Attachment A

South Dakota Annual Ambient Air Monitoring Network Plan 2010

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Executive Summary

The South Dakota Department of Environment and Natural Resources (DENR) conducts a review of the ambient air monitoring network each year as required by Title 40 of the Code of Federal Regulations (CFR) Part 58. The review completed through the 2009 calendar year air monitoring data finds the state's air quality better than the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards statewide. Modifications to the state's ambient air monitoring network are being proposed to adjust the sampling sites to meet the changing needs of the state.

DENR is planning the following site modifications in 2010 and 2011:

1. Modifications are planned for the SD School Site by adding required National Core (NCore) parameters to the site in the fall of 2010:
   a. A Thermo carbon monoxide trace level analyzer;
   b. Two Met One BAM 1020 continuous monitors will be paired at the site to allow the collection of particulate matter 10 microns in diameter or less (PM_{10}), particulate matter 2.5 microns in diameter or less ($PM_{2.5}$) and particulate matter 10 microns in diameter or less but greater than 2.5 microns in diameter (PMcoarse);
   c. A Thermo Model 42i analyzer testing for reactive nitrogen compounds NOy; and
   d. Old RAAS $PM_{2.5}$ monitors at the SD School Site will be replaced with Thermo Partisol 2000 $PM_{2.5}$ manual monitors;

2. A change was made in 2008 installing Met One BAM 1020 Federal Equivalent Method continuous monitors as Special Purpose Monitors (SPM) at the Badlands, Wind Cave, Credit Union, SD School, UC #1 and UC #2 sites. At the start of 2011, these monitors will now be State and Local Air Monitoring Station (SLAMS) monitors. Operating continuous and manual $PM_{2.5}$ monitors at the same site is costly and redundant. Some sites like SD School and UC #2 continue to need both methods but at other sites one of the methods can be removed. DENR plans to close out the manual monitors at Wind Cave and Credit Union because the operation of both methods is redundant and concentrations are low at these two sites. Only the continuous method Met One BAM 1020 will be operated at the Wind Cave and Credit Union sites for the $PM_{2.5}$ parameter;

3. If equipment purchases allow, DENR plans to continue to replace the old RAAS $PM_{2.5}$ manual monitors with Partisol 2000 $PM_{2.5}$ monitors. The RAAS $PM_{2.5}$ monitors have been discontinued by the manufacturer and replacement parts will no longer be available after 2011. At the beginning of 2011 the Sioux Falls KELO Site RAAS $PM_{2.5}$ monitors will be replaced with Partisol 2000 monitors;

4. The sulfur dioxide and nitrogen dioxide analyzers will be moved from the Wind Cave Site to the Credit Union Site. This change is being made because there are six years of data for the Wind Cave Site for both sulfur dioxide and nitrogen dioxide, concentration levels are almost the same as at the Badlands Site(see Figure 7-7 in Section 7.4.6), and recorded concentrations at the Wind Cave and are very low almost at the detection level of the analyzers. In addition the addition of 1-hour standards as part of the revised sulfur dioxide and nitrogen dioxide standards makes it important to move analyzers to areas that do not have data so comparisons can be made to the new standards; and

5. The PM_{10} parameter at the KELO Site was evaluated and will be shutdown because there are no recorded 24-hour concentrations greater than the standard and none of the 24-hour samples have concentrations greater than 80% of the standard. The SD School Site, the other site in Sioux Falls, records slightly higher concentrations than the KELO Site so the SD School Site represents the highest concentration site for the city. The KELO Site will continue to be operated because the PM2.5 concentrations at this site are among the highest in the state.

No ambient air monitoring sites are planned to be closed in 2010 as a result of this review.

DENR will continue to evaluate the following areas for the need to modify the ambient air monitoring network:

1. A new ambient air monitoring site was requested by the Rapid City Area Air Quality Board after hearing a presentation by the City Street Department on the changes being implemented. DENR informed the Rapid City Area Air Quality Board that DENR will continue to evaluate the need for other ambient air monitoring sites in the city if problems with dust are noted;
2. As monitoring rules are finalized by EPA there may be a need for modifications to the sulfur dioxide, nitrogen dioxide, and ozone ambient air monitoring site locations; and
3. EPA revised the lead standard so DENR will determine if any new monitoring sites will be needed to show the state is attaining the revised standard.

The “South Dakota Annual Ambient Air Monitoring Network Plan” is published in DENR’s air quality website to provide public review and comments so adjustments can be made to meet the needs of the general public. The plan includes the following major sections:

1. Air monitoring goals, plans and needs are in Sections 3.0 through 5.0;
2. Evaluation of collected data compared to the National Ambient Air Quality Standards is in Section 6.0;
3. Determination of air pollution trends are in Sections 7.0 and 8.0; and
4. Proposed modifications to the ambient air monitoring network to meet the changing trends and national requirements are in Section 10.0.

1.0 INTRODUCTION

The EPA through the Code of Federal Regulations and the Performance Partnership Agreement requires the South Dakota Department of Environment and Natural Resources (DENR) to complete an annual ambient air monitoring network plan and a 5-year assessment of the state's ambient air monitoring sites. EPA's requirements for an annual ambient air monitoring network plan are listed in 40 CFR § 58.10. The annual ambient air monitoring network plan will cover a review of the ambient air monitoring sites and determine if the network is meeting the monitoring objectives in 40 CFR Part 58, Appendixes A, C, D, and E. The 5-year assessment will determine if the ambient air monitoring sites are meeting the needs and goals of the ambient air monitoring network. Both the annual plan and 5-year assessment identify if modifications to the network are necessary such as the termination or relocation of a monitor, termination of an existing station, addition of new parameters, or the establishment of new station.

This document addresses only the annual ambient air monitoring network plan. DENR is required to public notice the annual ambient air monitoring network plan for 30 days prior to submitting the plan to EPA. DENR will comply with this requirement by posting this document on DENR's Air Quality Program website at the following website for 30 days:

http://denr.sd.gov/des/aq/airprogr.aspx

In addition, the annual plan will be submitted to EPA for comments at the start of the public comment period.

All comments received by DENR during the 30 day period will be addressed by DENR and the appropriate changes will be incorporated in the plan. If a substantial change is made to the plan because of public comments or from EPA, another 30 day public comment period will be completed. A final report will be submitted to EPA and include the public comments, EPA's comments and DENR's responses for EPA's approval.

2.0 AMBIENT AIR MONITORING NETWORK HISTORY

In 1972, South Dakota developed and EPA approved a State Implementation Plan (SIP) which included the establishment and operation of an ambient air monitoring network for the state. In 1980, South Dakota submitted a revision to its SIP to upgrade the program by establishing a network of state and local air monitoring stations (SLAMS) and special purpose monitoring (SPM) stations. The network, with appropriate modifications, became the new ambient air monitoring network for South Dakota.

In 1985, the state set up the first samplers to test for levels of particulate matter 10 microns in diameter or less (PM_{10}) in anticipation of EPA adopting a PM_{10} National Ambient Air Quality Standard (NAAQS). In 1987, the total suspended particulate (TSP) standard was replaced with the new PM_{10} standard. South Dakota submitted a revised ambient air monitoring network plan to include sampling sites for the new PM_{10} standard and shutdown the TSP monitoring network in 1987.

Another new standard was added by EPA for particulate matter 2.5 microns in diameter or less ($PM_{2.5}$) in 1997. South Dakota submitted a revised ambient air monitoring network plan to include sampling sites for the new $PM_{2.5}$ standard. In 1999, $PM_{2.5}$ samplers were added to the ambient air monitoring network to determine compliance with the new standard.

Also in 1997, a new standard was set for ozone that lowered the concentration level and moved from a one hour to an eight hour average standard. Due to the standard change and concern with the modeling results by the Ozone Transport Assessment Group, the state started monitoring for ozone which by 2006 included sites in Sioux Falls, Rapid City, and Wind Cave National Park. South Dakota submitted an attainment designation to EPA on April 15, 2003, designating each county as attaining the new ozone standard.

In 2006, EPA revised the $PM_{2.5}$ standard significantly by reducing the 24-hour standard from 65 to 35 micrograms per cubic meter. South Dakota submitted an attainment designation to EPA on December 11, 2007, designating each county as attaining the new $PM_{2.5}$ standard.

In 2007, EPA revised the ozone standard and significantly reduced the standard from 0.08 to 0.075 parts per million. South Dakota is attaining the new standard and submitted a proposed attainment designation package for all counties in the state to EPA on March 6, 2009. The new presidential administration in 2009, asked EPA to stay the implementation of the new ozone standard and re-evaluate the standard. A new revised standard was proposed and EPA's final decision on the standard will be published in 2010.

The nitrogen dioxide (NO_2) NAAQS was reviewed and a new one-hour standard was set by EPA in 2009. The annual standard was retained without any change in concentration level. DENR began monitoring for nitrogen dioxide in 2003 and currently operates nitrogen dioxide monitors in Sioux Falls, Union County, Badlands National Park, and Wind Cave National Park.

EPA also made some changes to the ambient air monitoring requirements for lead in 2009. The change lowered the required monitoring requirement for sources emitting from 1.0 ton to 0.5 ton of lead or more per year and required monitoring at the National Core (NCore) sites.

Although there were no changes to the sulfur dioxide NAAQS in 2009, EPA established a new one-hour standard in 2010. DENR began monitoring for sulfur dioxide in 2002 and currently operates sulfur dioxide monitors in Sioux Falls, Union County, Badlands National Park, and Wind Cave National Park.

Data collected from the ambient air monitoring network is entered into the federal database called the Air Quality System (AQS). Individuals interested in reviewing the air quality data can go to EPA's website at the following address:

http://www.epa.gov/airexplorer/index.htm

3.0 AIR MONITORING GOALS AND USES OF DATA

DENR's Air Quality Program was established with the primary goal of protecting the health, welfare and property of South Dakotans from the detrimental effects of air pollution. The Clean Air Act of 1970 and subsequent amendments define air quality standards for various air pollutants necessary to protect the public from injurious pollution concentrations. Air pollution concentrations that exceed these established standards can cause "a public health hazard, nuisance, annoyance or damage buildings, property, animals, plants, forests, crops, exposed metals or otherwise interfere with the enjoyment of life or property."

In order to attain and maintain the National Ambient Air Quality Standards (NAAQS), DENR developed regulations that restrict air pollution from sources, establishes these restrictions in an air quality permit, requires periodic inspections to ensure compliance, and maintains an ambient air monitoring network to provide air quality information and monitor the success of the Air Quality Program.

4.0 CURRENT AMBIENT AIR MONITORING NETWORK

In calendar year 2008, the ambient air monitoring network included 15 monitoring sites. With adjustments to the network, 17 sites were operated at the beginning of 2009. Figure 4-1 shows a map of the general locations and cities with ambient air monitoring sites at the beginning of 2009. The following types of ambient air monitors and monitoring sites are operated in South Dakota:

1. State local air monitoring stations (SLAMS);
2. Special purpose monitors (SPM);
3. Air toxic monitors;
4. Prevention of Significant Deterioration (PSD) monitors;
5. Interagency Monitoring of Protected Visual Environments (IMPROVE) sites;
6. Environmental radiation ambient monitoring systems; and
7. National Core (NCore) multi pollutant sites.

Ambient air monitoring site files are maintained in DENR's Pierre office for the SLAMS and SPM sites. The ambient air monitoring site files are available for public review during normal working hours from 8:00 AM to 5:00 PM each workday. The monitoring site files contain at a minimum the following information for each site:

1. AQS site identification form;
2. Sampling location;
3. Sampling and analysis method;
4. Operating schedule;
5. Monitoring objective and spatial scale;
6. Beginning date of operation; and
7. Site maps.

Figure 4-1 – South Dakota Ambient Air Monitoring Sites

4.1 State Local Air Monitoring Station (SLAMS)

State and local air monitoring stations are ambient air monitors selected by the state and local air programs and used to determine compliance with the NAAQS. At the beginning of 2009, thirteen of the ambient air monitoring network sites operated SLAMS for at least one air pollutant. The sites in the network collected PM_{10} data at twelve sites, $PM_{2.5}$ data at nine sites, and sulfur dioxide, nitrogen dioxide, and ozone at five sites throughout South Dakota.

4.2 Special Purpose Monitors (SPM)

A SPM is a generic term for all monitors used for special studies. The data is reported to EPA, the equipment is EPA or non-EPA designated monitoring methods, and the monitoring data is used for special circumstances or needs. Nine of the ambient air monitoring network sites operated some kind of SPM parameter in 2009. The SPM parameters in South Dakota include:

1. Weather stations at the Black Hawk, SD School, and UC #1 Sites;
2. Gilt Edge Site operates a weather station in support of a Superfund cleanup action;
3. Continuous $PM_{2.5}$ monitors were operated at the Wind Cave, Credit Union, SD School, and UC #2 Sites;
4. A $PM_{2.5}$ speciation monitor is operated at the SD School Site;
5. Radiation monitors are operated at the Pierre and National Guard sites;

6. Air Toxic monitors are operated at the SD School and UC#1 sites; and
7. National Guard Site operates a PM_{10} monitor to help define the extent of the PM_{10} high concentration area in western Rapid City.

4.3 Air Toxics Monitors

As part of a national research project, air monitors testing for pollutants classified as air toxics are being operated at the SD School Site in Sioux Falls and at the Union County (UC) #1 Site in 2009. Testing for air toxic parameters began in South Dakota in Sioux Falls at the Hilltop Site in 2000 and continued at the SD School Site in 2008. The SD School Site is located near a grade school and the goal is to determine current concentration levels in Sioux Falls, South Dakota's largest city.

In 2002, a second air toxics monitor was established in Custer. This location was established because EPA's modeling estimates of air toxic emissions indicated Custer County had the potential for some parameters to be the highest readings in the state. The city of Custer is the largest city in Custer County so expected concentrations should be the highest for the areas. In March 2008, five years of sampling data was completed at this site and concentration trends showed levels were remaining steady. DENR decided to move the sampling equipment to another location because concentration trends were steady, there are no national ambient air quality standards for these pollutants, and five years of data provides the necessary samples to show background levels.

The Custer Site was closed in December 2008 and the equipment was moved to the UC #1 Site. The UC #1 Site is operated as part of three sites to determine background concentrations in the Union County area in anticipation of construction of the Hyperion Energy Center.

The air toxic data is reported to the AQS database by the EPA contractor so it can be compared with other national sites, provide baseline levels for South Dakota, and used in health studies. Currently, the data collected between 2000 and 2009 have been added by the EPA contractor into the National Air Toxic Assessment database. An individual can review the data assessments at:

http://www.epa.gov/ttn/atw/natamain

4.4 Prevention of Significant Deterioration (PSD) Monitors

In 2009, no Prevention of Significant Deterioration monitoring project were started or completed.

4.5 IMPROVE Sites

Two Interagency Monitoring of Protected Visual Environments (IMPROVE) sites are being operated by the National Parks Service in South Dakota. The sites are located at the Badlands National Park and Wind Cave National Park. Data results for parameters collected by the National Park Service can be requested from the individual national parks at:

http://vista.cira.colostate.edu/views/Web/Data/DataWizard.aspx.

4.6 Environmental Radiation Ambient Monitoring Systems (ERAMS)

The ERAMS in Pierre and Rapid City are being operated as a part of the national network of sampling sites. The Pierre Site has been operated since the early 1980s. The state has a limited role in operating the monitor. The state collects the samples, takes preliminary readings of radioactivity levels, and ships the samples to the EPA office of Radiation and Indoor Air. The type of sample collected is airborne particulates and measurements taken are gross beta radiation levels.

In 2009, EPA requested a second site in the state to be located in the Rapid City area. The new ERAMS monitor was installed at the National Guard Site on May 7, 2009. The site is operated by the Rapid City Regional Office in conjunction with the National Guard staff.

The general objectives of the sampling sites are to provide a means of estimating ambient levels of radioactive pollutants in our environment, to follow trends in environmental radioactivity levels, and to assess the impact of fallout and other intrusions of radioactive materials. Specifically, the ERAMS was designed to:

1. Provide a direct assessment of the population's intake of radioactive pollutants due to fallout;
2. Provide data for developing a set of dose computational models for specific sources and a national dose computational model to aggregate all sources and determine total population dose;
3. Monitor pathways for significant population exposure from routine, accidental, and terrorist releases of radioactivity from major sources;
4. Provide data for indicating additional sampling needs or other actions required to ensure public health and environmental quality in the event of a major release of radioactivity to the environment; and
5. Serve as a reference for data comparison with other localized and limited monitoring programs.

Information on the radiation data collected at these sites may be viewed at:

http://oaspub.epa.gov/enviro/erams_query.simple_query.

4.7 National Core (NCore) Multi Pollutant Sites

The NCore multi-pollutant monitoring site will provide data on several pollutants some at lower detection limits then collected in past years and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. Each state's monitoring network is required to have at least one NCore site and the stations must be operational by January 1, 2011.

The NCore site shall address the following monitoring objectives:

1. Timely reporting of data to the public through AIRNow, air quality forecasting, and other public reporting mechanisms;
2. Support development of emission strategies through air quality model evaluation and other observational methods;
3. Accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors;
4. Support long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards (NAAQS);
5. Compliance through establishing nonattainment/attainment areas by comparison with the NAAQS; and
6. Support multiple disciplines of scientific research, including; public health, atmospheric and ecological.

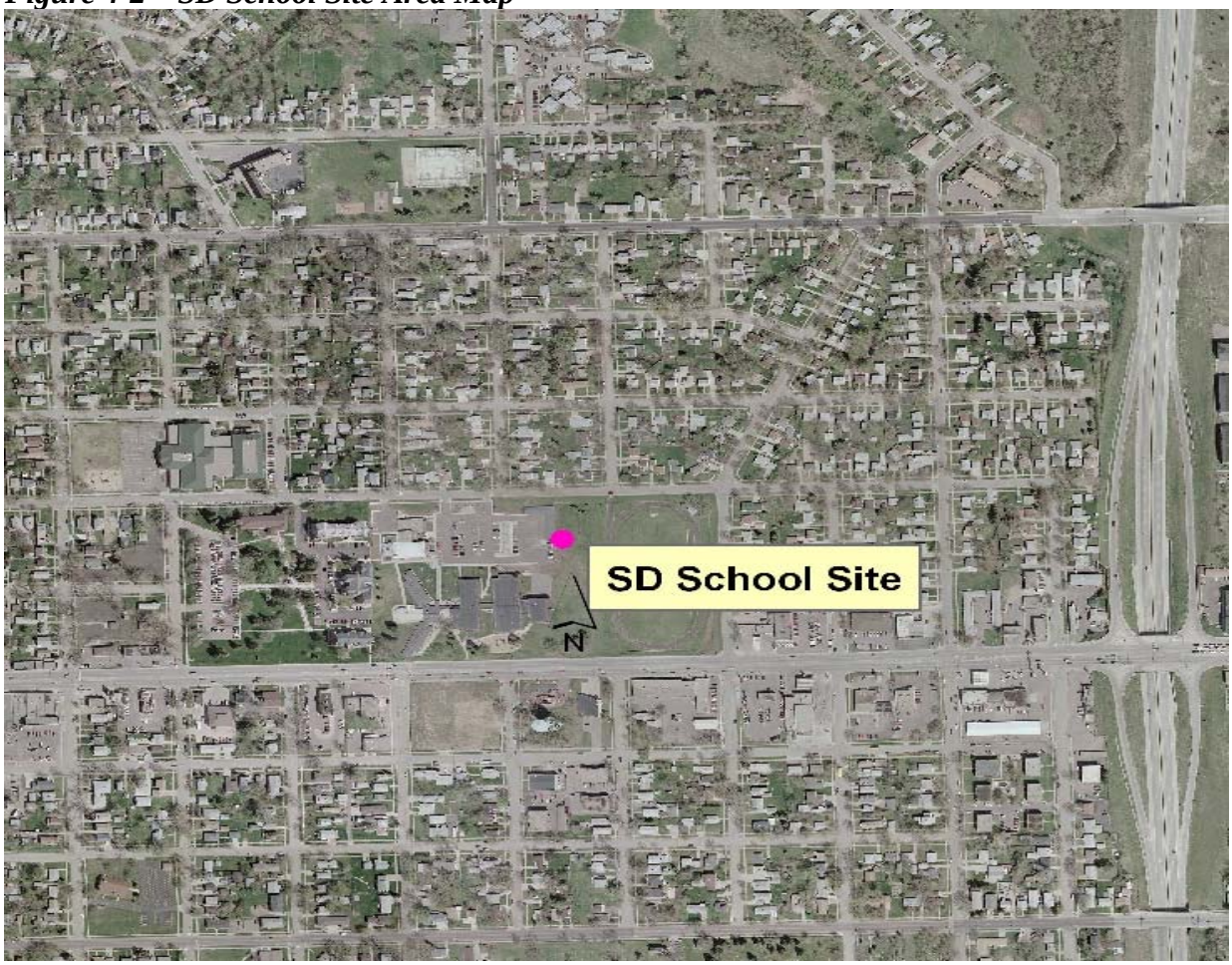
The NCore site in South Dakota is located on the School for the Deaf campus in Sioux Falls, which is identified as the SD School Site (46-099-0008). This site meets the location requirements to be in an urban population residential area. Sioux Falls was selected as the NCore site for South Dakota because it is the largest city in the state and is one of the states fastest growing communities. See Figure 4-2 for an aerial view of the city around the SD School Site.

The NCore site will collect data for trace level sulfur dioxide (SO_2), trace level nitrogen oxides (NOx), all reactive oxides of nitrogen (NOy), carbon monoxide (CO), ozone (O_3), $PM_{2.5}$ continuous and filter based monitors, PMcoarse mass, $PM_{2.5}$ speciated, PM_{10} lead, PMcoarse speciation and meteorological parameters of wind speed, wind direction, relative humidity, and ambient temperature.

DENR completed the equipment purchases and training is under way with DENR staff. The SD School Site was setup at the beginning of 2008. The site currently monitors for PM_{10} continuously, $PM_{2.5}$ continuously, $PM_{2.5}$ manually every third day, ozone continuously, trace level sulfur dioxide continuously, nitrogen dioxide continuously, air toxics every sixth day, and $PM_{2.5}$ speciation every sixth day. A meteorological station collects hourly data for wind speed, wind direction, relative humidity, and ambient temperature on a 10 meter tower.

In 2010, DENR plans to add a carbon monoxide analyzer, NOy analyzer and PMcoarse monitor to the site. EPA is not requiring the PM_{10} lead and PMcoarse speciation monitors be added to the site by the 2011 startup date. These parameters will be added later as equipment becomes available.

Figure 4-2 – SD School Site Area Map



5.0 MONITORING SITE LOCATIONS

The number and location sites and number and type of samplers in the ambient air quality monitoring network are determine for several reasons and meet certain needs such as population exposure, high concentration areas, source impacts, visibility protection of Class I areas, public access to collected data, and EPA required monitoring sites. This section will discuss these reasons and needs for sites in the air quality monitoring network.

5.1 Monitoring State's Large Population Centers

South Dakota's industrial base and population centers are typical of many of the northern plains states. The largest industry in the state is agriculture. Most of the other industries are located in several localized areas. The industries in these locations are typically small (less than 50 employees) and generally do not produce large quantities of air pollutants. Most are considered service oriented businesses or light industrial. The only heavy industrial facilities are Big Stone Power Plant in Grant County and the quarry area in Rapid City.

Most of the state's population of 754,844, in the 2000 Census, lives on either the eastern or western third of South Dakota. The two largest cities in South Dakota are Sioux Falls and Rapid City located in southeastern and western South Dakota, respectively. The remaining population is primarily spread across the eastern third of the state with the remaining portion of the state sparsely populated. See Table 5-1 for a list of the ten largest cities and Table 5-2 for a list of the 10 largest counties in the state.

Table 5-1 – 10 Largest Cities in South Dakota

Ranking	City Name	Counties	Population
1	Sioux Falls	Minnehaha/Lincoln	123,975
2	Rapid City	Pennington /Meade	59,607
3	Aberdeen	Brown	24,658
4	Watertown	Codington	20,237
5	Brookings	Brookings	18,504
6	Mitchell	Davison	14,558
7	Pierre	Hughes	13,876
8	Yankton	Yankton	13,528
9	Huron	Beadle	11,893
10	Vermillion	Clay	9,765

Given South Dakota's population distribution, most of the air monitoring efforts of the state have in the past been concentrated in the areas of high population. Within these areas of high population, monitoring sites are chosen that will determine areas of high pollution concentration, determine if the NAAQS are being met, identify and attempt to quantify pollutant concentrations emitted by industries, and identify sources that have the potential to release large amounts of pollutants. Air monitoring sites are currently being operated in or near the five largest cities and seven largest counties in the state.

