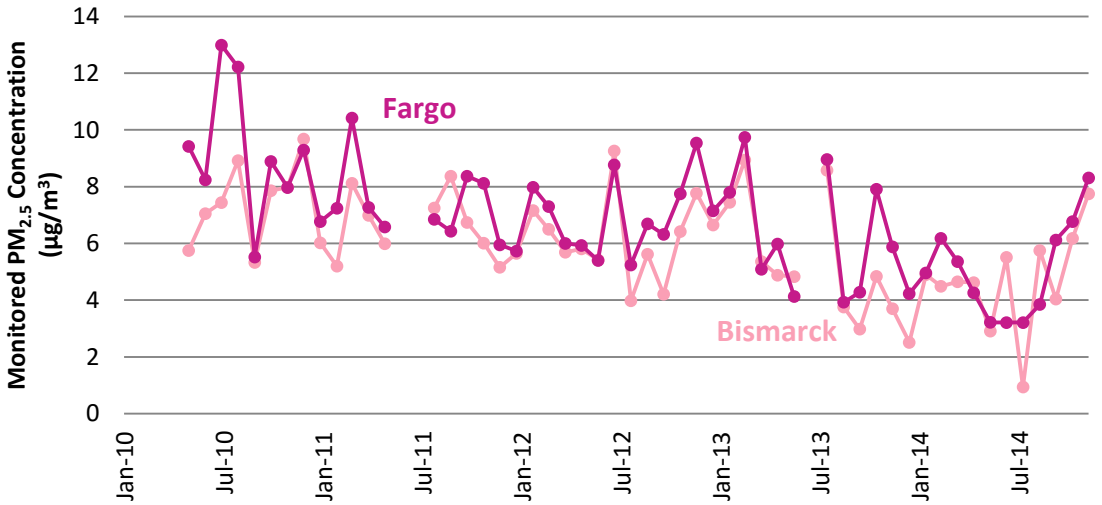


Figure 12. Time series comparison of monthly average monitored $PM_{2.5}$ concentrations at the Fargo and Bismarck ambient air quality monitoring sites.

10.4 Sulfur Dioxide

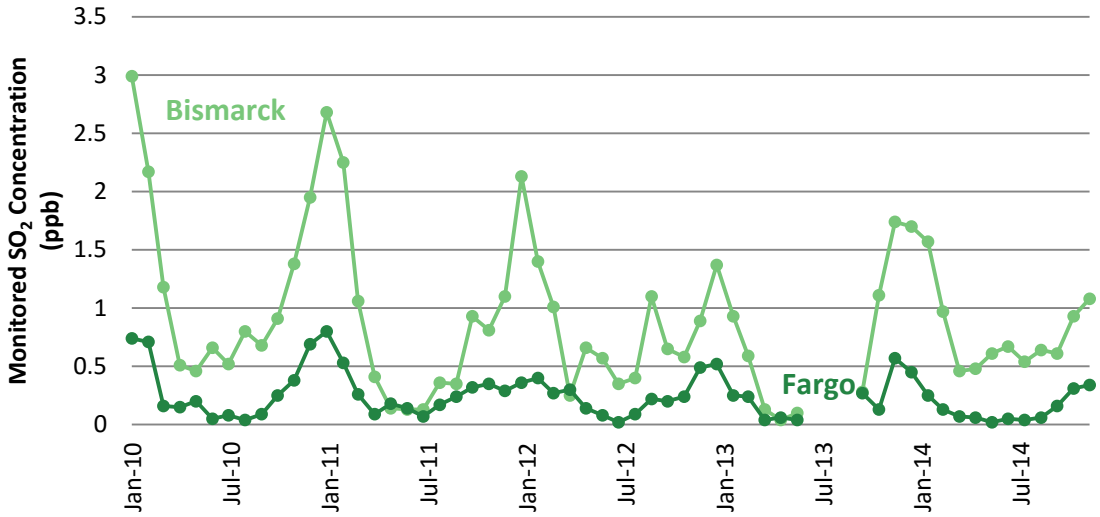


Figure 13. Time series comparison of monthly average monitored SO_2 concentrations at the Fargo and Bismarck ambient air quality monitoring sites.

As is discussed briefly in Section 2.0 and shown in the accompanying table and figure (2 and 1, respectively), the latest monitoring data for 2014 show similar results for the two sites for a good number of the NAAQS pollutants. Where there are differences, the monitored concentrations for both sites are still far below the level of the NAAQS[13]. These similarities appear to carry over to multiple years of comparison as well. The comparison charts (Figures 9, 10, 11, 12 & 13) show trends as seen in Fargo and Bismarck from January 2010 through December 2014 as a monthly average. Seasonal variations are clearly visible and the data tracks consistently between sites for the majority of pollutants.