Table 5-2 – 10 Most Populated Counties in South Dakota

Ranking	Counties	Population
1	Minnehaha	179,180
2	Pennington	98,533
3	Lincoln	39,713
4	Brown	35,154
5	Brookings	29,668
6	Codington	26,317
7	Meade	23,989
8	Lawrence	23,524
9	Yankton	21,835
10	Davison	18,931

5.2 Real Time Data

Providing air pollution data to the general public in a timely manner is one of the main goals for the air monitoring networks. DENR accomplishes this objective by providing hourly concentration data to the department website for Air Quality Program. The data on this website includes hourly data from the metropolitan statistical areas in Sioux Falls and Rapid City. It also includes ambient air monitoring at the Wind Cave and Badlands National Parks, Watertown, Black Hawk, and all three Union County sites (e.g., UC #1, UC #2, and UC #3). Specifically in the Rapid City area, High Wind Dust Alerts are called when meteorological conditions are forecasted that could cause high PM_{10} concentrations. This information along with a report graphing hourly concentrations recorded during the alert is also provided to the public through DENR's website at:

http://denr.sd.gov/des/aq/aarealtime.aspx

DENR also uploads data from the $PM_{2.5}$ and ozone monitors at the Wind Cave Site and ozone monitor at the Sioux Falls, SD School Site were reporting hourly data to the EPA AirNow website. This data along with other monitoring sites around the nation provides the public and EPA with near real time data to show current air pollution levels and forecast levels for long range transport. The goal for the future is to add other air monitoring sites in South Dakota to the EPA's AirNow site. The EPA AirNow website is at:

http://www.airnow.gov/

5.3 Class I Areas

There is a growing need for data in rural and small cities with the development of coal bed methane production in Wyoming and Montana and the potential for new coal fired power plants in and out of the state. In addition, South Dakota must develop a plan to implement the regional haze regulations required by the federal Clean Air Act. The implementation of these regulations will put more importance on air pollution levels in the state's two class I areas of the Badlands and Wind Cave National Parks.

Ambient air monitors were placed in these areas in order to determine background levels and the impact of long range transport of air pollutants like particulate matter, ozone, sulfur dioxide and nitrogen dioxide. In addition, ambient air monitoring data is needed to help in evaluating and determining air quality permit requirements for new facilities and the expansion of existing facilities. The Badlands Site was setup in 2000. In October 2004, DENR established a new monitoring site at Wind Cave Site. Both the Badlands and Wind Cave sites are collecting data for PM_{10}, $PM_{2.5}$, sulfur dioxide, nitrogen dioxide, and ozone. The two National Park sites also collect data using the IMPROVE monitors run by the National Park Service.

5.4 Ozone

Ozone levels in the nation are being impacted by long range transport from within the nation and internationally. In some cases, states are observing rural ozone levels higher than ozone levels in large cities. On the western side of South Dakota, DENR is aware that Colorado and Wyoming are having issues with high ozone levels in their rural areas. The sites with the highest recorded concentrations are at the Badlands and Wind Cave sites two areas with low population and industrial activities in the state.

On the eastern side of South Dakota, DENR has observed high concentrations due to long range transport originating from or passing through Minnesota and Iowa. It will be important to maintain ozone monitoring sites on both sides of South Dakota to determine if long range transport of air pollution affects concentration levels in South Dakota. This is a serious problem for states in the eastern half of the nation in meeting the ozone standard and beginning to be a problem in the western half of the nation as EPA lowers the ozone NAAQS.

In 1999, the first ozone monitor was setup in South Dakota and was located at the Sioux Falls Hilltop Site. In 2000, a second ozone monitor was added at the Robbinsdale Site in Rapid City. In 2003, the National Parks Service added an ozone monitor to the Badlands National Park and is located in a shelter next to the IMPROVE monitors near the park visitor center/headquarters. In 2005, a fourth ozone site was added at the Wind Cave Site. At that time, DENR moved the Rapid City ozone monitor to the RC Credit Union Site because the sampling shelter for the Robbinsdale Site was needed at the Wind Cave Site. The Wind Cave Site was added to determine if there are any impacts on the Wind Cave National Park from the large increase in oil and gas mining in Colorado, Wyoming and Montana.

In 2007, air dispersion modeling of industrial nitrogen dioxide emissions in Rapid City was completed by DENR and demonstrated the Credit Union Site does not meet location requirements for ozone monitoring in 40 CFR Part 58 because it is located within the one microgram per cubic meter impact area. For this reason the ozone analyzer was moved from the RC Credit Union Site to the Black Hawk Site in 2007.

Beginning in 2008, the SF Hilltop Site was moved to the SD School Site which is located on the school for the Deaf campus. The move was required because the City of Sioux Falls had to revert the Hilltop property back to the original owner because the water tower system was replaced ending the agreement to use the property.

5.5 $PM_{2.5}$

DENR added $PM_{2.5}$ monitors to the air monitoring network in 1998 after EPA set a new 24-hour and annual standard for this pollutant. All areas in the state attained the $PM_{2.5}$ standards set in 1997. In 2006, EPA revised the standard significantly lowering the 24-hour $PM_{2.5}$ NAAQS from 65 micrograms per cubic meter (ug/m^3) to 35 ug/m^3. At the lower level the standard concentration is a lot closer to the levels recorded at the South Dakota sites.

All sites have $PM_{2.5}$ concentrations that are attaining the revised 2006 $PM_{2.5}$ NAAQS levels in South Dakota. But two types of events are causing some concerns with 24-hour $PM_{2.5}$ samples. The first is the long range transport of smoke from wild land fires. DENR has investigated days with elevated concentrations of $PM_{2.5}$ that smoke maps have indicated were caused by wild fires in states to the west and Canada or large prescribed fires during the month of April from Kansas. Transport of smoke has caused elevated concentrations of $PM_{2.5}$ at almost all of the monitoring sites in the state during the last three years but sites currently continue to attain the standard because the number of days affect each year are still low.

The other event that causes elevated concentrations of $PM_{2.5}$ are large inversions that allow the build up of pollutants from large metropolitan areas east and southeast of the state form such areas as Minneapolis and Chicago. DENR staff continues to follow the Minnesota daily forecasts for $PM_{2.5}$ levels during the past two years because the high days recorded at the Watertown, Brookings, Sioux Falls and Union County sites are the same as forecast for Minnesota.

Part of the review of the air monitoring network is to determine if each monitoring site can be used to determine if an area is attaining the $PM_{2.5}$ standards. All of the monitoring sites in the South Dakota air monitoring network meet the requirements in 40 CFR Part 58, Appendix D Section 4.7 for $PM_{2.5}$ testing for comparison to the NAAQS. Other requirements for $PM_{2.5}$ monitoring listed in this section include:

1. Minimum of one population-oriented site in an area of expected high concentration. DENR operates monitors in the Sioux Falls Metropolitan Statistical Area and Rapid City Metropolitan Statistical Area located on the neighborhood scale and associated with expected high concentration area from mobile and stationary;
2. Monitor in areas of suspected poor air quality. DENR operates sites in the largest cities in the state at Rapid City, Aberdeen, Watertown, Brookings, and Sioux Falls and in Union County;
3. Have at least one site to test for background and long range transport. DENR operates sites at the Badlands and Wind Cave sites. Both sites provide data for this purpose; and
4. Operate one $PM_{2.5}$ speciation site. A $PM_{2.5}$ speciation monitor is operated at the in Sioux Falls at the SD School Site.

In 2010, EPA began the process of a new review of the particulate matter standards. Indications are EPA may once again low concentration levels moving closer to levels recorded in South Dakota. $PM_{2.5}$ will continue to be a priority for sampling sites in eastern 1/3 of the state where concentrations are the highest in the state.

5.6 Other Air Monitoring Needs

40 CFR Part 58, Appendix D, contains information used to design an ambient air monitoring network and lists three basic objectives in designing an air monitoring network. The first objective is to provide air pollution data to the general public in a timely manner which was discussed in Section 5.2. The following are the other two basic objectives DENR follows when developing the air monitoring network in South Dakota:

1. Support compliance with ambient air quality standards and emissions strategy development. DENR accomplishes this objective by locating the sites throughout the state to assess the permit control measures and pollution emission impacts on the state. For example, the Rapid City air monitoring sites specifically evaluate the facility permit control measures and the special measures taken to reduce fugitive dust levels; and
2. Support for air pollution research studies. DENR supports research by loading the air quality data into EPA's AQS site and by supporting local studies when requested by the state's colleges.

5.7 Future Monitoring

There is currently minimal monitoring being completed in other parts of the state that have small, but expanding populations and industries. These areas include the northeastern and the northern Black Hills portions of the state. These areas will continue to be evaluated to determine whether additional monitoring efforts need to be concentrated in those areas.

PM_{10}, $PM_{2.5}$ and ozone will be the focus of the monitoring network as levels of these pollutants have the greatest potential to have concentrations close to the standard. As the standards are revised for nitrogen dioxide and sulfur dioxide additional sampling may be required. Testing for the pollutants listed in this paragraph will be a priority for the Air Quality Program.

6.0 COMPLIANCE WITH NAAQS

This section provides a comparison of the collected data to the NAAQS. The comparison will determine if an area is attaining the standard. In addition, the comparison will assist in determining if more monitoring stations for certain parameters is needed in an area or an area no longer needs to monitor for a certain parameter or parameters.

6.1 Particulate Matter (PM_{10})

The PM_{10} NAAQS is based on a 24-hour average concentration. The maximum 24-hour average concentration allowed is 150 micrograms per cubic meter (ug/m^3). Attainment with the 24-hour standard is demonstrated when there is less than or equal to one expected exceedance per year averaged over three years. A 24-hour average concentration of 154.4 ug/m^3 is the highest level that still attains the 24-hour standard for PM_{10}.

In 2009, the statewide PM_{10} monitoring network included 13 monitoring locations. Six of the sites recorded data using manual monitors providing 24-hour sample concentrations. Seven of the sites have continuous samplers providing 1-hour concentrations. The main distribution of the PM_{10} air monitoring sites is located in South Dakota's two largest cities; Rapid City (three sites) and Sioux Falls (two sites). Two sites are operated in central Union County for pre-construction, construction and post construction of the Hyperion Energy Center. Other locations with one site include Badlands, Wind Cave, Aberdeen, Watertown, Black Hawk, and Brookings.

Table 6-1 contains a list of the 24-hour PM_{10} expected exceedance rates and the design value (2nd maximum, 24-hour 3-year average) concentration for each site through the end of 2009. Again, the design value means the calculated pollutant concentration according to the applicable appendix in 40 CFR Part 50 as compared to the pollutant's standard. Since the 24-hour standard allows for one expected exceedance per year, the 2nd highest maximum 24-hour concentration helps determine how close a site is to exceeding the 24-hour standard. The 3-year average value (design value) reduces the impact from an unusually high concentration in one year and is a better comparison of the actual pollution levels.

During 2009, one event recorded 24-hour concentrations greater than the PM_{10} 24-hour standard of 150 ug/m^3. The event occurred at the Wind Cave Site from September 3 through September 6 when a federal land manager's prescribed fire burned the area around the air monitoring site at Wind Cave. The 24-hour average PM_{10} concentration during the first day of the event was 337 ug/m^3. The second day of the fire the concentration fell to 141 ug/m^3. The following two days concentrations continued to fall. All four days had higher than normal concentrations and were flagged as exceptional events due to the federal land manager's prescribed fire. DENR flagged the data and will request EPA's concurrence for the first day of the pre-scribed fire if the day will have a significant impact on the attainment status of this site. The 24-hour design value site concentration for the Wind Cave is 41 ug/m^3 so the 24-hour concentration for September 3 through September 6, 2009 is significantly higher than past levels. DENR has committed to working with the federal land managers on a Smoke Management Plan to minimize the impacts of prescribed fires on air quality.

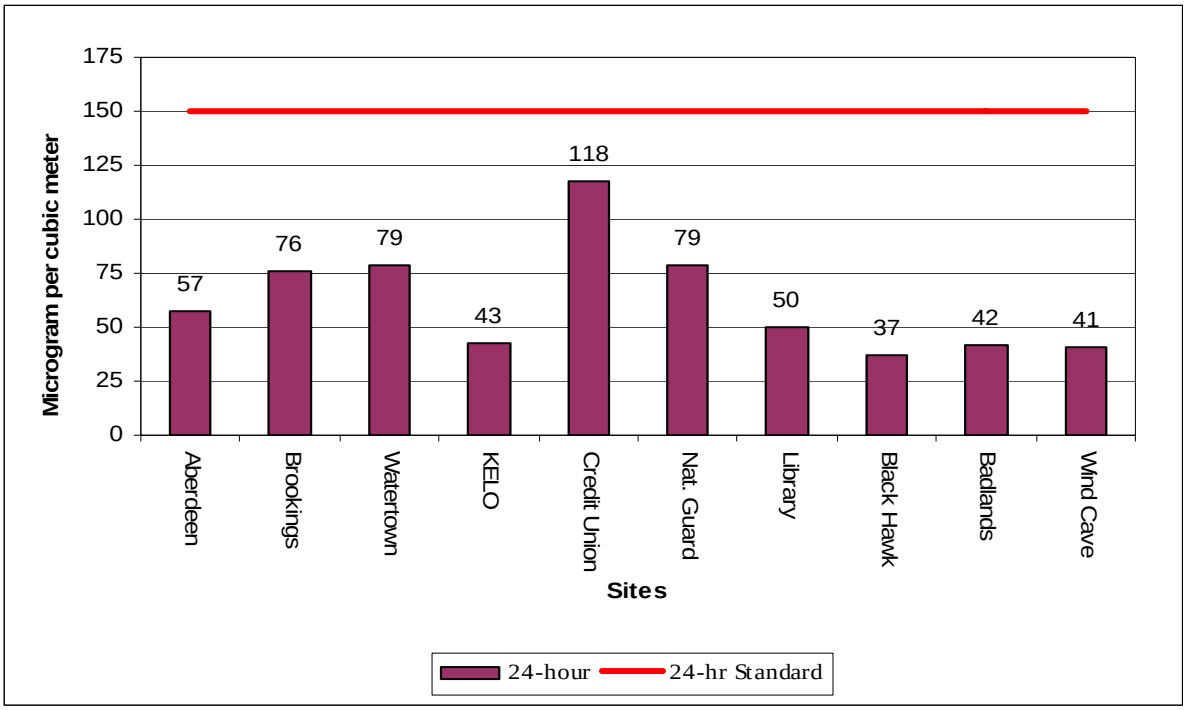
Table 6-1 – Statewide PM_{10} 24-Hour Average Concentrations

Site	Expected Exceedance Rate	Yearly 2nd Maximum 24-hour	2009 3-year Average	Attainment	Percent Standard
RC Library	0	2007 – 54 ug/m^3 2008 – 48 ug/m^3 2009 – 49 ug/m^3	50 ug/m^3	Yes	33%
RC National Guard	0	2007 – 89 ug/m^3 2008 – 84 ug/m^3 2009 – 65 ug/m^3	79 ug/m^3	Yes	53%
RC Credit Union	0	2007 – 105 ug/m^3 2008 – 124 ug/m^3 2009 – 124 ug/m^3	118 ug/m^3	Yes	79%
Black Hawk	0	2007 – 42 ug/m^3 2008 – 36 ug/m^3 2009 – 34 ug/m^3	37 ug/m^3	Yes	25%
Badlands	0	2006 – 30 ug/m^3 2007 – 40 ug/m^3 2008 – 56 ug/m^3	42 ug/m^3	Yes	28%
SF KELO	0	2007 – 42 ug/m^3 2008 – 46 ug/m^3 2009 – 40 ug/m^3	43 ug/m^3	Yes	29%
SD School	0	2007	55 ug/m^3	[1]	37%

Site	Expected Exceedance Rate	Yearly 2nd Maximum 24-hour	2009 3-year Average	Attainment	Percent Standard
		2008 – 59 ug/m^3 2009 – 51 ug/m^3			
Brookings	1.0	2007 – 49 ug/m^3 2008 – 120 ug/m^3 2009 – 58 ug/m^3	76 ug/m^3	Yes	51%
Aberdeen	0	2007 – 49 ug/m^3 2008 – 70 ug/m^3 2009 – 53 ug/m^3	57 ug/m^3	Yes	38%
Watertown	0.3	2007 – 66 ug/m^3 2008 – 91 ug/m^3 2009 – 80 ug/m^3	79 ug/m^3	Yes	53%
Wind Cave	0	2007 – 43 ug/m^3 2008 – 47 ug/m^3 2009 – 32 ug/m^3	41 ug/m^3	Yes	27%
UC #1	0	2007 2008 2009 – 79 ug/m^3	79 ug/m^3	[1]	53%
UC #2	0	2007 2008 2009 – 49 ug/m^3	49 ug/m^3	[1]	33%

[1] – Site with less than three years of air monitoring data. DENR is unable to compare the results to the PM_{10} 24-hour standard until three years of data is obtained.

Figure 6-1 – 2009 PM_{10} 24-Hour Design Values Statewide



In 2009, the RC Credit Union Site continued to record the highest 24-hour average concentration not affected by an exceptional event in the state at 124 ug/m^3 and had the highest PM_{10} design value in the state at 79% of the standard. The second highest site in the state was the Watertown Site at 80 ug/m^3, which is the first time the site has had the second highest concentration in the last three years. This is represented by the Watertown and RC National Guard sites each having the second highest design value in 2009 at 53% of the standard. The remaining sites have design values less than 53%. Figure 6.1 shows a graph of the design value for each PM_{10} site. The design value for all of the sites is less than 80% of the 24-hour standard, although the RC Credit Union Site is close at 79%. Sites with a design value 80% or greater have the potential to have a 24-hour sample exceed the PM_{10} standard.

In general, PM_{10} concentrations were about the same to slightly lower at most sites in 2009. The only exception was at the Badlands Site with an increase from 40 to 56 ug/m^3. The Rapid City area continues to be the only location in South Dakota with a PM_{10} 24-hour design value close to 80% of the PM_{10} standard. DENR continues to work with the city, county, industry, and other state agencies to minimize fugitive dust emissions and maintain PM_{10} concentrations below the PM_{10} standard. The PM_{10} data collected in 2007 through 2009 demonstrates that South Dakota is attaining the PM_{10} 24-hour NAAQS.

6.2 Particulate Matter ($PM_{2.5}$)

The $PM_{2.5}$ NAAQS consists of a 24-hour and annual standard. The 24-hour standard is 35 ug/m^3. Attainment of the 24-hour standard is achieved when the maximum expected 24-hour average concentration, based on the annual 98th percentile averaged over three years, is less than or equal

to 35 ug/m^3. The $PM_{2.5}$ annual standard is 15 ug/m^3. Attainment is demonstrated when the maximum expected annual arithmetic mean averaged over three consecutive years is equal to or less than 15 ug/m^3.

In 2009, there were eleven $PM_{2.5}$ SLAMS sites operated in the state. Federal Reference Method manual monitors were operated at nine of the $PM_{2.5}$ sites. Met One BAM continuous $PM_{2.5}$ monitors with Federal Equivalent Method designation were operated as SLAMS parameters at UC #1 and Badlands. Met One BAM continuous $PM_{2.5}$ monitors were operated as SPMs for $PM_{2.5}$ at SD School, UC #2, Credit Union, and Wind Cave sites. Because these were SPMs type parameters for $PM_{2.5}$, the samples collected at these sites were not compared to the $PM_{2.5}$ NAAQS to determine compliance.

Table 6-2 shows the yearly 24-hour 98th percentile for each of the last three years, the 2009 3-year average design value, designation status, and the design values' percentage of the standard for each site. The highest 24-hour design value was recorded at the Sioux Falls KELO Site with a 3-year average concentration of 25.5 ug/m^3 or 73% of the standard. The Watertown Site followed closely with a 3-year average concentration of 24.2 ug/m^3 with only 1.3 ug/m^3 separating the two sites. As expected, the background locations at the Badlands and Wind Cave sites had the lowest 24-hour design value. Figure 6-2 contains a graph of the expected 24-hour 98 percentile concentration for each $PM_{2.5}$ monitoring site in the state.

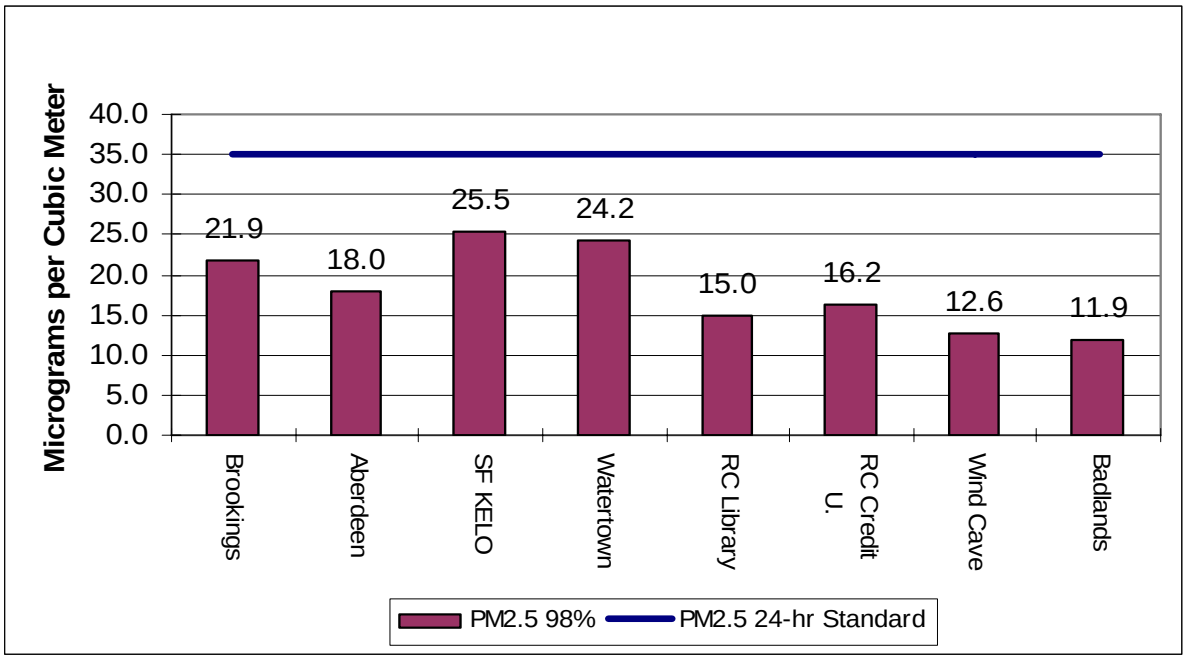
Table 6-2 – Statewide $PM_{2.5}$ 24-Hour Concentrations

Site	Yearly 98th Percentile	2009 3-year Average Design Value	Attainment	Percent Standard
RC Library	2007 – 16.7 ug/m^3 2008 – 15.2 ug/m^3 2009 – 13.1 ug/m^3	15.0 ug/m^3	Yes	43%
RC Credit Union	2007 – 15.5 ug/m^3 2008 – 18.7 ug/m^3 2009 – 14.3 ug/m^3	16.2 ug/m^3	Yes	46%
Badlands	2007 – 12.4 ug/m^3 2008 – 12.8 ug/m^3 2009 – 10.4 ug/m^3	11.9 ug/m^3	Yes	34%
SF KELO	2007 – 28.4 ug/m^3 2008 – 26.0 ug/m^3 2009 – 22.2 ug/m^3	25.5 ug/m^3	Yes	73%
SD School	2007 2008 – 20.2 ug/m^3 2009 – 21.9 ug/m^3	21.1 ug/m^3	[1]	60%
Brookings	2007 – 21.1 ug/m^3 2008 – 18.9 ug/m^3 2009 – 25.7 ug/m^3	21.9 ug/m^3	Yes	63%

Site	Yearly 98th Percentile	2009 3-year Average Design Value	Attainment	Percent Standard
Aberdeen	2007 – 14.7 ug/m^3 2008 – 16.3 ug/m^3 2009 – 23.0 ug/m^3	18.0 ug/m^3	Yes	51%
Watertown	2007 – 21.1 ug/m^3 2008 – 28.4 ug/m^3 2009 – 23.1 ug/m^3	24.2 ug/m^3	Yes	69%
Wind Cave	2007 – 17.5 ug/m^3 2008 – 10.8 ug/m^3 2009 – 9.6 ug/m^3	12.6 ug/m^3	Yes	36%
UC #1	2007 2008 2009 – 21.3 ug/m^3	21.3 ug/m^3	[1]	61%
UC #2	2007 2008 2009 – 23.3 ug/m^3	23.3 ug/m^3	[1]	67%

[1] – Site with less than three years of air monitoring data. DENR is unable to compare the results to the $PM_{2.5}$ 24-hour standard until three years of data is obtained.

Figure 6-2 – 2009 $PM_{2.5}$ 24-Hour Design Value Statewide



The change in the 24-hour 98th percentile concentrations from 2008 to 2009 was a mixture with the west river sites having concentrations that were slightly lower and majority of the east river sites showing a slight increase in $PM_{2.5}$ levels. In 2009, the highest 24-hour 98th percentile concentration in the state was recorded at the Brookings Site with a level of 25.7 ug/m^3. The second highest site was the UC #2 Site at 23.3 ug/m^3.

During 2009, two periods of time recorded 24-hour concentrations greater than the $PM_{2.5}$ 24-hour standard of 35 ug/m^3. The first event occurred at the Wind Cave Site from September 3 through September 6 when a federal land manager's prescribed fire burned the area around the air monitoring site at Wind Cave. The 24-hour average $PM_{2.5}$ concentration during the first day of the event was 112.6 ug/m^3. The second day of the fire the concentration was 303.6 ug/m^3. The following two days also recorded concentrations greater than the standard as the fire slowly burned out. All four days were flagged as exceptional events due to the federal land manager's prescribed fire. DENR flagged the data and will request EPA's concurrence for all four days if these days will have a significant impact on the attainment status of this site. The 24-hour 98th percentile for 2009 at the Wind Cave Site is 9.6 ug/m^3, which includes the 24-hour average $PM_{2.5}$ concentrations recorded during this event. DENR has committed to working with the federal land managers on a Smoke Management Plan to minimize the impacts of prescribed fires on air quality.

The second event occurred on December 18, 2009, and impacted the eastern edge of the state with concentrations greater than the 24-hour $PM_{2.5}$ standard at Watertown, Brookings, both Sioux Falls Sites, and both Union County sites. This event was associated with high concentrations in both Minnesota and Iowa with Minnesota calling an alert for the southern two thirds of its state. The following is the $PM_{2.5}$ pollution alert issued by Minnesota:

> "The Minnesota Pollution Control Agency (MPCA) has issued an air pollution health advisory for the southern two-thirds of Minnesota, including the Twin Cities, Rochester, St. Cloud, Marshall, and Detroit Lakes areas for Thursday, December 17 through Friday, December 18. Light southerly winds and local temperature inversions are encouraging fine particle transport and buildup in the region. As a result, Air Quality Index (AQI) levels in the Twin Cities are forecasted to be high-moderate on Thursday and unhealthy for sensitive groups on Friday, with an expected peak AQI of 105. The MPCA issues an air pollution health alert when actual AQI levels exceed 101.
> Air quality is expected to improve late Friday as winds increase and clean air from the north enters the region. The extended air quality forecast indicates air quality will improve to low-moderate conditions on Saturday, and should become good by Sunday."

The alert notice indicates the high levels were pollutants brought in by long range transport of $PM_{2.5}$ air pollution from the south and southeast of Minnesota pushed by southeast and east winds into eastern South Dakota. The weather in eastern South Dakota during this period of time included light winds and fog during the hours of the event with snow on the ground.

Table 6-3 contains a list of the $PM_{2.5}$ annual concentrations for each site in the state. The highest annual concentration in 2009 was recorded at the SF KELO Site at 9.1 ug/m^3. The second highest site outside of the Sioux Falls area was the Brookings Site at 8.6 ug/m^3. The Badlands Site had the lowest annual average in 2009 at 4.0 ug/m^3. The $PM_{2.5}$ data collected in 2007 through 2009 demonstrates that South Dakota is attaining the 24-hour $PM_{2.5}$ NAAQS.

Figure 6-3 contains a graph of the expected annual averages for each of the $PM_{2.5}$ sites in the state. None of sites in the network exceeded the expected annual $PM_{2.5}$ standard through the end

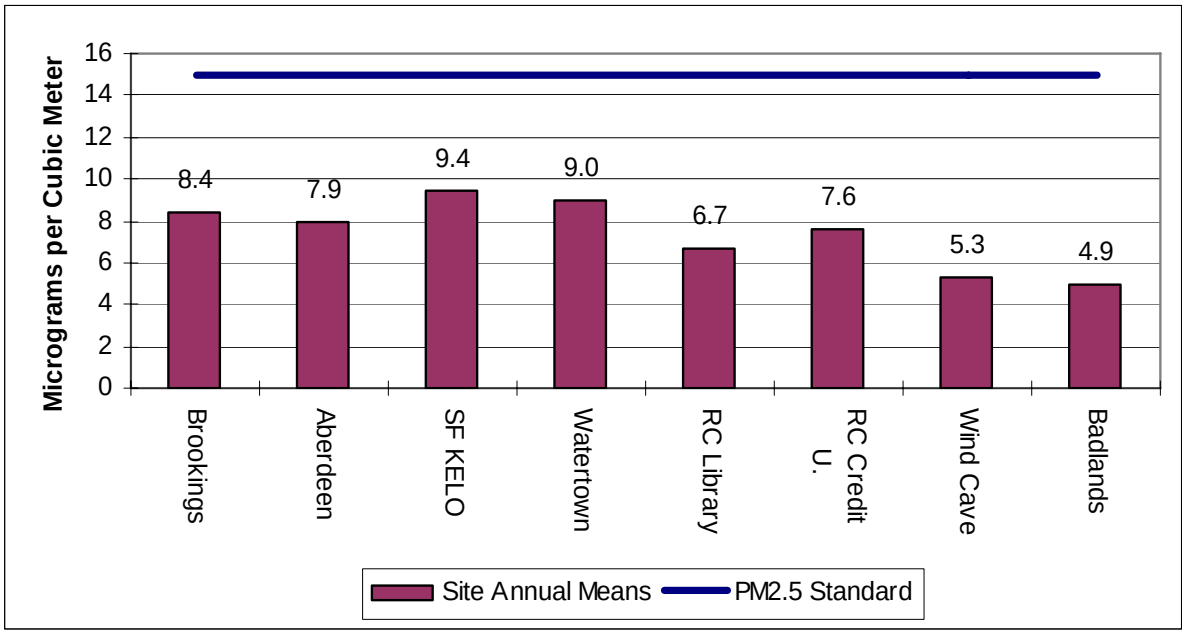
Table 6-3 – Statewide $PM_{2.5}$ Annual Concentrations

Site	Annual Average	2009 3-yr Average	Attainment	Percent Standard
RC Library	2007 – 7.4 ug/m^3 2008 – 6.7 ug/m^3 2009 – 5.9 ug/m^3	6.7 ug/m^3	Yes	45%
RC Credit Union	2007 – 8.3 ug/m^3 2008 – 7.7 ug/m^3 2009 – 6.7 ug/m^3	7.6 ug/m^3	Yes	51%
Badlands	2007 – 5.5 ug/m^3 2008 – 5.2 ug/m^3 2009 – 4.0 ug/m^3	4.9 ug/m^3	Yes	33%
SF KELO	2007 – 9.6 ug/m^3 2008 – 9.4 ug/m^3 2009 – 9.1 ug/m^3	9.4 ug/m^3	Yes	63%
SD School	2007 2008 – 9.0 ug/m^3 2009 – 9.0 ug/m^3	9.0 ug/m^3	[1]	60%
Brookings	2007 – 8.7 ug/m^3 2008 – 8.0 ug/m^3 2009 – 8.6 ug/m^3	8.4 ug/m^3	Yes	56%
Aberdeen	2007 – 8.0 ug/m^3 2008 – 7.7 ug/m^3 2009 – 8.1 ug/m^3	7.9 ug/m^3	Yes	53%
Watertown	2007 – 8.9 ug/m^3 2008 – 9.7 ug/m^3 2009 – 8.5 ug/m^3	9.0 ug/m^3	Yes	60%
Wind Cave	2007 – 6.2 ug/m^3 2008 – 4.9 ug/m^3 2009 – 4.7 ug/m^3	5.3 ug/m^3	Yes	35%
UC #1	2007 2008 2009 – 7.4 ug/m^3	7.4 ug/m^3	[1]	49%
UC #2	2007 2008 2009 – 8.4 ug/m^3	8.7 ug/m^3	[1]	58%

[1] – Site with less than three years of air monitoring data. DENR is unable to compare the results to the $PM_{2.5}$ annual standard until three years of data is obtained.

of 2009. The expected annual average concentrations followed about the same pattern as the 24-hour levels. The highest annual concentrations were collected in the eastern third of the state.The highest expected annual concentration was recorded at the SF KELO Site with a level of 9.4 ug/m^3. The lowest $PM_{2.5}$ expected annual average was recorded at the background site of Badlands with a concentration of 4.9 ug/m^3.

Figure 6-3 – 2009 $PM_{2.5}$* Annual *Design Value Statewide



6.3 Lead

During the early 1980's, DENR conducted lead sampling. The levels detected were well below the lead NAAQS at that time. After passage of the 1990 Clean Air Act Amendments, there were concerns with the way EPA had instructed states in determining if those areas were in attainment of the lead standard. For this reason, a monitoring site was established in April 1992, at the Jaehn's Site in Rapid City to determine compliance with the standard. This site was downwind of GCC Dacotah, which is a cement plant and has the potential to emit lead.

The results of the analyzed data from the second quarter of 1992 through the first quarter of 1994 showed lead levels again well below the standard level for the lead NAAQS. Due to the low concentrations of lead in Rapid City, the sampling site was terminated at the end of the first quarter in 1994.

EPA changed the lead NAAQS on October 15, 2008. The change significantly lowers the lead standard from 1.5 ug/m^3 to 0.15 ug/m^3 based on the annual maximum three month rolling average. Attainment of the lead NAAQS is achieved if the annual maximum three month rolling average, averaged over a three year period, is less than or equal to 0.15 ug/m^3.

In 2010, an EPA rule change calls for source type testing in addition to network testing if a point source has actual lead emissions of 0.5 ton or greater per year. The rule also requires lead testing at the NCore sites but it is anticipated lead testing will not be required at the NCore site until 2012.

Currently, the only lead monitoring site planned in the air monitoring network will be at the SD School Site, which is South Dakota's NCore site. No other change in the air monitoring network

will be needed for lead testing since point source emissions of lead are all below the 0.5 ton per year level in South Dakota. The goals of any new testing would be to show attainment, establish background, and compare the results to earlier sampling.

6.4 Ozone

In 2008, EPA changed the ozone NAAQS from 0.08 to 0.075 parts per million (ppm) based on the fourth highest daily 8-hour average. Attainment of the ozone standard is achieved if the fourth highest, daily 8-hour average, averaged over three years, is less than or equal to 0.075 ppm.

In 2009, the new EPA administration stopped the implementation of the standard and is currently reviewing the ozone standard. EPA proposed a different revised ozone standard and will make a final decision on the standard at the end of 2010. DENR is basing its review on the current ozone standard of 0.075 ppm.

Table 6-4 provides a statewide comparison of annual 4th highest 8-hour average concentrations,

Table 6-4 – Statewide Ozone 4th Highest Concentrations

Site	4th Highest Concentration	2009 3-year Average	Attainment	Percent Standard
SD School	2007 2008 – 0.061 ppm 2009 – 0.062 ppm	0.062 ppm	[1]	83%
Brookings Research Farm	2007 2008 – 0.059 ppm 2009 – 0.057 ppm	0.058 ppm	[1]	77%
Black Hawk	2007 – 0.053 ppm 2008 – 0.060 ppm 2009 – 0.057 ppm	0.057 ppm	Yes	76%
Badlands	2007 – 0.064 ppm 2008 – 0.053 ppm 2009 – 0.054 ppm	0.057 ppm	Yes	76%
Wind Cave	2007 – 0.069 ppm 2008 – 0.059 ppm 2009 – 0.061 ppm	0.063 ppm	Yes	84%
UC #3	2007 2008 2009 – 0.060 ppm	0.060 ppm	[1]	80%

[1] – Site with less than three years of air monitoring data. DENR is unable to compare the results to the ozone standard until three years of data is obtained.

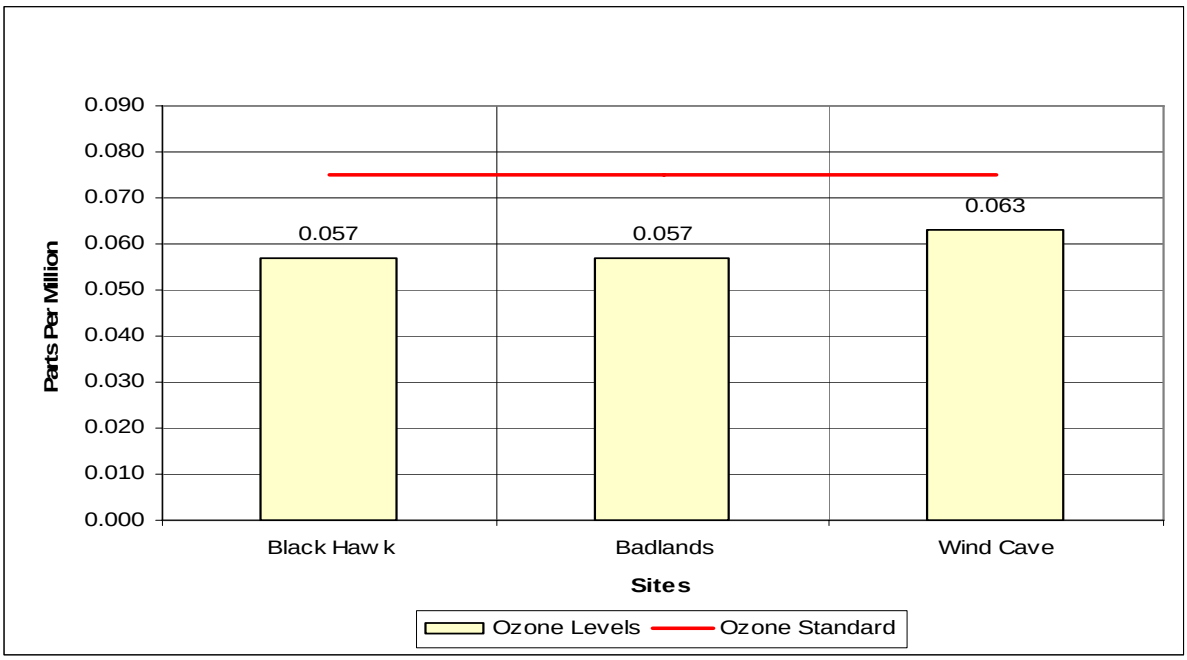
the 3-year average design value, attainment status, and the design values percentage of the standard. Figure 6-4 provides a statewide view of the 2009 ozone 8-hour design value statewide. In 2009, the maximum 4th highest 8-hour ozone concentration was recorded at the SD School

Site at 0.062 ppm. The lowest 4th highest 8-hour ozone concentration in 2009 was recorded at the Badlands Site at 0.054 ppm.

Ozone concentrations are close in concentration levels statewide. The Wind Cave Site continues to have the highest three year average for ozone concentrations in the state at 0.063 ppm, which is 84% of the ozone standard. The ozone data collected from 2007 to 2009 demonstrates that South Dakota is attaining the 8-hour ozone NAAQS.

Ozone concentration level changes from 2008 to 2009 showed mixed results. Most of the sites had a slight increase in concentrations with the Black Hawk and Brookings Research Farm sites having slightly lower levels. Currently all ozone sites are less than 85% of the standard at the end of 2009. One item to note, the same federal land manager's prescribed fire at the Wind Cave National Park which impacted the particulate monitors also impacted the ozone monitor resulting in ozone concentrations being voided and threatening the percentage of days collected at the site in 2009. If the percentage of days collected at the site is less than 75%, that year of data can not be used to calculate the three year average for ozone levels.

Figure 6-4 – 2009 Ozone 8-Hour Design Value Statewide



The ozone data collected in the past three years demonstrates that South Dakota is attaining the ozone NAAQS. Once EPA issues its determination on what the ozone NAAQS should be, DENR will need to evaluate each site and possibly new locations in order to demonstrate compliance with the standard in future years.

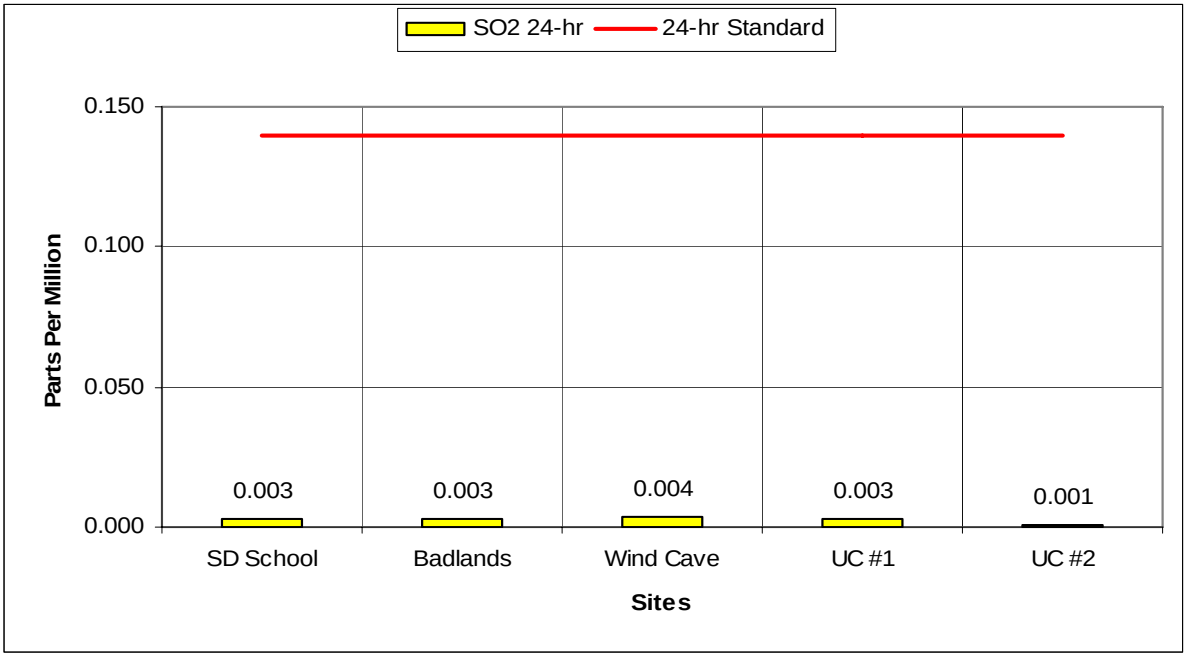
6.5 Sulfur Dioxide

The standards for sulfur dioxide have three different concentration levels. There are two primary standards based on a 24-hour average and an annual average. The third is a secondary standard based on a maximum 3-hour average.

The 24-hour standard is based on an average concentration of 0.14 ppm, not to be exceeded more than once per year. Attainment with the 24-hour standard is achieved if the 2nd highest 24-hour average concentration for the year is less than or equal to 0.14 ppm. When using a standard form of not more than one exceedance per year the 2nd highest maximum 24-hour concentration is used to determine compliance with the standard. The graph in Figure 6-5 shows the 24-hour concentration 2nd maximum for each of the sites in the network for 2009.

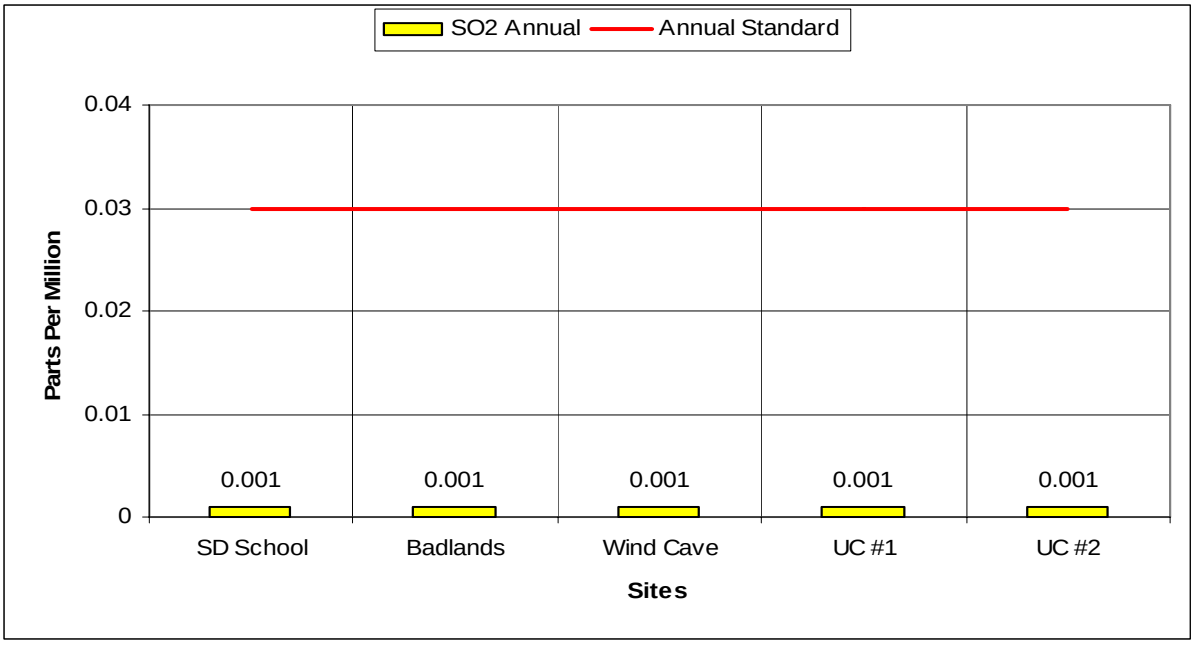
All six of the sites recorded concentrations well under the 24-hour standard. The 2nd highest 24-hour concentration was recorded at the Wind Cave Site with a maximum concentration of 0.004 ppm which is 3% of the standard and is slightly lower than the highest level in 2008. All five sites have concentrations within 0.001 to 0.004 ppm showing similar sulfur dioxide levels statewide. The sulfur dioxide data collected in 2009 demonstrates that South Dakota is attaining the sulfur dioxide 24-hour NAAQS.

Figure 6-5 – 2009 Sulfur Dioxide 2nd Highest 24-Hour Concentration Statewide



The annual sulfur dioxide standard is based on a maximum annual arithmetic mean. Attainment is demonstrated when the annual arithmetic mean is less than or equal to 0.030 ppm. The graph in Figure 6-6 shows the annual concentrations in 2009 for all sites in the network.