The one notable exception is SO_2 (Figure 13). Although seasonality between the sites appears to correlate, Bismarck consistently monitors higher ambient concentrations than the Fargo site. This is likely because of the preponderance of EGUs in the Bismarck air-shed. Although an individual facility cannot be identified as the cause of the monitored readings, this dataset once again illustrates the usefulness of the Bismarck site in being able to identify emissions trends, especially in light of current and future air quality rule actions.

11.0 QUALITY ASSURANCE

Quality assurance is an essential component of air quality data collection and analysis. 40 CFR 58 Appendix A outlines the applicable quality assurance requirements of a SLAMS station. The

[13] PM_{10} showed the greatest difference between sites (24%), yet the high at Fargo was still only at 62% of the standard (Table 2).

Bismarck Station adheres to all applicable QA requirements and will continue to do so if approved as an NCore station.

The Department is currently in the process of completely reviewing and updating all applicable monitoring instrument Standard Operating Procedures (SOP) documents as part of a required periodic Quality Assurance Project Plan (QAPP) revision. Updated documents will accommodate any future NCore relocation from Fargo to Bismarck.

12.0 SUMMARY

As a result of evaluating the North Dakota ambient monitoring network for the 2015 Ambient Monitoring Network Plan and 5-year network review, the Department determined that moving the NCore site and Speciation Trends Network samplers from the Fargo NW station to the Bismarck Residential station should be proposed.

Benefits of completing the relocation include:

- Local field staff presence will result in a reduction in response times and associated equipment downtime relating to equipment failures.
- Cost savings of over $17,000 in the first year and $22,000 in subsequent years due to the elimination of required contract worker positions.
- Siting the NCore station in a location more suitable to monitoring statewide trends due to industrial development and a changing regulatory environment.

Bismarck was identified as a suitable site because:

- Bismarck is the second most populous metropolitan area in North Dakota and is the location of the Department field staff offices.
- Many of the NCore required parameters are currently being monitored in Bismarck and have been for a number of years allowing data continuity.
- The Bismarck site can easily accommodate those NCore samplers that are not currently located at Bismarck (i.e., NOy, CO) and has served as a speciation trends site in the past.
- Data trends between Bismarck and Fargo for monitored criteria pollutants are similar.
- Site location and prevailing winds are considered good for identifying impact of pollutant transport on an urban population.

ERRATA AND COMMENTS RECEIVED

February 5, 2016 Update

- General formatting corrections.
- Table 2: The RM Heskett station and Milton R. Young station positions were reversed in the table and mis-identified.
- Table 6: $PM_{2.5}$ Speciation and $PM_{10-2.5}$ differentiated.

A public comment period was held from January 5, 2016 through February 5, 2016. The Department received one email requesting clarification on the status of air quality monitoring at the Fargo station provided the relocation of NCore to Bismarck proceeds. The email and Department response are included on the following page.

Additionally during the public comment period, EPA inquired in a phone conversation whether any Fargo data is being used for any ongoing research studies. The Department responded that we are not aware of any current or planned studies that utilize Fargo ambient air monitoring station data.

No additional comments were received.

From: JJ England [mailto:jj.w.england@gmail.com]
Sent: Wednesday, January 06, 2016 12:39 PM
To: Hyatt, Chuck R.
Subject: Fargo NCORE relocation question

Mr. Hyatt,

I noticed the public notice regarding NCORE relocation today, and I wanted to ask a quick clarifying question. Will the Fargo NW site continue in operation as a SLAMS site under the Department's proposal? If so, which pollutants will still be monitored at the Fargo location?

Thank you for your help on this,

JJ England
Bismarck, ND

From: Hyatt, Chuck R.
Sent: Wednesday, January 06, 2016 1:08 PM
To: JJ England [mailto:jj.w.england@gmail.com]
Subject: Re: Fargo NCORE relocation question

Hello JJ,

Thank you for your interest in the ND NCore relocation proposal.

In the event that the relocation of the NCore site from Fargo to Bismarck is approved, Fargo will still operate as an urban scale SLAMS site. The pollutants that will continue to be monitored at Fargo will include Particulate Matter less than 2.5 microns in size (PM2.5), Nitrogen Dioxide (NO2), Ozone (O3), and Sulfur Dioxide (SO2). The pollutants that will no longer be monitored at Fargo after relocation include Carbon Monoxide (CO), Total Reactive Nitrogen (NOy), and PM2.5 Speciation.

There is quite a bit of additional information on air quality monitoring throughout the state in our complete 2015 annual report which can be found on our website at http://www.ndhealth.gov/AQ/ambient/Annual%20Reports/ARNP_14-15.pdf.

Regards,
-Chuck

From: JJ England [mailto:jj.w.england@gmail.com]
Sent: Wednesday, January 06, 2016 1:16 PM
To: Hyatt, Chuck R.
Subject: Re: Fargo NCORE relocation question

Great. Thanks for the quick reply!

-JJ