Figure 6-6 – 2009 Sulfur Dioxide Annual Concentrations Statewide



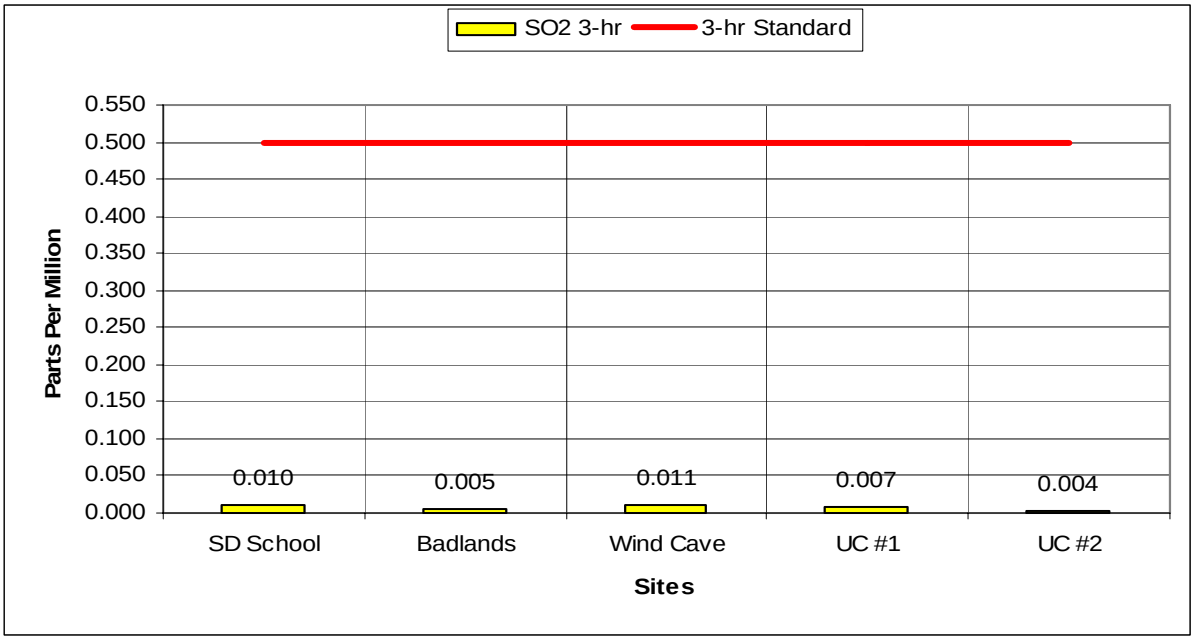
All sites in 2009 are well under the standard and had the same annual concentration of 0.001 ppm. The calculated level is near the detection level of the equipment and is 3% of the annual standard. The annual sulfur dioxide concentrations for all five sites show only slight changes from the previous year. The sulfur dioxide data collected in 2009 demonstrates that South Dakota is attaining the sulfur dioxide annual NAAQS.

The secondary standard is based on a 3-hour average concentration of 0.500 ppm, not to be exceeded more than once per year. All sites are attaining the standard in 2009. The Wind Cave and SD School sites recorded the highest 3-hour average in 2009. The Wind Cave Site concentration of 0.011 ppm was only 2% of the 3-hour standard and the SD School Site at 0.010 ppm also at 2% of the standard. The graph in Figure 6-6 shows the maximum 3-hour concentrations in 2009 for all five sites in the network.

6.6 Nitrogen Dioxide

Beginning in 2010 the standard for nitrogen dioxide was revised adding a 1-hour standard of 100 parts per billion (ppb) and kept the annual arithmetic mean concentration of 0.053 ppm. Attainment with the 1-hour standard is demonstrated when the 3-year average of 98th percentile daily maximum 1-hour concentration is less than or equal to 100 parts per billion (ppb). Attainment with the annual standard is demonstrated when the annual arithmetic mean is less than or equal to 0.053 ppm.

Figure 6-7 – 2009 Sulfur Dioxide 2nd Highest 3-Hour Concentrations Statewide



There were five sites operated in the monitoring network in 2009, SD School, Badlands, Wind Cave, UC #1 and UC #2. All sites had concentrations under the 1-hour nitrogen dioxide standard. The SD School Site recorded the highest 1-hour average in 2009 of 38 ppb. This level represents 38% of the 1-hour standard. Many of the hourly concentrations collected at the five sites are at the detection level of the analyzers. Table 6-5 contains the 1-hour yearly 98th

Table 6-5 – Nitrogen Dioxide 1-hour Concentrations

Site	98th Percentile Concentration	2009 3-year Average	Attainment	Percent Standard
SD School	2007 2008 – 38 ppb 2009 – 38 ppb	38 ppb	[1]	[1]
Badlands	2007 – 4 ppb 2008 – 4 ppb 2009 – 4 ppb	4 ppb	Yes	4%
Wind Cave	2007 – 6 ppb 2008 – 3 ppb 2009 – 3 ppb	4 ppb	Yes	4%
UC #1	2007 2008 2009 – 17 ppb	17 ppb	[1]	[1]
UC #2	2007 2008 2009 – 16 ppb	16 ppb	[1]	[1]

[1] – Site with less than three years of air monitoring data. DENR is unable to compare the results to the one hour nitrogen dioxide standards until three years of data is obtained.

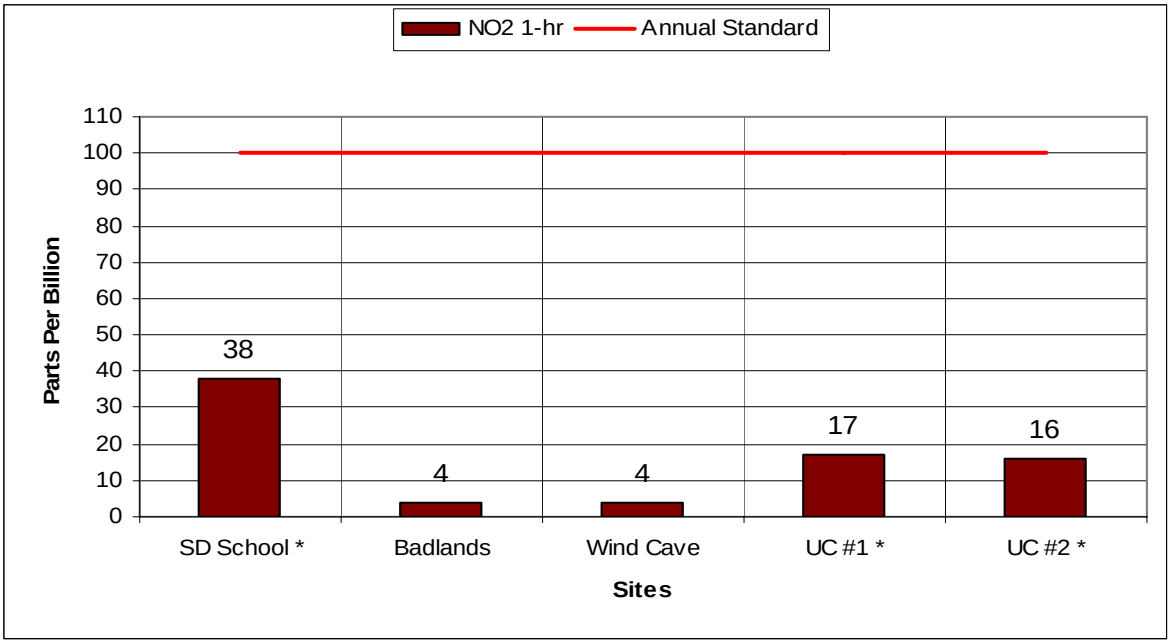
percentiles, 3-year average concentrations, if the site is attaining the standard and the percentage of the standard. Figure 6-8 shows the 1-hour nitrogen dioxide design value for each site.

The nitrogen dioxide data collected in 2007 through 2009 demonstrates that South Dakota is attaining the new 1-hour nitrogen dioxide NAAQS at the Badlands and Wind Cave sites. DENR needs one more year of data at the SD School Site and two more years of data at the UC #1 and UC #2 sites to determine attainment of the standard.

Figure 6-9 shows the annual nitrogen dioxide average concentrations for the five sites operated in 2009. The highest nitrogen dioxide annual average was recorded at the SD School Site at 0.006 ppm or 11% of the standard. The SD School Site's nitrogen dioxide concentrations were down slightly from 2008. The Badlands and Wind Cave sites remain at the detection level and UC #1 and UC #2 were slightly higher at 0.002 ppm.

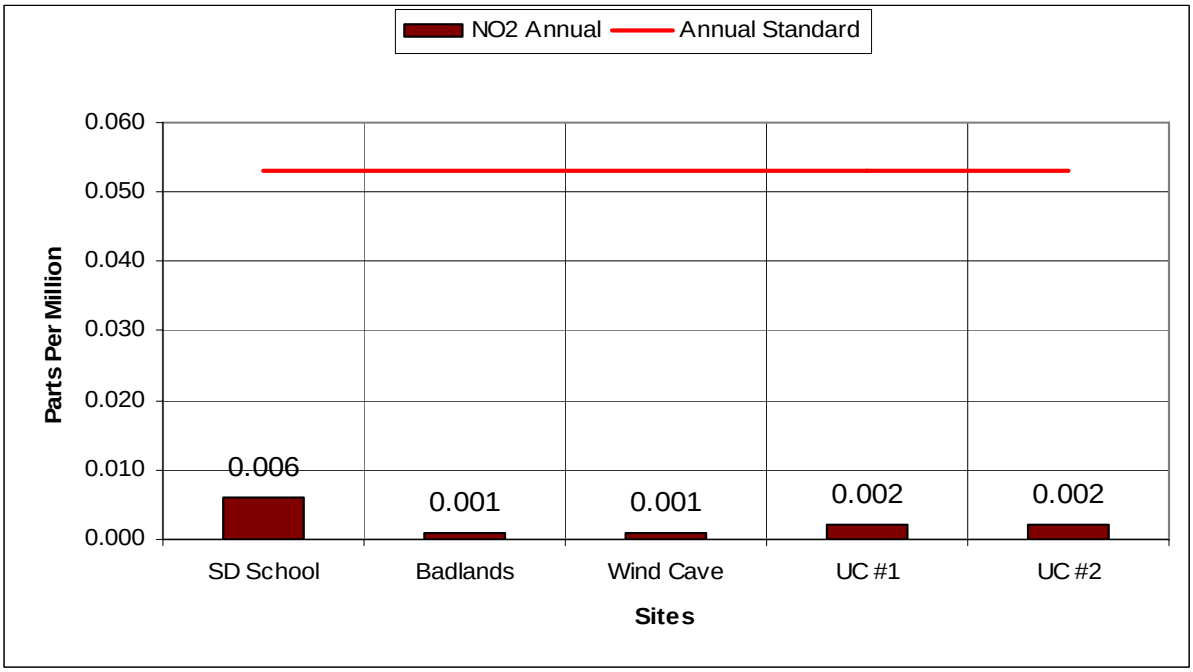
The nitrogen dioxide data collected in 2009 demonstrates that South Dakota is attaining the nitrogen dioxide annual NAAQS.

Figure 6-8 – 2009 Nitrogen Dioxide 1-hour Design Value Statewide



* - Site with less than three years of air monitoring data. DENR is unable to compare the results to the one hour nitrogen dioxide standards until three years of data is obtained.

Figure 6-9 – 2009 Nitrogen Dioxide Annual Concentrations Statewide



6.7 Carbon Monoxide

The carbon monoxide standard is based on two primary standards in the form of a one-hour and 8-hour average concentrations. The one-hour standard is 35.0 ppm and is not to be exceeded more than once per year. The other standard is an 8-hour average concentration of 9.0 ppm, not to be exceeded more than once per year.

The state's low population numbers, low traffic counts, and small cities directly influence why there has been no carbon monoxide monitoring in South Dakota in the past. The state's largest city, Sioux Falls, is not prone to atmospheric inversions and the amount of automobile traffic has historically been small when compared to cities with carbon monoxide problems nationally. The state's second largest city, Rapid City, can have atmospheric inversions but historically they are short in duration.

DENR began the operation of the first carbon monoxide analyzer in June of 2009 at UC #1 Site in Union County. A second analyzer is planned for the SD School Site as required by the NCore sampling requirements in the beginning of 2011.

DENR will continue to evaluate the need to monitor carbon monoxide in other locations in South Dakota on a year-to-year basis. The first two sites should provide information to determine if other locations in the state need to be tested for carbon monoxide.

7.0 AIR MONITORING SITE EVALUATION AND TRENDS

This section will discuss the goals of each air monitoring site in the network and trends for each pollutant tested. Through this evaluation a determination is made if site goals are being met and if each testing parameter is needed at the site. This section also has site specific information which includes AQS ID #, location, operation, data use, sampling schedule, monitoring objectives, spatial scale, and sampling and analytical methods required as part of the annual plan in 40 CFR Part 58.

7.1 Rapid City Area

The Rapid City area had a total of three monitoring sites collecting data in 2009. The high concentration site for PM_{10} was located at the Credit Union Site and a continuous PM_{10} monitor was used to determine compliance with the NAAQS standards. The Library and National Guard sites have manual Andersen PM_{10} monitors collecting 24-hour data using a filter based gravimetric sampling method.

In cooperation with the City, County, and industry, DENR is implementing a Natural Events Action Plan for the Rapid City Area. Part of this plan is to alert the public of the potential of high dust levels caused by high winds and to advise the public of precautions to take during the events. Under the Natural Events Action Plan high wind dust alerts are called when the following forecast conditions occur:

1. Hourly wind speeds exceed 20 miles per hour;
2. Peak wind gusts are greater than 40 miles per hour; and
3. Five consecutive days of 0.02 inches or less of precipitation each day excluding dry snow.

During 2009, a total of four high wind dust alerts were called for the Rapid City area. Because of the actions taken by the City, County, and industries during the high wind dust alerts, none of the days exceeded the PM_{10} standards. Excellent moisture levels and cooler summer temperatures kept surface vegetation green and reduced the potential for high dust levels.

The Rapid City area had a total of two monitoring sites collecting data for $PM_{2.5}$ in 2009. Both sites have manual Andersen $PM_{2.5}$ monitors collecting 24-hour data using a filter based gravimetric sampling method. In addition to the manual monitor method, a continuous Met One BAM $PM_{2.5}$ monitor was operated on the Credit Union Site as a SPM parameter.

In the fall of 2008, Rapid Valley began using Rapid Creek for a drinking water source. High levels of chlorides during snow melt events caused the drinking water to smell and the water treatment plant had to stop producing drinking water until chloride levels dropped. The City of Rapid City began a process of reducing the use of liquid deicer and increasing the use of river sand in areas of eastern and south eastern parts of Rapid City to help reduce chloride levels in Rapid Creek. DENR is working with Rapid City to determine which streets can be changed from liquid deicer to river sand so air quality is not affected. Currently, there are no indications PM_{10} or $PM_{2.5}$ concentrations have increase because of the deicing changes.

7.1.1 Rapid City Public Library Site

The Library Site is located on the Public Library building in Rapid City. The site was established in 1972, and it is the oldest sampling site in South Dakota still operating. The site is geographically located in the downtown area of the city east of the hogback and in the Rapid Creek river valley. The site purpose is to evaluate population exposure, fugitive dust controls, the success of the street sanding and sweeping methods employed by the city of Rapid City and general concentration levels in the eastern part of the city. Figure 7-1 shows a picture of the Library Site.

PM_{10} sampling began at the site in 1985. $PM_{2.5}$ monitors were added to the site in 1999. An attainment designation for $PM_{2.5}$ was completed for the Rapid City area in 2004. An attainment designation for PM_{10} was completed and approved by EPA for the Rapid City area in 2006. Table 7-1 contains details on the monitoring site specific to 40 CFR Part 58.

Figure 7-1 – Library Site

Table 7-1 – Rapid City Library Monitoring Site Specifics

Parameter	Information
Site Name	Rapid City Public Library
AQS ID Number	46-103-1001
Street Address	6th and Quincy, Rapid City, South Dakota
Geographic Coordinates	UTM Zone 13, NAD 83, E 641,837.99, N 4,882,111.77
MSA	City of Rapid City
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS),
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day, co-located every 12th day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/Cyclone
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.1.1.1 Library PM_{10} Data

Annual averages for the Library Site are shown in a graph in Figure 7-2. The concentrations trends show a decline from a high of 30 ug/m^3 in 1991, to a low of 16 ug/m^3 in 2005. The largest reduction in annual concentrations came when changes were implemented by the city on the street sanding and sweeping operations in the early 1990s. In the last six years including 2009, annual concentrations have leveled out. The plan is to continue the PM_{10} monitoring as this is the only site east of the Hogback in Rapid City and the site will provide a check on PM_{10} levels from fugitive dust controls, especially now when street sanding methods have changed from a liquid deicer to sand.

7.1.1.2 Library $PM_{2.5}$ Data

The graph in Figure 7-3 shows the $PM_{2.5}$ annual average for each sampling year since 2001. The annual average concentrations vary in difference by 1.9 ug/m^3 from the highest to lowest annual average. The highest was 7.8 ug/m^3 in 2001 and the lowest was 5.9 ug/m^3 recorded in 2009. The trends indicate a steady concentration level for $PM_{2.5}$ for the previous eight years of sampling. With the addition of the 2009, the Library Site recorded its lowest $PM_{2.5}$

concentrations which may change the trend to a slight decrease in $PM_{2.5}$ levels. Plans are to continue testing for $PM_{2.5}$ at this site.

Figure 7-2 – Library PM_{10} Annual Averages

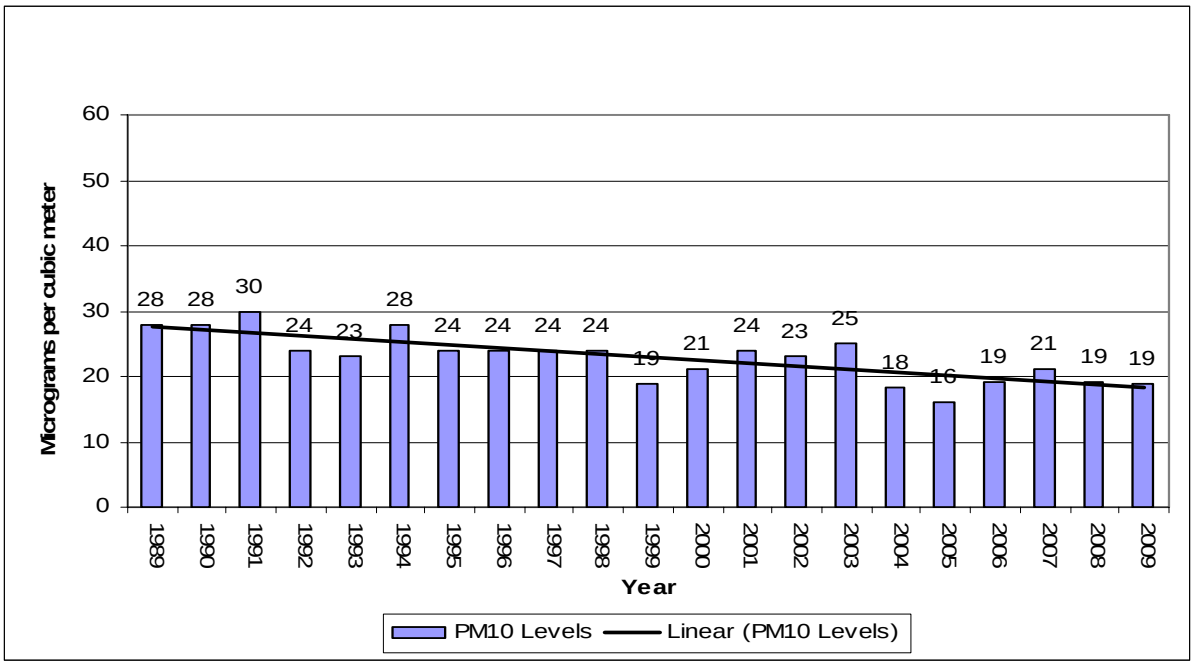
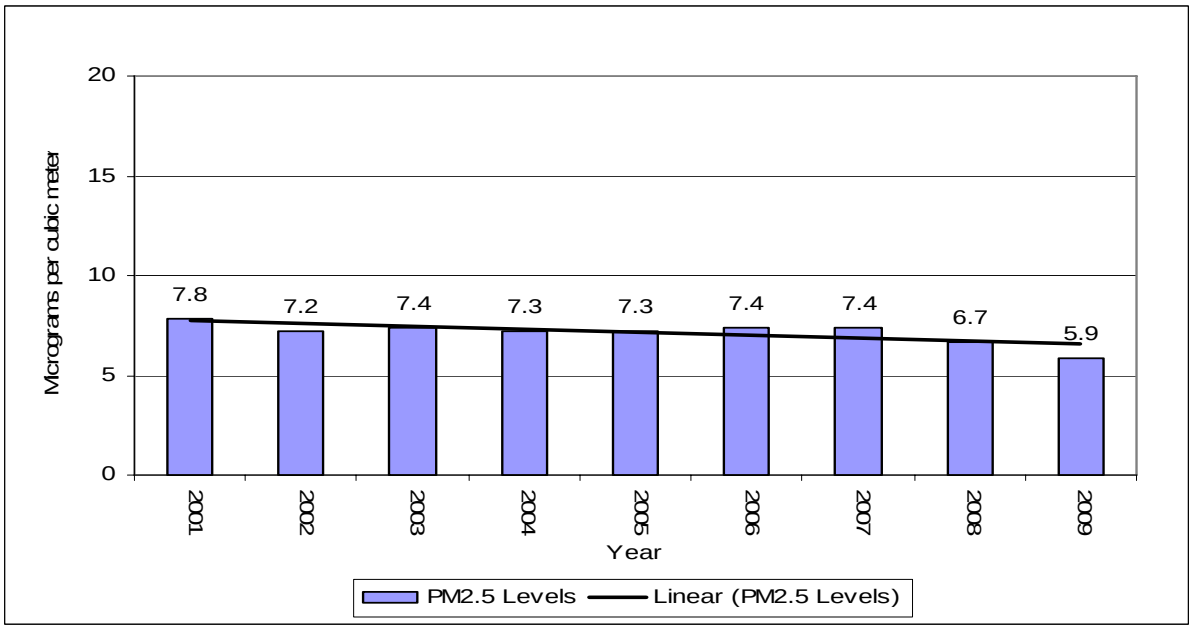


Figure 7-3 – Library $PM_{2.5}$ Annual Averages



7.1.2 Rapid City National Guard Site

The National Guard Site is located on the roof of the armory at the Camp Rapid facility in western Rapid City (see Figure 7-4). The site was established at this location in 1992, with PM_{10} the only sampling parameter because a large portion of the particulate matter emissions near this site consists of crustal material. Because the site is located only a few blocks from the high concentration location at the Credit Union Site, the site is designated as a SPM site for PM_{10}. The goal of the site is to determine the size of the area being impacted by fugitive dust sources in the quarry area in western Rapid City.

In the spring of 2009 a radiation monitor was added to the site as part of the national ERAMS network of sites. The monitor is a SPM that provides a warning system to detect levels of radiation from accidental releases or military activities.

Figure 7-4 – National Guard Site

The sampling objectives for the PM_{10} parameter is to measure population exposure and high concentration from source impacts from the quarry area north of the monitoring site. In addition, this monitoring site along with the Credit Union Site, define the high PM_{10} concentration area in western Rapid City. Table 7-2 contains details on the monitoring site specific to 40 CFR Part 58.

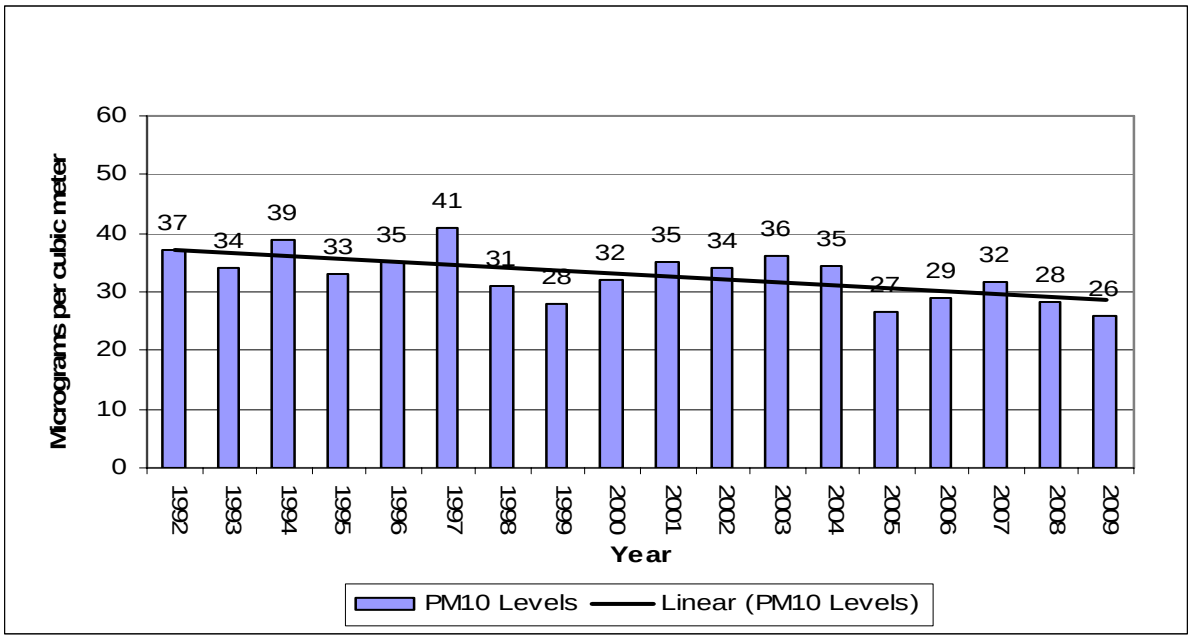
Table 7-2 – National Guard Monitoring Site Specifics

Parameter	Information
Site Name	National Guard
AQS ID Number	46-103-0013
Street Address	Camp Rapid Armory West Main Street
Geographic Coordinates	UTM Zone 13, NAD 83, E 638,543.08, N 4,882,373.72
MSA	City of Rapid City
PM_{10}	(Manual)
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SPM (No comparison to the NAAQS),

7.1.2.1 National Guard PM_{10} Data

The National Guard Site is the second oldest monitoring site and is a special purpose site sampling for PM_{10} in Rapid City. The graph in Figure 7-5 shows the annual means for the site since 1992. The annual means vary from a high of 41 ug/m^3 in 1997 to a low of 26 ug/m^3 in 2009. The trends for the annual mean concentrations continue to decline; but do cycle up and down from year to year. In 2009, PM_{10} annual average concentrations decreased by 2 ug/m^3 from 2008. Concentrations in 2009 are the lowest recorded at this site.

Figure 7-5 – National Guard PM_{10} Annual Averages



The National Guard Site PM_{10} concentration data continues to be well below the levels recorded at the Credit Union Site. The Credit Union Site is only four city blocks from the National Guard Site. Therefore, the National Guard Site PM_{10} testing will continue to be evaluated for closure.

7.1.3 Credit Union Site

The Credit Union Site is located on a lot next to the new Fire Station #3 building. The Credit Union Site replaced the Fire Station #3 Site in October 2003, as the high PM_{10} concentration location for the western part of Rapid City. The Credit Union Site is located just south of the quarry area and is centrally located in relation to the quarry facilities. Figure 7-6 contains a picture of the monitoring site looking in a south direction. The goal of this site is to determine if the Rapid City area is attaining the PM_{10} standard and population exposure.

Figure 7-6 – Credit Union Site

Continuous Thermo BETA PM_{10} continuous, $PM_{2.5}$ Met One BAM and $PM_{2.5}$ manual monitors were operated at this site in 2009. The BETA PM_{10} monitor provides hourly concentrations on an every day sampling schedule. The hourly readings from the continuous PM_{10} monitor are used to assist in the calling of high wind dust alerts for Rapid City and to compare concentrations to the PM_{10} NAAQS.

Manual $PM_{2.5}$ federal reference method monitors are operated at this site on a schedule of every third day to assess the concentrations levels to the $PM_{2.5}$ NAAQS. A continuous Met One BAM $PM_{2.5}$ monitor is used to supply hourly data for investigation of high concentrations recorded on the manual $PM_{2.5}$ monitors. The Met One BAM $PM_{2.5}$ monitor is designated by EPA as a

Federal Equivalent Method sampling method but the monitor is being operated as a special purpose method for the first two years to develop operating procedures and methods. Beginning in 2011, the sampling data will be used to compare to the $PM_{2.5}$ NAAQS.

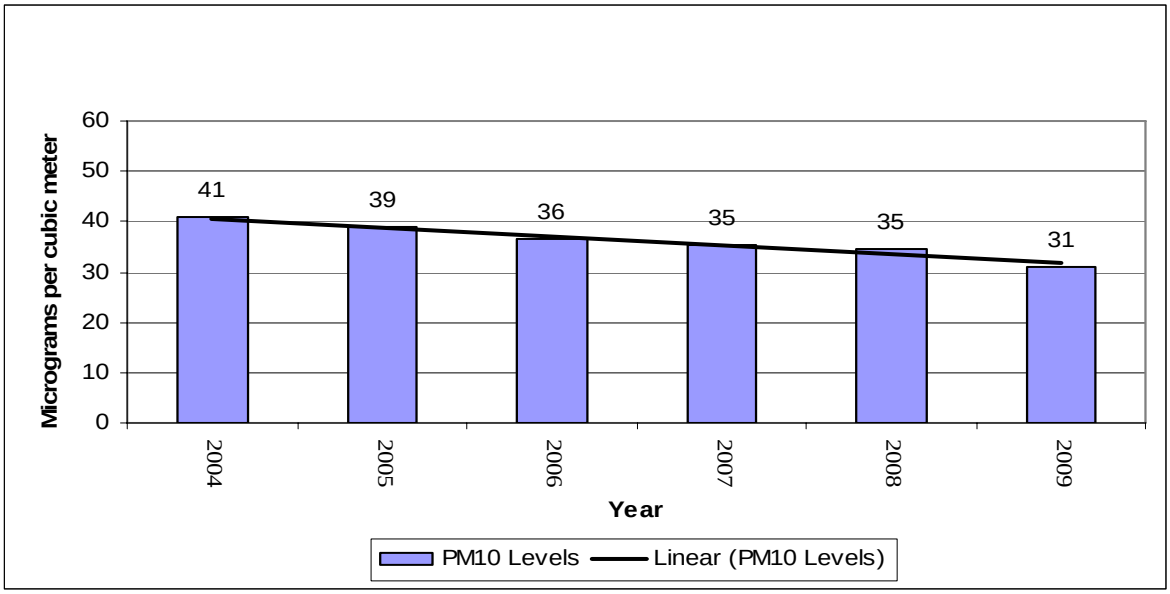
Table 7-3 – Credit Union Monitoring Site Specifics

Parameter	Information
Site Name	Credit Union
AQS ID Number	46-103-0020
Street Address	106 Kinney Ave.
Geographic Coordinates	UTM Zone 13, NAD 83, E 638,199.75, N 4,882,811.92
MSA	City of Rapid City
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day/co-located FEM to FRM every 12th day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Methods	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-Time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPS-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/cyclone
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0308-170
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Met One BAM-1020
Analysis Methods	Beta Attenuation
Data Use	Real-time Data and SPM

7.1.3.1 Credit Union PM_{10} Data

The Credit Union Site began operation in October 2003. Only three months of data was collected in 2003, so 2004 is the first complete sampling year. Figure 7-7 shows a graph of the annual average PM_{10} concentration.

Figure 7-7 – Credit Union PM_{10} Annual Averages



The PM_{10} annual average concentration trends show a declining level each year since 2004. In 2009, average concentration levels decrease to the lowest level recorded at this site since 2004. Over the six year period, annual concentrations changed significantly by 10.0 ug/m^3. Testing for PM_{10} concentrations is a priority for this site and the parameter will continue.

7.1.3.2 Credit Union $PM_{2.5}$ Data

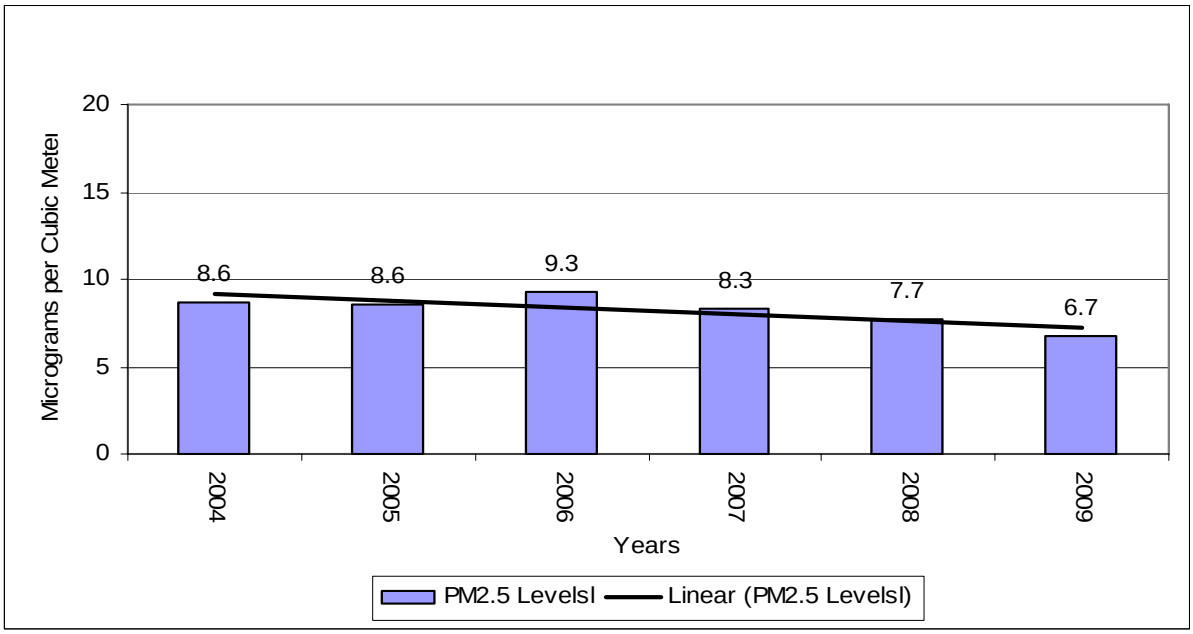
The testing for $PM_{2.5}$ parameter using the manual method began at this site in October 2003 and completed the first full year of testing in 2004. The Credit Union Site records the highest $PM_{2.5}$ concentrations in the Rapid City area for both 24-hour and annual concentrations.

The graph in Figure 7-8 shows the annual average for each sampling year since 2004. The annual average concentrations have remained relatively constant over the first four years. But in the last two years $PM_{2.5}$ annual concentrations have declined to the lowest level since the site began operation with a concentration of 6.7 ug/m^3 for the annual average. The highest annual average for $PM_{2.5}$ at this site was 9.3 ug/m^3 in 2006. Over the six year period, annual concentrations changed by 2.6 ug/m^3. The annual average $PM_{2.5}$ concentrations in Rapid City are the lowest concentration recorded in a city in the state.

In 2009, a continuous method $PM_{2.5}$ monitor was also operated at the site as a special purpose monitor. At the end of 2010, the continuous monitor which is a Federal Equivalent Method will become a SLAMS monitor. DENR will need to designate one method as the primary monitor or remove one of the methods from the site. The continuous method had a slightly higher 24-hour concentration level at 15.1 ug/m^3 versus 14.3 ug/m^3 for the manual method. The manual method had a slightly higher annual average at 6.7 ug/m^3 versus 6.1 ug/m^3 for the continuous method. This comparison indicates the continuous and manual monitors provide similar concentration levels and are within 10 percent of each other. DENR believes the best option will be to remove the manual monitors from the site because the manual monitors are RAAS 100 samplers which

are being decommissioned. The parameter of $PM_{2.5}$ will be continued at this site to determine compliance with the NAAQS and if any changes in concentration levels occur.

Figure 7-8 – Credit Union $PM_{2.5}$ Annual Averages



7.2 Black Hawk Site

Black Hawk is a small town located just north of the Rapid City in Meade County north of the quarry area. Black Hawk is not an incorporated city but is a growing subdivision and is part of the Rapid City MSA. The Black Hawk Site provides data that demonstrates the urban background levels of particulate matter transporting into the Rapid City area from the north. The site also is the ozone testing site for the Rapid City MSA. The goal of the monitoring site is to determine urban background concentrations for PM_{10} and to determine compliance with the ozone NAAQS in the Rapid City MSA.

The Black Hawk Site was setup in the fall of 2000. The site is located on a small hill east of the Black Hawk Elementary School. PM_{10} and $PM_{2.5}$ monitors were located on a sampling shelter until October 2003 when the sampling shelter was moved to the Credit Union Site. The monitors were located on scaffolding within the site fence until the fall of 2006 when a shelter was added back to the site. At the end of 2004 the $PM_{2.5}$ monitors were removed because concentrations were the lowest in the area and the potential for concentrations over the NAAQS were very low. In 2007, the ozone analyzer was moved from Credit Union Site to the Black Hawk Site to operate the ozone parameter outside of the nitrogen dioxide modeled one microgram per cubic meter influence area from air quality sources in western Rapid City.

The land use around the site is mainly residential with a few service type businesses. There are no obstructions around the monitoring site. See Figure 7-9 for a picture of the site looking to the northwest.

Figure 7-9 – Black Hawk Site

The limestone quarry industries are located to the south and southeast of the Black Hawk Site. The quarry industries are expanding to ore bodies located closer to this site. The first of the new limestone quarries are currently operating about one mile south of the site.

The site's spatial scale is neighborhood for PM_{10} and ozone sampling. The goal of the site is to provide a background level for the MSA, population exposure, and to show compliance with the ozone standard. The goals are being met and the site will be continued with sampling for both ozone and PM_{10} parameters.

The objectives of the PM_{10} sampling are high concentration, population, and source impact. The objectives of the ozone sampling are high concentration and population. Table 7-4 contains details on the monitoring site specific to 40 CFR Part 58.

Table 7-4 – Black Hawk Monitoring Site Specifics

Parameter	Information
Site Name	Black Hawk Elementary
AQS ID Number	46-093-0001
Street Address	7108 Seeaire Street
Geographic Coordinates	UTM Zone 13, NAD 83, E 634,683.07 N 4,890,309.65
MSA	City of Rapid City
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every Third Day
Scale Representation	Neighborhood
Monitoring Objective	Population, Urban Background
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-147
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Instrumental Thermo 49i
Analysis Methods	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS) and Real-time Data

7.2.1 Black Hawk PM_{10} Data

Sampling for PM_{10} levels began at this site in 2001. The first four years of concentration levels remained about the same. In 2005, the annual average dropped significantly by 4 ug/m^3 from the 2004 level. The highest annual average was 21 ug/m^3 recorded in both 2001 and 2003. The lowest level of 15 ug/m^3 was recorded in 2005. In 2009, the PM_{10} concentrations remained the same as the levels in 2008. The overall trend shows a slight decrease in concentrations over the nine year period; but has been relatively flat for the last five years. Figure 7-10 contains a graph showing the PM_{10} annual averages for the Black Hawk Site.

7.2.2 Black Hawk Ozone 8-hour Average

The 2009 sampling year is the third ozone season at the Black Hawk Site (see Figure 7-11). Concentrations were the lowest ozone levels recorded in the state during the first year of testing. In the second year of testing the site recorded the second highest ozone level in the state for 2008. This is an unusual occurrence because all the other ozone sites had lower concentrations in 2008. The 2009 sampling concentration was slightly lower than in 2008. The testing results show the area attaining the ozone standard.

Figure 7-10 – Black Hawk PM_{10} Annual Averages

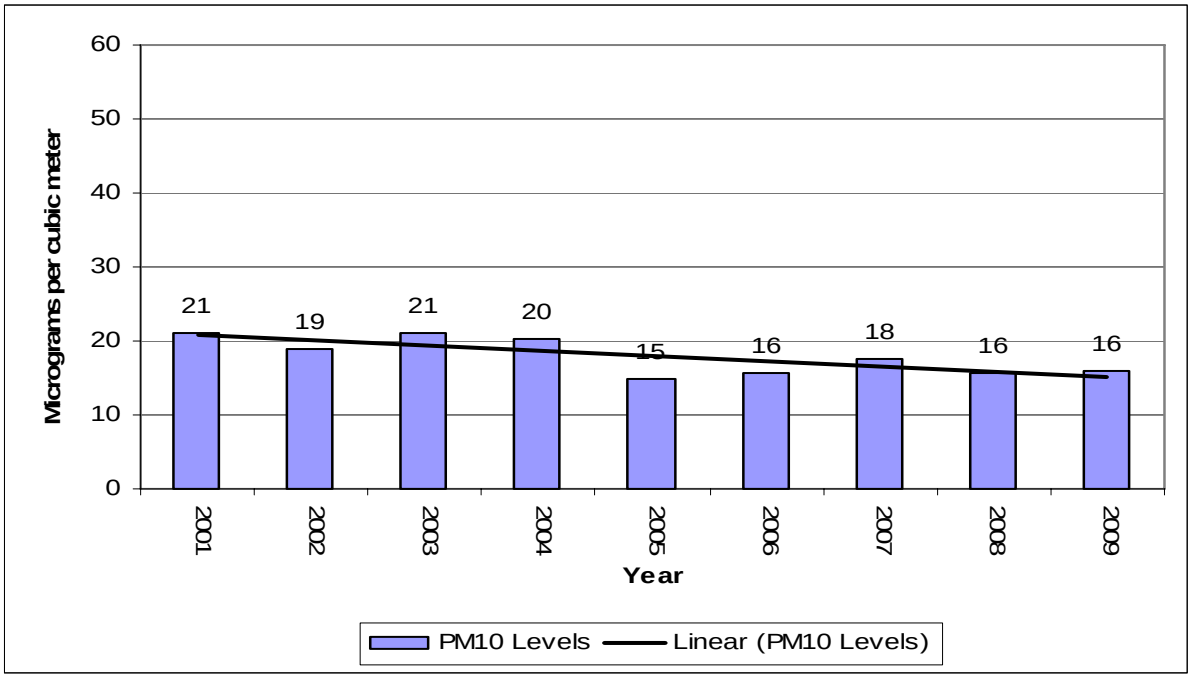
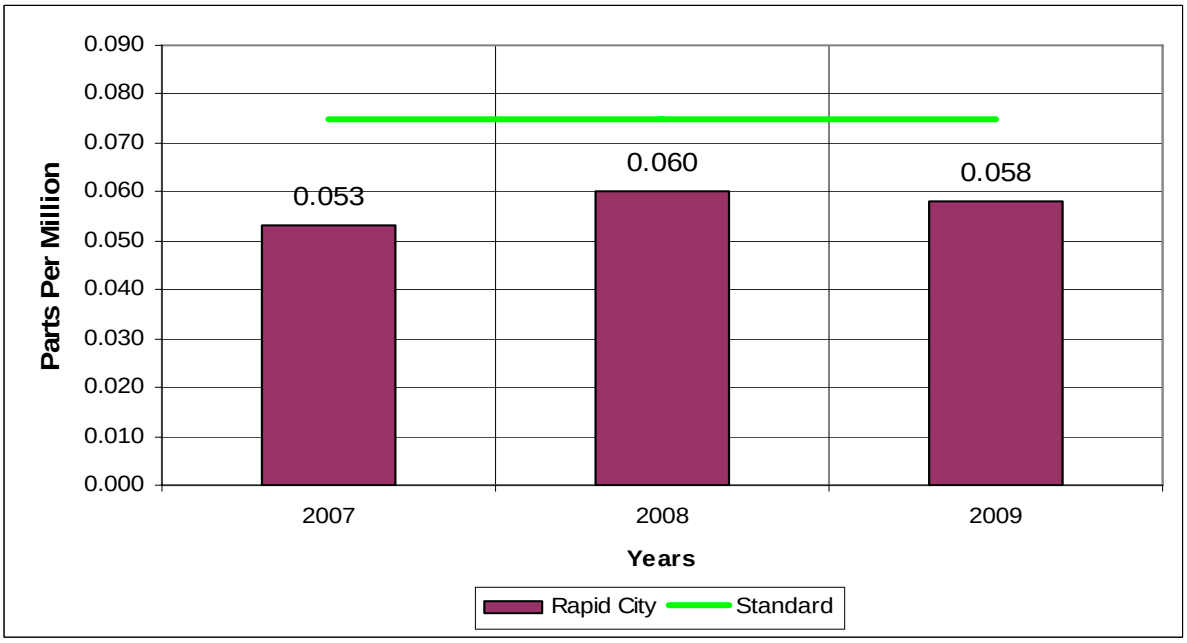


Figure 7-11 – Black Hawk Ozone Yearly 4th Highest 8-hour Averages



7.3 Badlands Site

The Badlands National Park is one of two Class I areas in South Dakota designated for visibility protection under the Clean Air Act. The Badlands area is a large national park that attracts more than two million visitors each year. The Badlands area is a dry semi-desert area with short prairie grass and beautiful sandstone cliff vistas.

The Badlands Site was established in 2000, with manual monitors for PM_{10} and $PM_{2.5}$. The site is located next to the IMPROVE site which also included an ozone analyzer operated by the National Park Service. The site is in the southeast part of the park near the visitor center. Figure 7-12 shows a current picture of the Badlands Site.

Figure 7-12 – Badlands Site

In October 2004, the number of pollutant parameters was increased by adding continuous monitors for PM_{10}, $PM_{2.5}$, sulfur dioxide, and nitrogen dioxide. The changes improved the amount of data collected and provide additional information on transport of air pollution. At the end of 2007, DENR took over the operation of the ozone monitor at this site upon a request made by the National Park Service.

The IMPROVE data will be used to determine what type of sources are impacting the visibility of the national parks in South Dakota and determine if DENR's regional haze program is successful or needs adjustment to achieve the national goal of natural conditions by 2064. The goal of having a SLAMS site next to the IMPROVE site is to determine how the data compares

between the two different sampling methods, to determine air pollution background levels, and to see if pollution trends show long range transport of air pollution into the state. Table 7-5 contains details on the monitoring site specific to 40 CFR Part 58.

Table 7-5 – Badlands Site Specifics

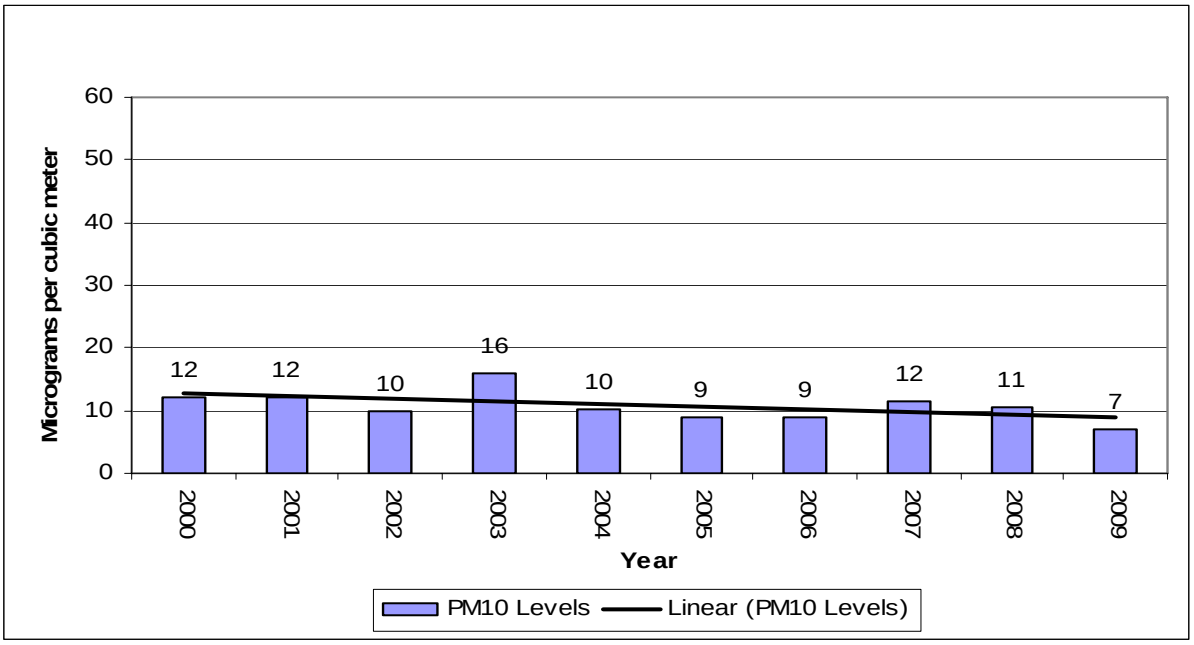
Parameter	Information
Site Name	Badlands National Park
AQS ID Number	46-071-0001
Street Address	25216 Ben Reifel Road, Interior, South Dakota 57750
Geographic Coordinates	UTM Zone 14, NAD 83, E 263,173.81 N 4,847,799.95
MSA	None
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0308-170
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SLAMS
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
Ozone	**(Continuous)**

Parameter	Information
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS) and Real-time Data

7.3.1 Badlands PM_{10} Data

PM_{10} data has been collected at this site since 2000. The PM_{10} manual monitor was operated on an every sixth day schedule through 2004. Beginning in 2005, a continuous Thermo Beta Gauge PM_{10} monitor replaced the manual monitors. Figure 7-13 contains a graph of the annual averages for the Badlands Site.

Figure 7-13 – Badlands PM_{10} Annual Averages



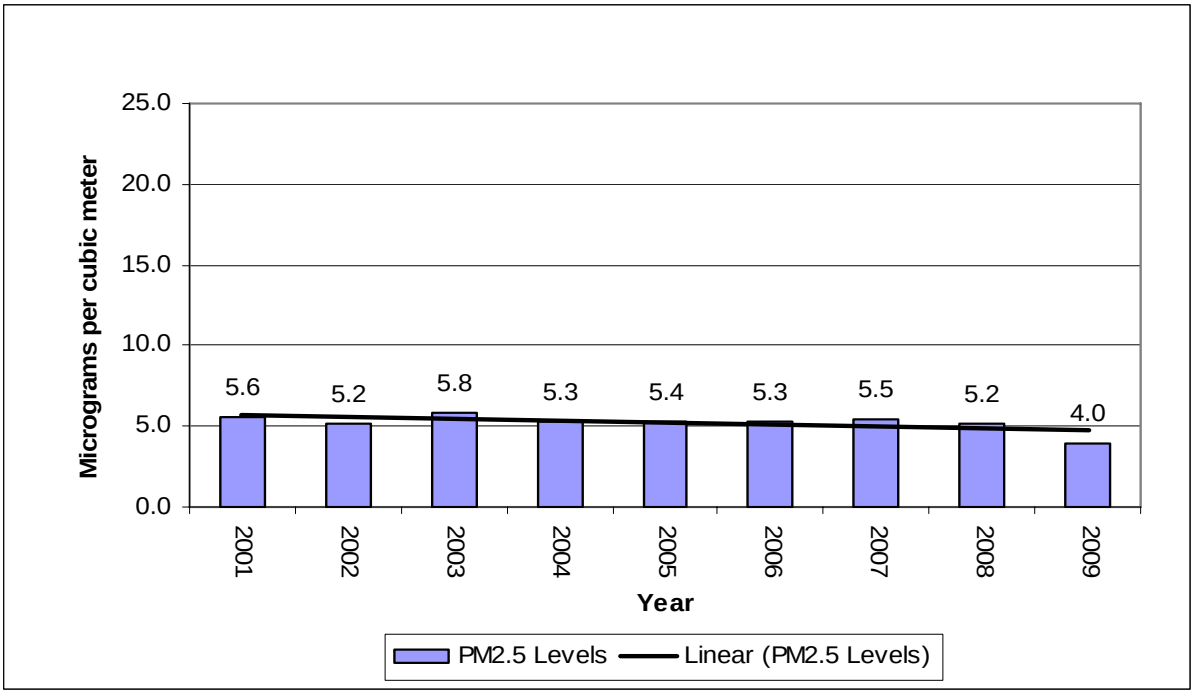
The annual average concentrations over the last 10 years have varied a little but remained relatively constant with a slight decline in concentration level. The highest annual average concentration of 16 ug/m^3 was recorded in 2003. The lowest annual average concentration of 7 ug/m^3 was recorded in 2009. The PM_{10} concentrations recorded at this site are some of the lowest levels in the state and are considered background for the western half of the state. This parameter is meeting the goals for testing at this site.

7.3.2 Badlands $PM_{2.5}$ Data

The $PM_{2.5}$ monitors run on an every third day schedule from 2001 to 2008. With the completion of the 2003 year, the site had three years of $PM_{2.5}$ data and DENR was able to make a comparison of the concentration levels to the 24-hour and annual standards. The area was designated as attaining the standard. Beginning in 2009, with the addition of the Met One BAM-1020 Federal Equivalent Method continuous monitor and removal of the manual monitors the schedule went to every day.

The annual averages for the Badlands Site show a concentration range with a high of 5.8 ug/m^3 in 2003 and a low of 4.0 ug/m^3 in 2009. The trend for the annual average was steady during the first eight years of testing but declined slightly in 2009 by 1.2 ug/m^3. $PM_{2.5}$ concentrations at this site are the lowest in the state and represent background levels for western South Dakota. Figure 7-14 contains a graph of the annual averages. This parameter is meeting the goals for testing at this site.

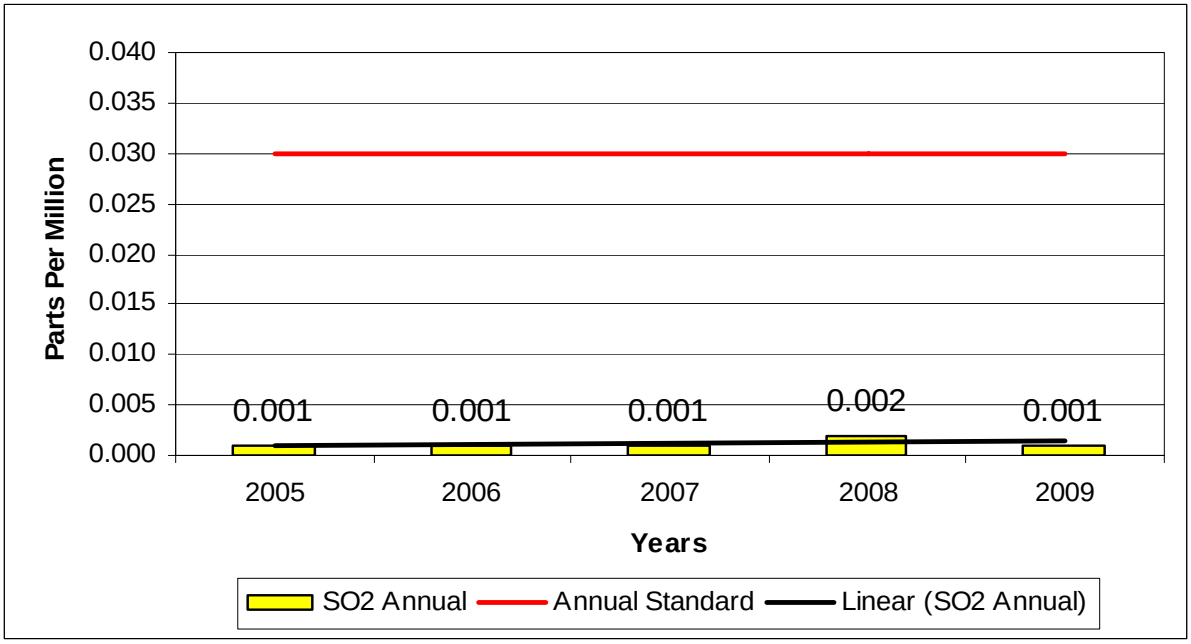
Figure 7-14 – Badlands $PM_{2.5}$ Annual Averages



7.3.3 Badlands Sulfur Dioxide Data

The 2005 year is the first year of testing at the Badlands Site for sulfur dioxide. As expected, concentrations for sulfur dioxide are very low and represent background levels. Concentrations are at or near the detection limit for the analyzers at 0.001 ppm for the annual average levels. In 2009, the annual average decreased slightly from 2008 to 0.001 ppm of sulfur dioxide. See Figure 7-15 to view a graph of the annual average concentrations for sulfur dioxide. The linear trends line shows steady concentration levels which are very low and indicate minimal concentrations of sulfur dioxide. This parameter is meeting the goals for testing at this site.

Figure 7-15 – Badlands Sulfur Dioxide Annual Averages



7.3.4 Badlands Ozone Data

The 2003 year is the first year of testing at the Badlands Site for ozone with the equipment being operated by the National Park Service. DENR completed quarterly audits of the ozone analyzer so data could be compared to the NAAQS. At the beginning of 2008 sampling year DENR took over the operation of the ozone analyzer.

Concentrations of ozone at this site have varied over the seven years of testing. The yearly 4th highest 8-hour average ranged from a high of 0.071 ppm in 2006 to a low of 0.053 ppm in 2008. This trend is similar to most of the sites in the state with the last three years having lower ozone levels. See Figure 7-16 to view a graph of the yearly 4th highest 8-hour average. The linear trends line shows a declining concentration level mainly due to the last three years of testing.

Concentrations of ozone at this site are one of the highest concentrations in the state. Levels have decreased in the last three years but concentrations still remain close to the proposed standard level. This parameter will continue to be a priority at this location and the testing is meeting the goals for the sampling.

7.3.5 Badlands Nitrogen Dioxide Data

The 2005 year is the first year of testing at the Badlands Site for nitrogen dioxide. As expected, concentrations for nitrogen dioxide are very low and represent background levels. Many hourly concentrations are at the detection limit of the analyzer at 0.001 ppm. The calculated annual average levels for all four years are also at the detection level for the nitrogen dioxide analyzer. See Figure 7-17 to view a graph of the annual average concentrations. The linear trends line

shows a steady concentration level. Concentrations are very low providing background concentration levels for the western part of the state.

Figure 7-16 – Badlands Ozone Yearly 4th Highest 8-hour Averages

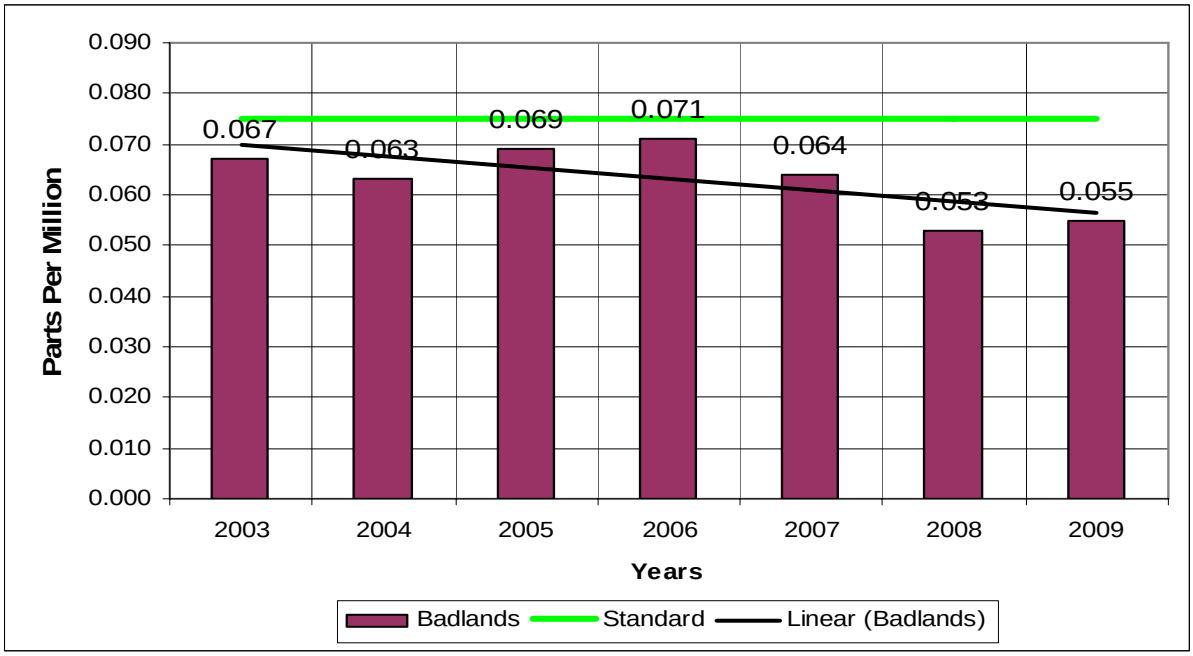
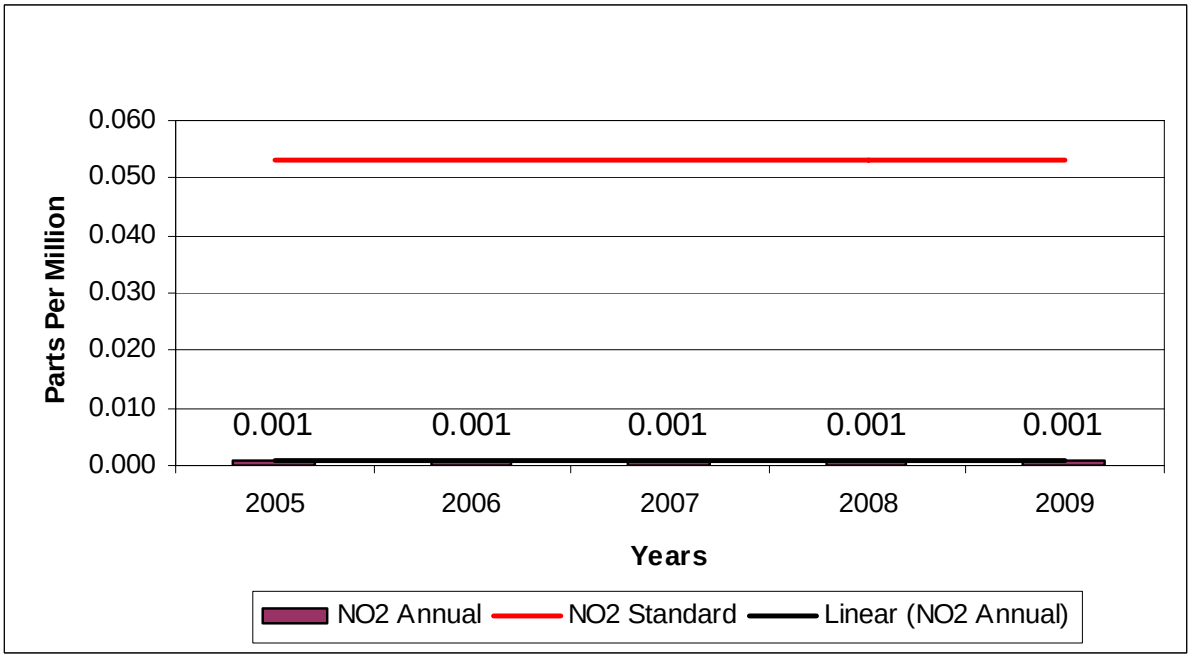


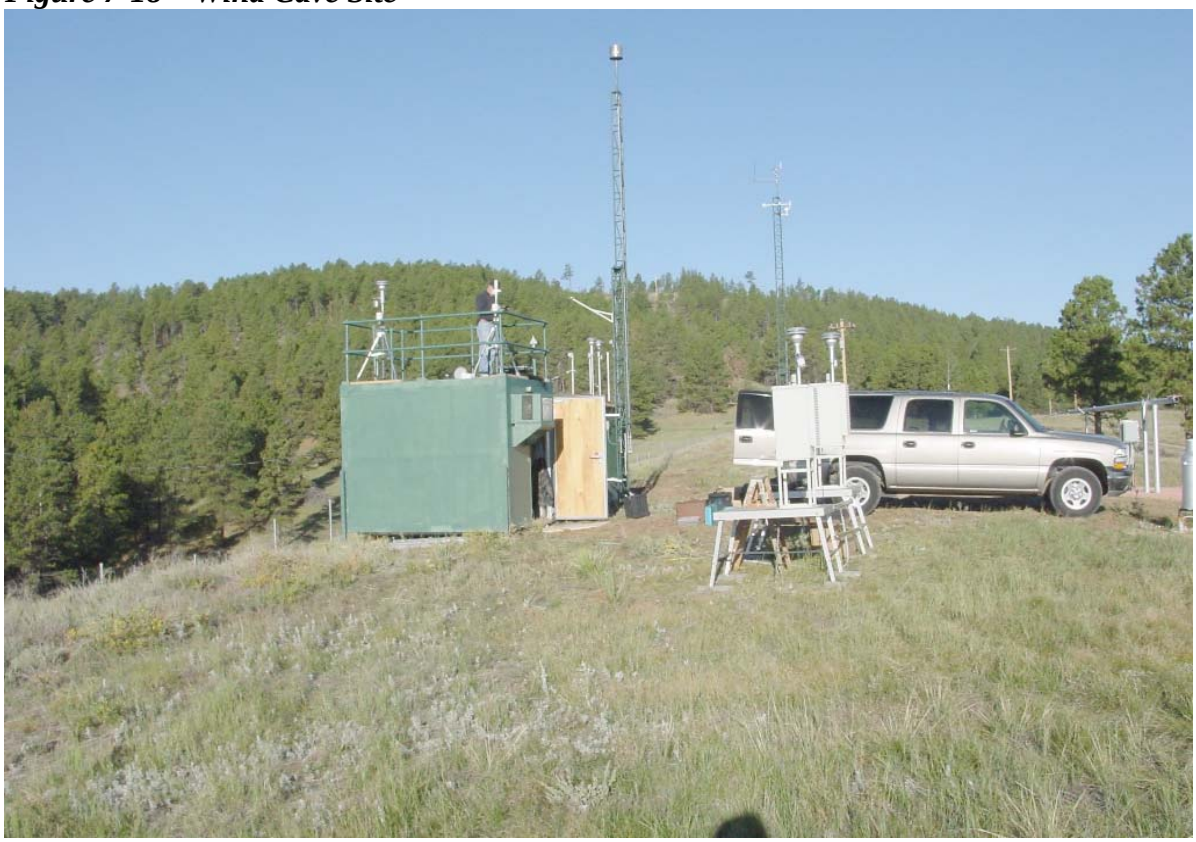
Figure 7-17 – Badlands Nitrogen Dioxide Annual Averages



7.4 Wind Cave Site

The Wind Cave National Park is one of two class I areas in South Dakota designated for visibility protection under the Clean Air Act. The Wind Cave area is a large national park located in the southern Black Hills of South Dakota. The Wind Cave Site was established in 2005, with manual monitors for $PM_{2.5}$ and continuous monitors for $PM_{2.5}$, PM_{10}, sulfur dioxide, nitrogen dioxide, and ozone. The monitoring equipment is located in a sampling shelter next to the IMPROVE site operated by the National Park Service. The site is located a short distance west of the visitor center. Figure 7-18 shows a current picture of the Wind Cave Site.

Figure 7-18 – Wind Cave Site



The IMPROVE data will be used to determine what type of sources are impacting the visibility of the national parks in South Dakota. The purpose of having a SLAMS site next to the IMPROVE site is to determine how the data compares between the two different sampling methods, to determine air pollution background levels, and to see if pollution trends show long range transport of air pollution from outside of the state. Table 7-6 contains details on the monitoring site specific to 40 CFR Part 58.

Table 7-6 – Wind Cave Monitoring Site Specifics

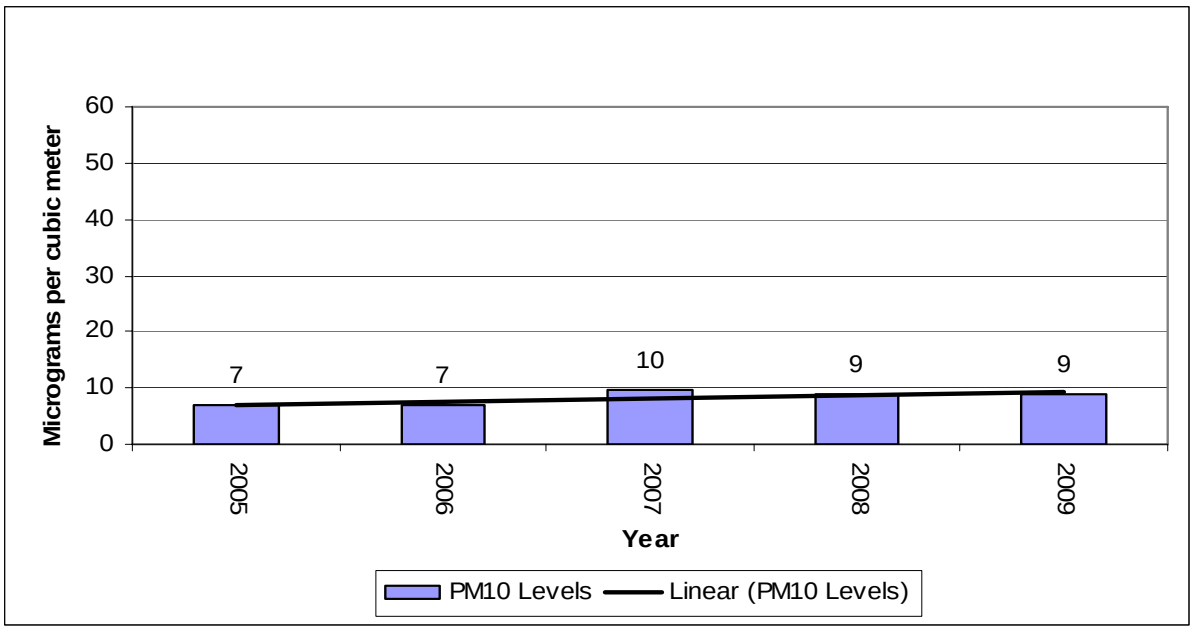
Parameter	Information
Site Name	Wind Cave
AQS ID Number	46-033-0132
Street Address	290 Elk Mountain Camp Road, Hot Springs, South Dakota
Geographic Coordinates	UTM Zone 13, NAD 83, E 622,471.56 N 4,823,856.93
MSA	None
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every Third Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ SAM w/WINS
Analysis Method	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0308-170
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 FEM
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SPM
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional

Parameter	Information
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Ultra Violet
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data

7.4.1 Wind Cave PM_{10} Data

The PM_{10} concentrations at this site are one of the lowest in the state and are similar in concentrations as the Badlands Site. The Wind Cave Site is the most remote site in the state and a site that has no influence from industry and agriculture activities near the location. The 2009, PM_{10} concentrations remained the same as in 2008. Figure 7-19 contains a graph showing the annual average PM_{10} concentrations. The trend line indicates a slight increase in concentration levels over the five years of testing. The concentrations ranged from 7 to 10 ug/m^3 and are very low representing background levels. This parameter is meeting the goals of background, visibility protection, and long range transport and will be continued.

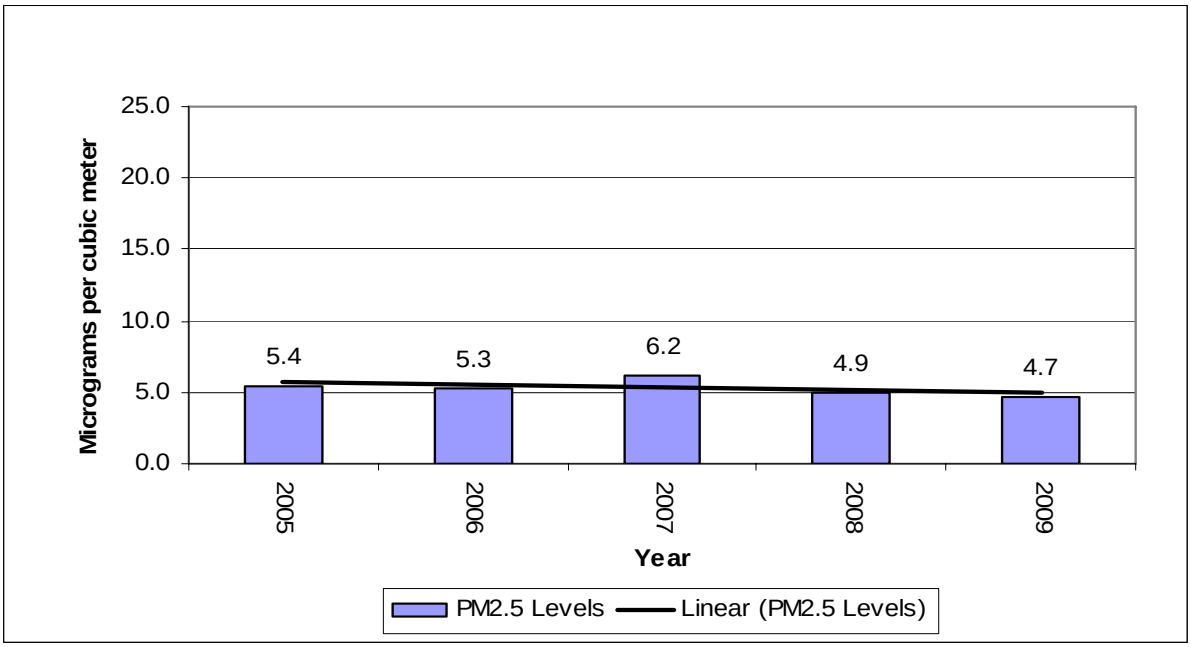
Figure 7-19 – Wind Cave PM_{10} Annual Averages



7.4.2 Wind Cave $PM_{2.5}$ Data

The $PM_{2.5}$ concentrations are similar to the levels recorded at the Badlands Site and are some of the lowest in the state. Figure 7-20 contains a graph showing the annual average $PM_{2.5}$ concentration levels. The linear trend line indicates a slightly decrease in concentration level during the five years of testing. The $PM_{2.5}$ annual average concentration range from 6.2 ug/m^3 in 2007 to 4.7 ug/m^3 in 2009. This parameter is meeting the goals of background, visibility protection, and long range transport and will be continued.

Figure 7-20 – Wind Cave $PM_{2.5}$ Annual Averages



7.4.3 Wind Cave Sulfur Dioxide Data

The annual sulfur dioxide averages for the Wind Cave Site are very low and are at the detection level for the sulfur dioxide analyzer. The graph in Figure 7-21 shows the annual concentration levels. The linear trends line shows a steady sulfur dioxide concentration level but levels are too low over the five years of testing to provide any indication of actual trends. This parameter is meeting the goals of background, visibility protection, and long range transport and will be continued.

7.4.4 Wind Cave Nitrogen Dioxide Data

The annual nitrogen dioxide averages are very low and are at the detection level for the analyzer. The graph in Figure 7-22 shows the annual average concentration levels for the Wind Cave Site. The linear trend line shows a steady concentration level but with recorded levels at the detection level for the method trends are difficult to determine. This parameter is meeting the goals of background, visibility protection, and long range transport and will be continued.

Figure 7-21 – Wind Cave Sulfur Dioxide Annual Averages

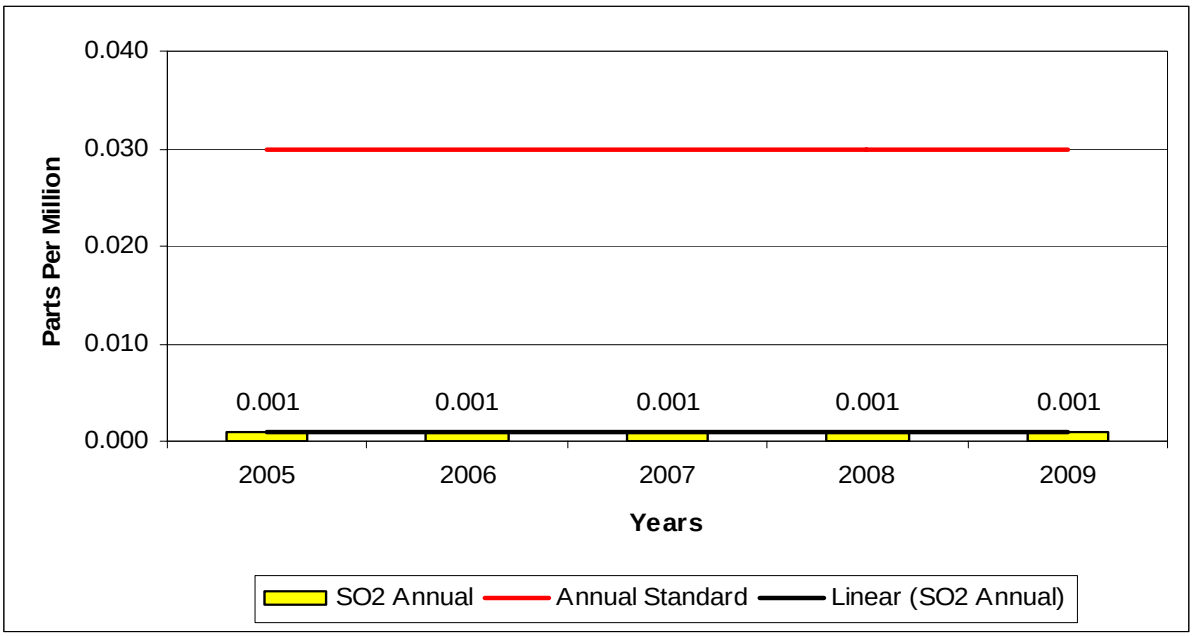
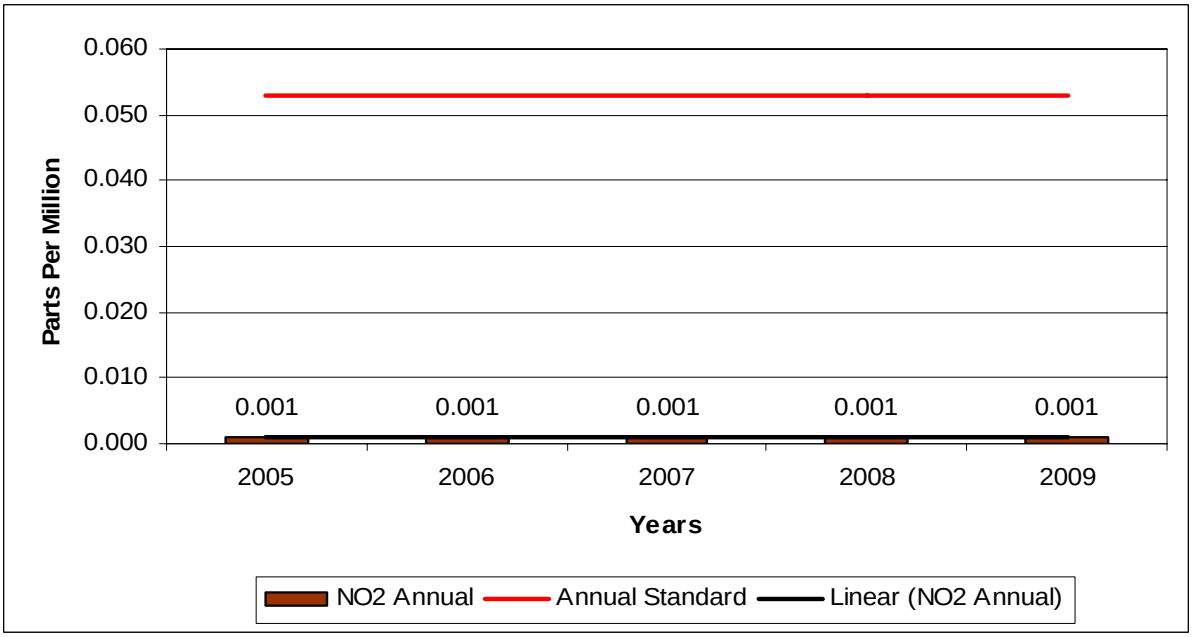


Figure 7-22 – Wind Cave Nitrogen Dioxide Annual Averages

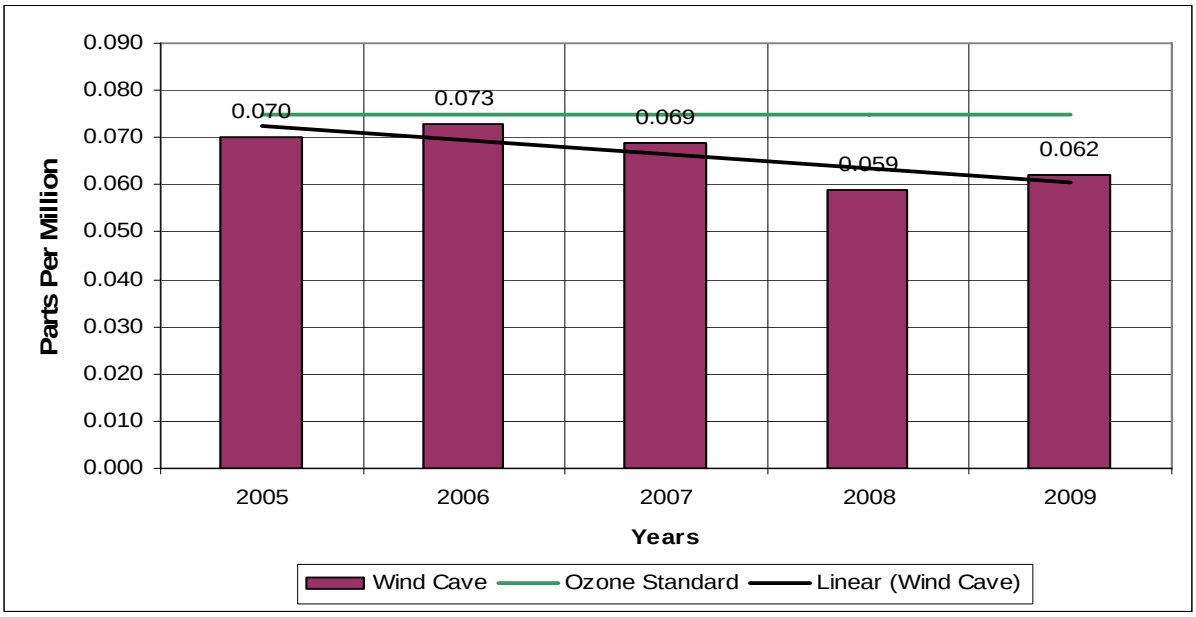


7.4.5 Wind Cave Ozone

The Wind Cave Site has the highest reported yearly 4th highest 8-hour ozone level in the state at 0.073 parts per million recorded in 2006. Figure 7-23 contains a graph of the ozone 8-hour concentrations for the Wind Cave Site since 2005. The yearly 4th highest 8-hour average ranged from a high of 0.073 ppm in 2006 to a low of 0.059 ppm in 2008. This trend is similar to most of the sites in the state with the last two years having lower ozone levels. The linear trends line

shows a declining concentration level mainly due to the last two years of testing. Testing for ozone is meeting the needs of the monitoring network by detecting transport levels for this area of the state and the parameter will be continued.

Figure 7-23 – Wind Cave Ozone Yearly 4th Highest 8-hour Averages



7.4.6 Comparison of National Park Sites

Many of the concentrations for sulfur dioxide, nitrogen dioxide, PM_{10} and $PM_{2.5}$ at the Wind Cave Site are very close to the concentrations recorded at the Badlands Site. The PM_{10} and $PM_{2.5}$ concentrations show some variability but remain the lowest in the state. See Table 7.7 for a comparison of the sampling data design values.

Table 7-7 – Comparison of Wind Cave Data to Badlands Data Design Values

Parameter	Averaging Period	Wind Cave	Badlands
PM_{10}	24-hour	38 ug/m3	42 ug/m3
$PM_{2.5}$	24-hour	12.6 ug/m3	11.9 ug/m3
$PM_{2.5}$	Annual	5.3 ug/m3	4.9 ug/m3
SO_2	1-hour	0.063 ppm	0.057 ppm
SO_2	24-hour	0.002 ppm	0.003 ppm
SO_2	Annual	0.001 ppm	0.001 ppm
SO_2	3-hour	0.005 ppm	0.005 ppm
NO_2	Annual	0.001 ppm	0.001 ppm
NO_2	1-hour	4 ppb	4ppb

Both sampling sites are providing background data for these parameters but appear to be duplicating the sampling effort for some parameters. The sulfur dioxide and nitrogen dioxide concentration levels at both sites are the lowest in the state and concentrations show near the same levels.

The only exception to the duplication of sampling effort is the concentrations for ozone. The ozone concentrations are some of the highest in the state at both sites with the Wind Cave Site having the highest design value in the state.

The testing at both sites are meeting the air monitoring goals but significant resources are being used to duplicate sampling efforts with the same parameters at both sites. Therefore, DENR is considering changes to one of the national park sites.

7.5 Sioux Falls Area

In 2009, two sampling sites were operated in Sioux Falls. The criteria pollutant parameters being tested at these sites include PM_{10}, $PM_{2.5}$, ozone, sulfur dioxide, and nitrogen dioxide. In addition, special purpose monitoring for continuous $PM_{2.5}$, speciation $PM_{2.5}$ and air toxics are also operated at the SD School Site. Air monitoring data records show the Sioux Falls area is attaining all of the National Ambient Air Quality Standards set by EPA. Because concentrations for PM_{10} and $PM_{2.5}$ are less than 70% of the standards and because the population of the area is less than 500,000, no National Air Monitoring Site is actually required for Sioux Falls.

The city continues to grow and now includes residential areas in two counties, Minnehaha and Lincoln. Sioux Falls is the largest city in the state with a 2000 Census population of 123,975. The population in Minnehaha County is 179,180 and in Lincoln County 39,713. The industrial base is mainly service oriented businesses and light industry.

7.5.1 KELO Site

The KELO Site was established in 1991, as a replacement for the City Hall Site. The site is located in the downtown, central part of the city and at 19 years of operation is the oldest site still operating in Sioux Falls. The KELO Site is a SLAMS site for both PM_{10} and $PM_{2.5}$. The sampling frequency for $PM_{2.5}$ monitor is every third day and the PM_{10} monitor was changed to every sixth day at the beginning of 2009. Sampling objectives for these monitoring parameters are population and high concentration. The sampling scale is neighborhood for both PM_{10} and $PM_{2.5}$. Figure 7-24 shows a current picture of the monitoring site.

In 2002, a $PM_{2.5}$ speciation monitor was added to the site to determine the chemical make up of the $PM_{2.5}$ pollution. The sampler was located at this site because the $PM_{2.5}$ concentrations are some of the highest in the state and because the city of Sioux Falls is the largest population center in the state. The $PM_{2.5}$ speciation monitor was moved from this site to the SD School Site at the beginning of 2009.

Figure 7-24 – KELO Site

During an oversight review completed by EPA in 2001, it was noted that a tree planted on the west edge of the building to the west of the sampling site had grown and would require that the sampling platform be moved about 10 feet east. The monitors were moved so the tree would not be an obstruction of the 360-degree arch around the monitor. In 2009, the distance between the monitors and the tree is sufficient so the tree is not an obstruction to the site. The height of the tree will be assessed each year to be sure the distance of the monitors from the tree meets the location requirements in 40 CFR Part 58. Table 7-8 contains details on the monitoring site specific to 40 CFR Part 58.

Table 7-8 – KELO Monitoring Site Specifics

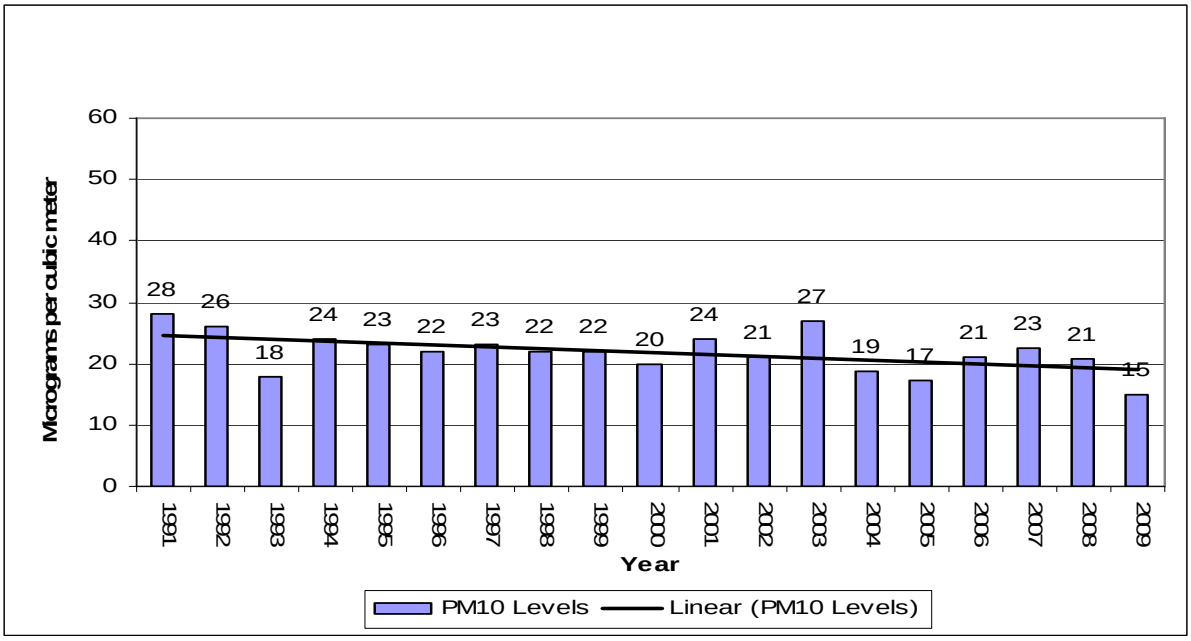
Parameter	Information
Site Name	KELO
AQS ID Number	46-099-0006
Street Address	500 South Phillips, Sioux Falls, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 683,678.21 N 4,823,550.80
MSA	Sioux Falls
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200

Parameter	Information
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/VSCC
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.5.1.1 KELO PM_{10} Data

The annual PM_{10} averages for the KELO Site range from a high of 28 ug/m^3 in 1991 to a low of 15 ug/m^3 in 2009. Annual average concentrations vary moving back and forth through the high and low range over the 19 years of sampling. In 2009, the annual average declined to the lowest level since testing began at this site. Figure 7-25 contains a graph of the annual averages since the site was set up in 1991. The overall PM_{10} annual trend line shows a declining concentration level. This parameter does not record the highest concentrations in the city but does provide an evaluation of population exposure. Because the site is not the highest concentration in Sioux Falls and with 24-hour PM_{10} concentrations are very low with no levels higher than 80% of the standard this parameter could be removed from this site.

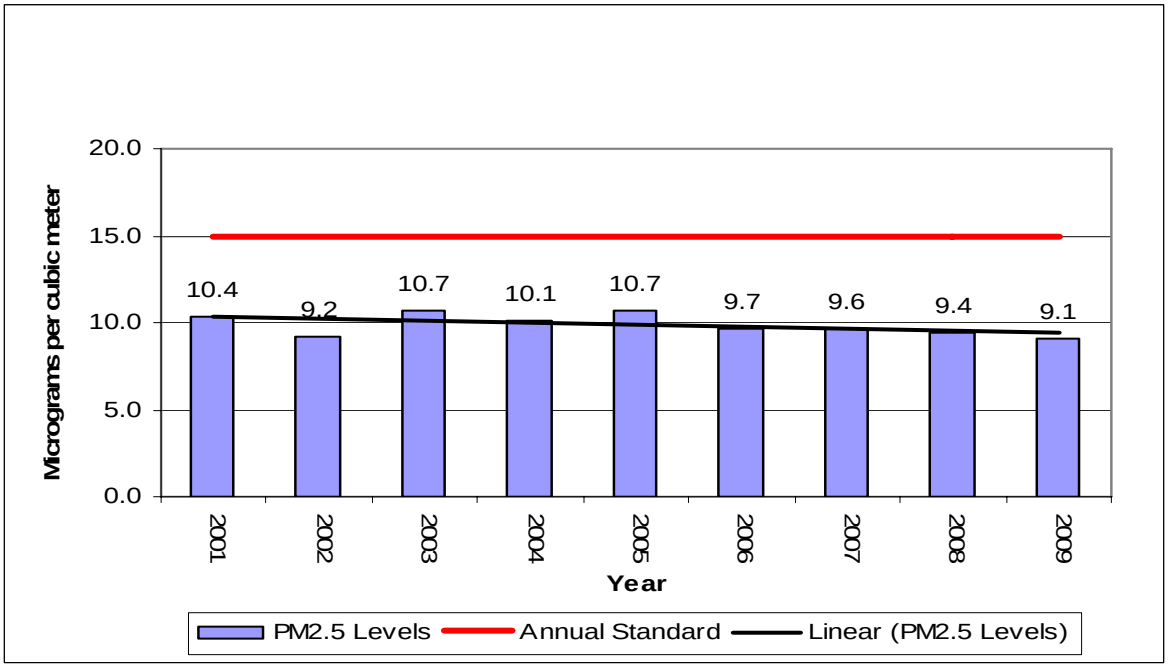
Figure 7-25 – KELO PM_{10} Annual Averages



7.5.1.2 KELO $PM_{2.5}$ Data

Sampling for $PM_{2.5}$ concentrations began in 2001. Annual averages for the KELO Site range from a high of 10.7 ug/m^3 in 2003 and 2005 to a low of 9.1 ug/m^3 in 2009. Figure 7-26 contains a graph of the annual averages for the KELO Site. Annual averages show some variation from year to year, but the trend line shows a slight decrease in concentration levels through the 2009 year. This site is currently the high $PM_{2.5}$ concentration site in the state. This parameter is meeting the goals of high concentration and population and will be continued.

Figure 7-26 – KELO $PM_{2.5}$ Annual Averages



7.5.2 SD School Site

The SD School Site replaced the SF Hilltop Site on January 1, 2008. The site is the NCore site for the state. Operating sampling parameters at the SD School Site included PM_{10}, $PM_{2.5}$, ozone, sulfur dioxide, nitrogen dioxide, meteorology, $PM_{2.5}$ speciation and air toxics in 2009. At the beginning of 2011 the parameters of carbon monoxide, lead, NOy, and PMcoarse will be added to this site. Figure 7-27 shows a current picture of the SD School Site.

The SD School Site is located on the east central part of the city. The site is about 1.5 miles southeast of the main industrial area in Sioux Falls. The area around the site is mainly residential. Interstate 229 which is a major commuting road runs north and south about five city blocks east of the monitoring site. Table 7-9 contains details on the monitoring site specific to 40 CFR Part 58. In addition to the parameters listed in Table 7-9 an air toxic and $PM_{2.5}$ speciation monitor are operated at this site on an every 6th day sampling schedule.

Figure 7-27 – SD School Site

Table 7-9 – SD School Monitoring Site Specifics

Parameter	Information
Site Name	SD School
AQS ID Number	46-099-0008
Street Address	2009 East 8th Street, Sioux Falls, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 687,288.70 N 4,822,930.29
MSA	Sioux Falls
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150 / co-located FRM
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Thermo FH 62 C14 Continuous BETA
Analysis Methods	beta attenuation
Data Use	SPM Real-time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Reference Method RFPS-0498-116
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	BGI PQ200 w/VSCC

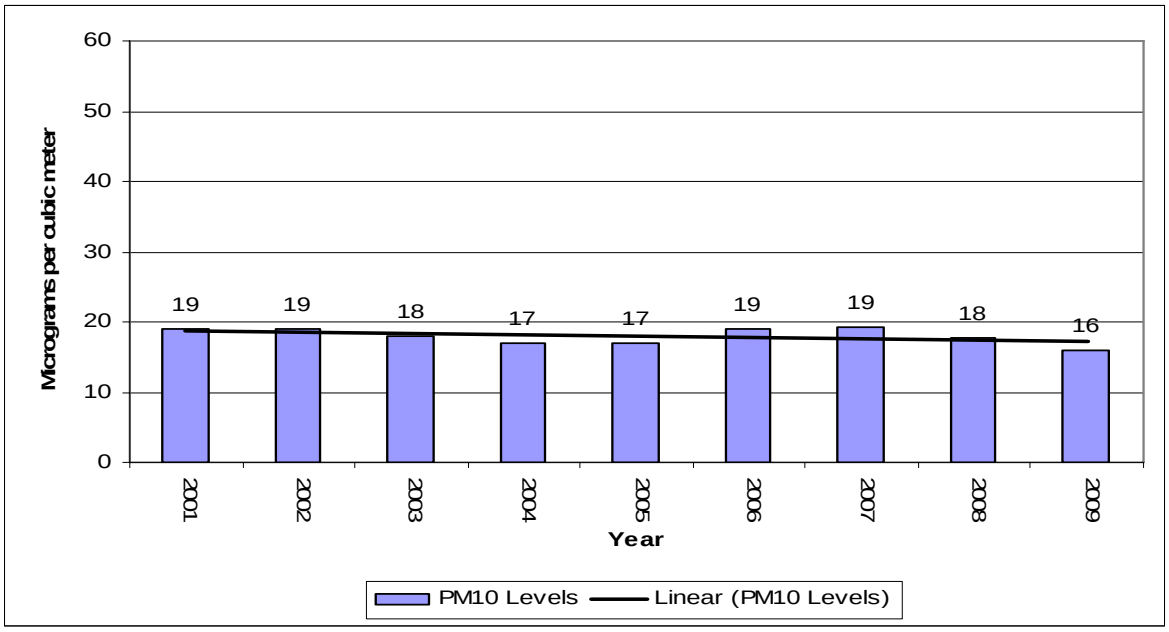
Parameter	Information
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0308-170
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Met One BAM-1020
Analysis Methods	beta attenuation
Data Use	SPM
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Instrumental Thermo 49C
Analysis Methods	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Automated Analyzer Thermo 42c
Analysis Methods	Ultraviolet Fluorescence
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Instrumental Thermo 43i TL
Analysis Methods	Pulsed Fluorescence
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data
CO	**(Continuous)**
Sampler Type	(Pending)
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Thermo 300 EU
Analysis Methods	Gas Filter Correlation
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data

The 2009 sampling year is the second at this location. To provide a comparison for the parameters being collected in Sioux Falls the data from the SF Hilltop and SD School sites will be combined and evaluated in the following graphs.

7.5.2.1 SD School/Hilltop PM_{10} Data

The annual averages at the SD School/Hilltop Site range from a high of 19 ug/m^3 in four of the years to a low of 16 ug/m^3 in 2009. The overall long term trends line show a steady to slightly decreasing PM_{10} concentration levels over the nine years of testing. Figure 7-28 shows a graph of the annual averages since 2001. This parameter is meeting the goals of high concentration and population and will be continued.

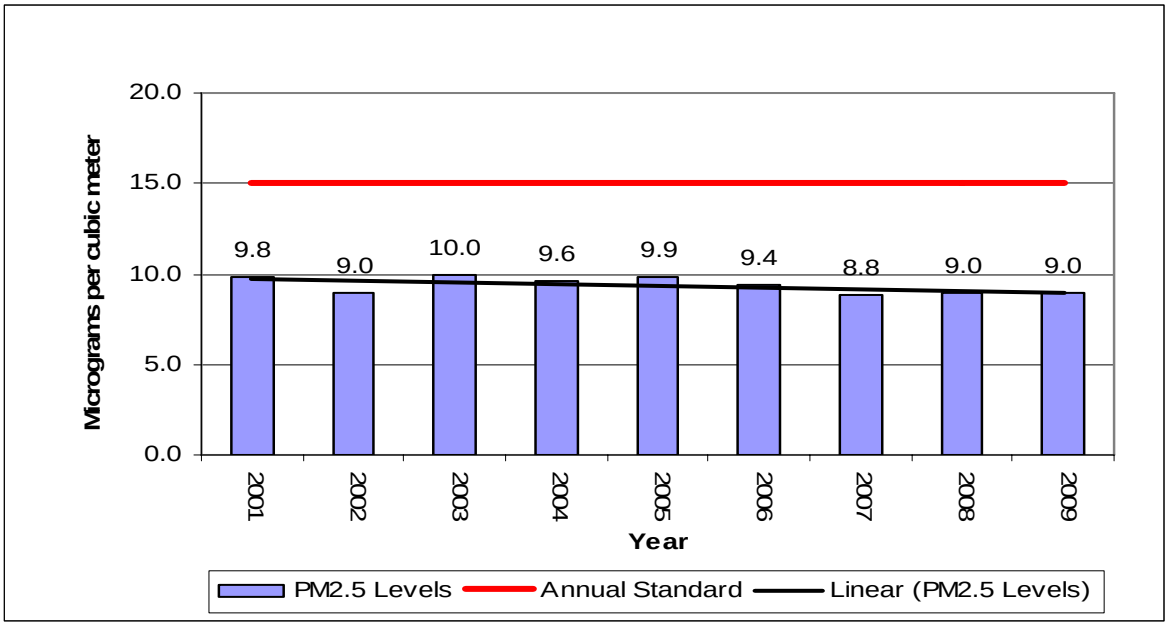
Figure 7-28 – SD School/Hilltop PM_{10} Annual Averages



7.5.2.2 SD School/Hilltop $PM_{2.5}$ Data

$PM_{2.5}$ data is being collected at this site since 2001. Annual averages for the SD School/Hilltop sites range from a low of 8.8 ug/m^3 in 2007 to a high of 10.0 ug/m^3 in 2003. The 2009 sampling year recorded the same concentration as was recorded in 2008. With the addition of the 2009 annual average the trends line shows a slight decline in concentration level over the last nine years. But overall the annual averages show little change at this site. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-29 contains a graph of the annual averages.

Figure 7-29 – SD School/Hilltop $PM_{2.5}$ Annual Averages



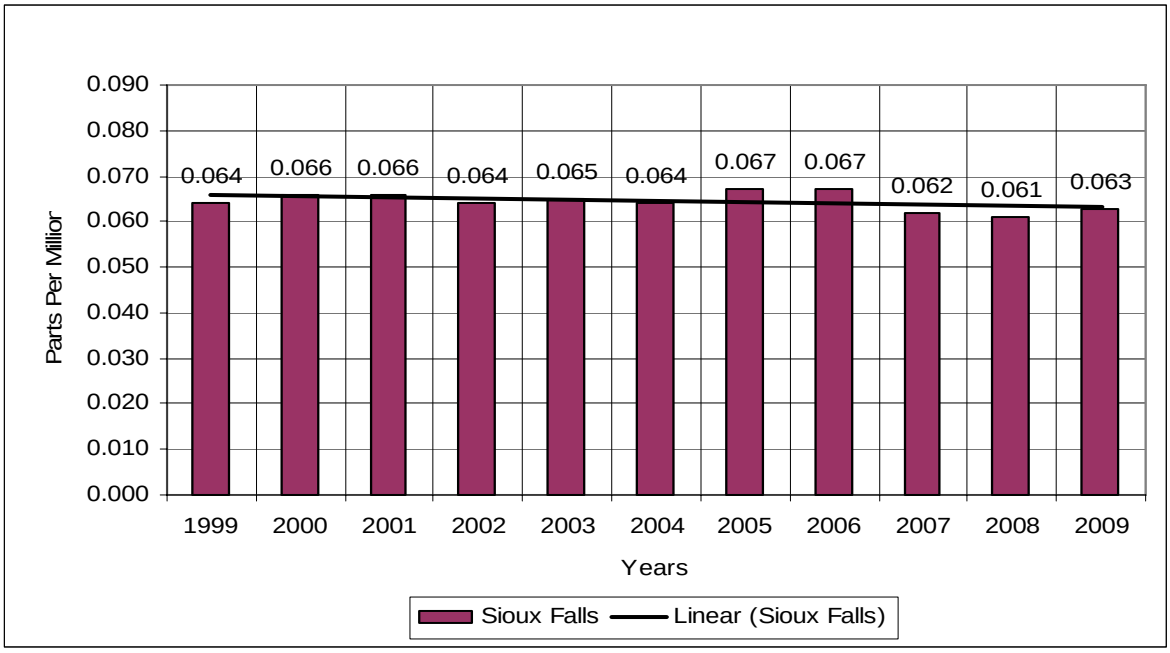
7.5.2.3 SD School/Hilltop Ozone Data

The ozone analyzer runs on a continuous sampling schedule providing hourly concentrations to the data logger. DENR is operating the ozone analyzers year around instead of just during the ozone season.

Sampling began for ozone in Sioux Falls in 1999 at the SF Hilltop Site. The site was moved to the SD School Site in 2008. The highest annual 8-hour ozone concentration was recorded in 2005 and 2006 at 0.067 ppm. The lowest annual 8-hour ozone concentration was recorded at 0.061 ppm in 2008. The lower ozone levels are similar for many of the sites in the state with the last three years having lower ozone levels.

Figure 7-30 contains a graph of each year's 4th highest ozone concentration level. With the addition of 2009, trends indicate that concentrations are steady to slightly decreasing over the eleven years of testing in Sioux Falls. This parameter is meeting the goals of high concentration and population and will be continued.

Figure 7-30 – SD School/Hilltop Ozone Yearly 4th Highest 8-Hour Averages



7.5.2.4 SD School/Hilltop Sulfur Dioxide Data

Testing for sulfur dioxide started at the Hilltop Site in 2002 and ended in 2007. At the beginning of 2008 the sulfur dioxide analyzer was operated at the SD School Site. A continuous analyzer is providing hourly concentration levels. The sulfur dioxide levels remain low at or just above the detection level for this type of analyzer. In 2009, there was a slight decrease in sulfur dioxide concentrations. No trend can be determined because of the low sulfur dioxide levels. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-31 contains a graph of the sulfur dioxide annual average for each sampling year.

7.5.2.5 SD School/Hilltop Nitrogen Dioxide Data

Nitrogen dioxide testing was added at the Hilltop Site in 2003 and continued to 2007. The SD School Site continued the testing in 2008. The nitrogen dioxide analyzer provides hourly concentration levels. There is only 0.003 ppm difference in concentration levels from 2002 to 2009. The highest level was recorded in 2003 and 2008 at 0.007 ppm. The lowest level of 0.004 ppm was recorded in 2007. The trends indicated a slight decline in concentration levels in the seven years of sampling but in general concentrations are remaining about the same level. This parameter is meeting the goals of high concentration and population and will be continued. See Figure 7-32 for more information on the nitrogen dioxide levels collected at this site.

Figure 7-31 – SD School/Hilltop Sulfur Dioxide Annual Averages

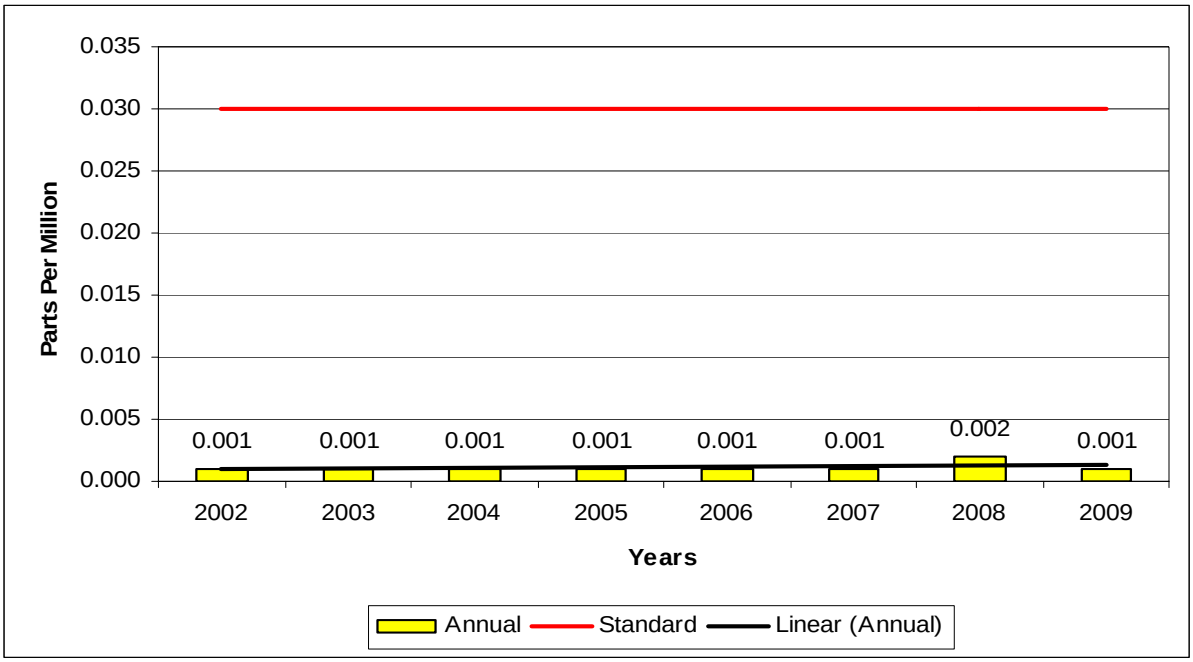
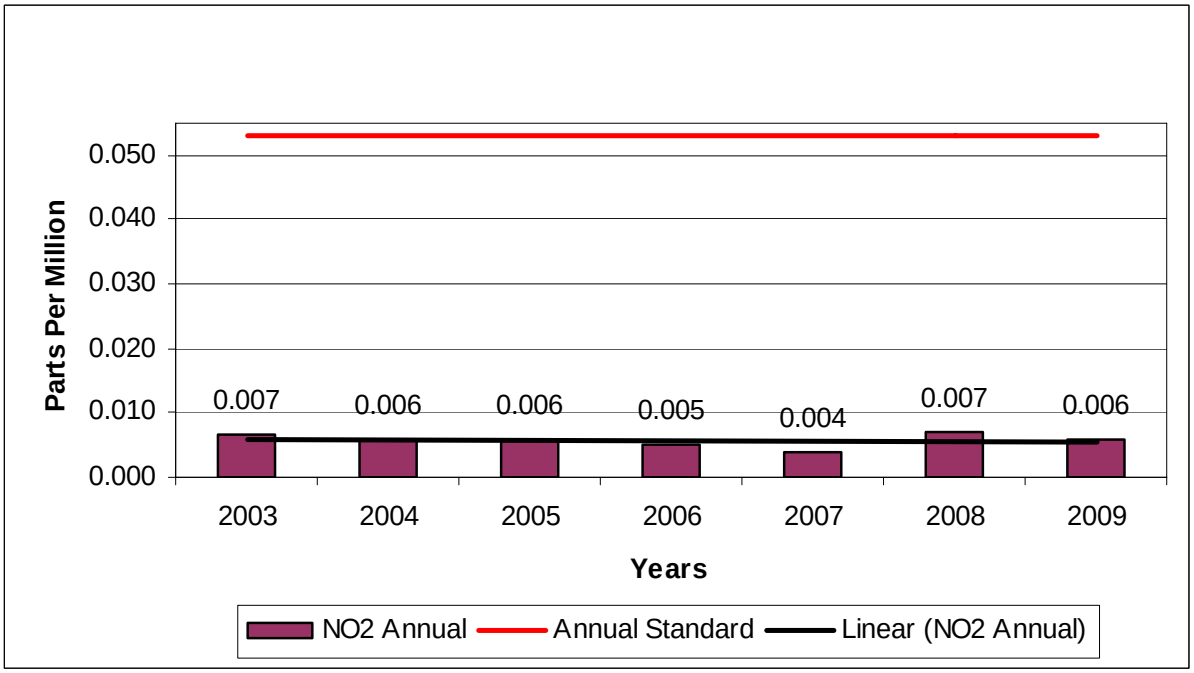


Figure 7-32 – SD School/Hilltop Nitrogen Dioxide Annual Averages



7.6 Aberdeen Fire Station #1 Site

In 2009, one sampling site was operated in the city of Aberdeen at the Fire Station #1 Site. The Fire Station #1 Site was established in 2000 as part of the implementation of the $PM_{2.5}$ air monitoring network. The parameters tested at the site included PM_{10} and $PM_{2.5}$. The monitoring site is located in the center of the city on top of the fire station roof just east of the main downtown business area. The area around the site has service type businesses, school, county and city offices, and residential area to the east. Aberdeen is the third largest city in the state. See Figure 7-33 for a picture of the monitoring site.

Figure 7-33 – Aberdeen Fire Station #1 Site

In 2009, the Fire Station #1 was renovated and a small addition was added to the south side of the building. The addition had no change in the site meeting the location requirements in 40 CFR Part 58. Table 7-10 contains details on the monitoring site specific to 40 CFR Part 58.

Table 7-10 – Aberdeen Monitoring Site Specifics

Parameter	Information
Site Name	Fire Station #1
AQS ID Number	46-013-0003
Street Address	111 2nd Ave SE, Aberdeen, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 540,216.92 N 5,034,545.94
MSA	None
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063

Parameter	Information
Operating Schedule	Every 6th Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS),
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/cyclone
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.6.1 Aberdeen PM_{10} Data

In 2009, the sampling schedule changed from every third day to every 6th day because concentrations at the site continue to be low and the chance of recording a concentration over the standard are very low. The annual average concentrations vary slightly but the trends line indicates levels are steady to slightly increasing through the ten years of testing. The slight increasing trend is not significant when looking at how low concentrations are at this location. The annual averages range from a low of 17 ug/m^3 in 2004 and 2005 to a high concentration level of 24 ug/m^3 recorded in 2003 and 2008. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-34 contains a graph of the annual averages since the site was set up in 2000.

7.6.2 Aberdeen $PM_{2.5}$ Data

Sampling began for $PM_{2.5}$ at this site in 2001. The $PM_{2.5}$ monitors run on an every third day sampling schedule. Annual averages for the Fire Station #1 Site in Aberdeen have concentrations that range from 7.7 ug/m^3 in 2008 to 9.0 ug/m^3 in 2005. The 2009, annual average concentrations is slightly higher then was recorded in 2008. The trend line shows that annual averages have decreased slightly over the last nine years. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-35 contains a graph of the annual average concentrations.

Figure 7-34 – Aberdeen PM_{10} Annual Averages

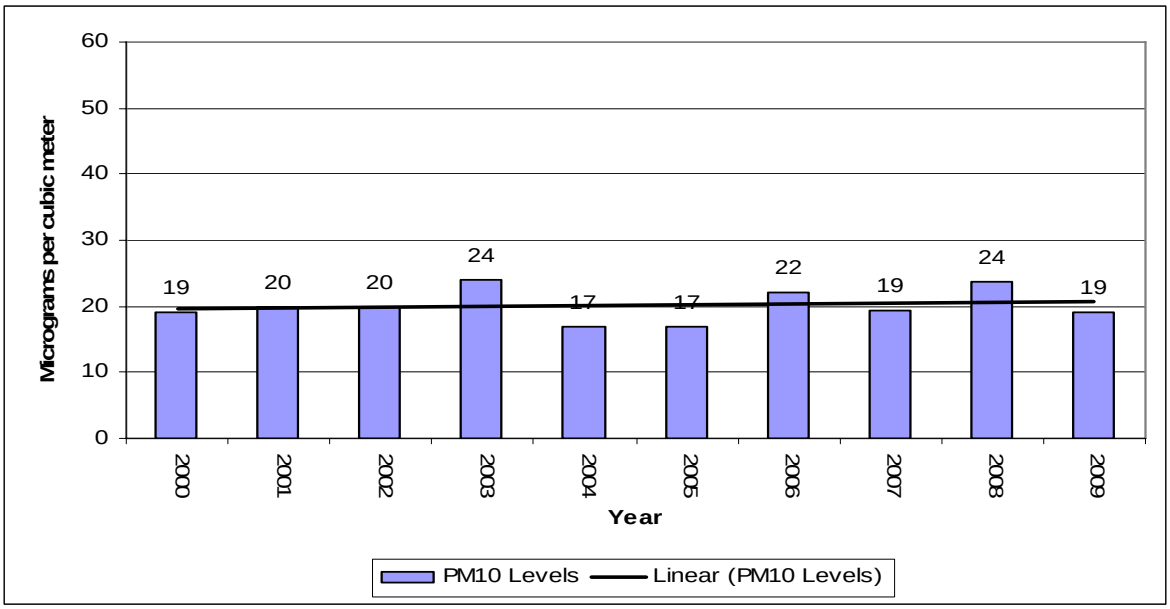
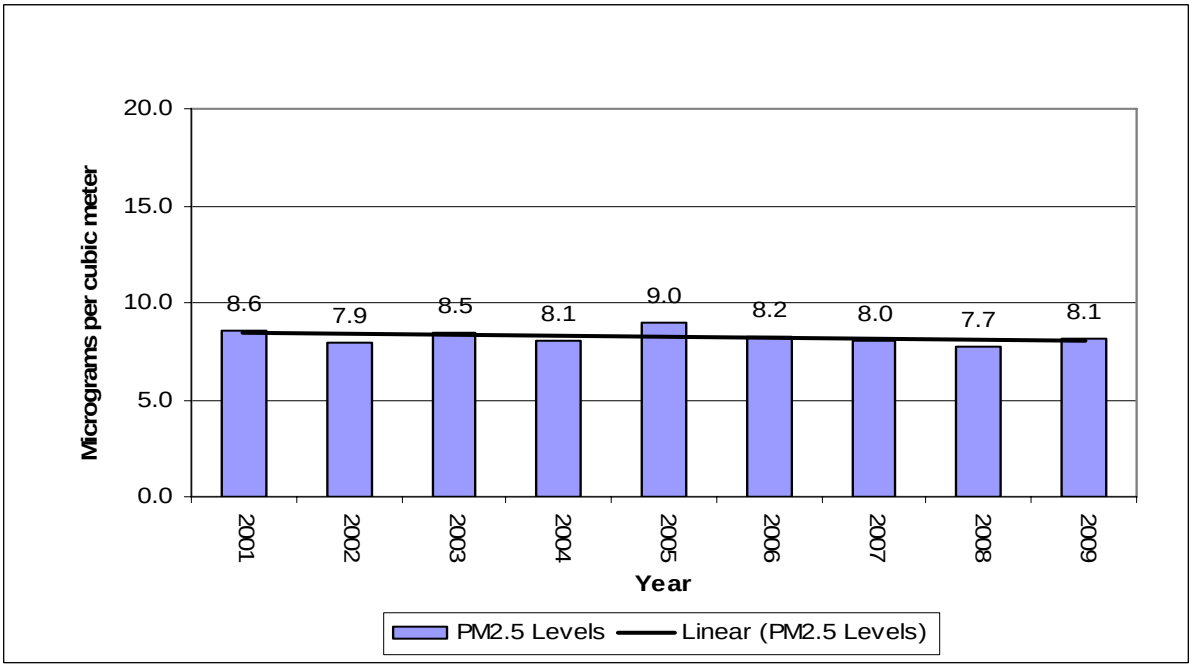


Figure 7-35 – Aberdeen $PM_{2.5}$ Annual Averages



7.7 Brookings County Sites

In 2009, two air monitoring sites were operated in Brookings County. One of the sites is located in the City of Brookings and the other northwest of the city in rural Brookings County. The city site is located at the City Hall building in the center of the city. Testing at this site includes PM_{10} and $PM_{2.5}$ parameters.

The rural site is located on the Eastern Soil and Water Research Farm and was setup in 2008. Testing at this site includes ozone and meteorological data.

7.7.1 City Hall Site

The City Hall Site was established in 1989 and sampled for levels of PM_{10}. The site is the result of a cooperative effort between DENR and the City of Brookings. The area to the west of the site is residential and the areas north, east, and south have service oriented businesses and light industry. Brookings is a growing community with a population of 18,504 and has a growing industrial base. In 1999, $PM_{2.5}$ monitors were added to the site. The sampling frequency for PM_{10} and $PM_{2.5}$ are every third day. Figure 7-36 shows a current picture of the monitoring site. Table 7-11 contains details on the monitoring site specific to 40 CFR Part 58.

Figure 7-36 – City Hall Site

Table 7-11 – City Hall Site Specifics

Parameter	Information
Site Name	City Hall
AQS ID Number	46-011-0002
Street Address	311 3rd Avenue, Brookings, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 675,410.76 N 4,908,468.06
MSA	None
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every 3rd Day

Parameter	Information
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS),
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/WINS
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.7.2 City Hall PM_{10} Data

PM_{10} sampling began at this site in 1989. The annual averages range from a high of 38 ug/m^3 in 1990 to a low of 17 ug/m^3 in 1993. The trend line shows concentration levels declining over the 21 years the site has been operating. In 2009, PM_{10} concentrations were down slightly from the previous year and significantly below the highest concentration in 1990. This parameter is meeting the goals of high concentration and population and will be continued. In Figure 7-37, there is a graph of the annual averages since the site was setup in 1989.

In 2008, a 24-hour concentration was greater than the PM_{10} standard. This is the second time a 24-hour PM_{10} concentration over the standard was recorded at this site in the 21 years of operation. The sample was collected on a high wind day combined with a big area of the down town streets near the site dug up to replace water and wastewater infrastructure. Although there was a 24-hour PM_{10} concentration greater than the standard, the monitoring at the City Hall Site demonstrates compliance with the PM_{10} NAAQS.

7.7.3 City Hall Site $PM_{2.5}$ Data

The $PM_{2.5}$ monitors run on an every third day schedule. Annual averages for the City Hall Site range from a high of 9.7 ug/m^3 in 2003 and 2005 to a low of 8.0 ug/m^3 in 2008. This site records some of the highest 24-hour and annual average concentrations in the state.

The trends for the nine years of testing show a slight decrease in $PM_{2.5}$ levels overall. In 2009, $PM_{2.5}$ concentrations were slightly higher then in 2008 but were the second lowest concentration year. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-38 contains a graph of the annual average concentrations.

Figure 7-37 – City Hall Site PM_{10} Annual Averages

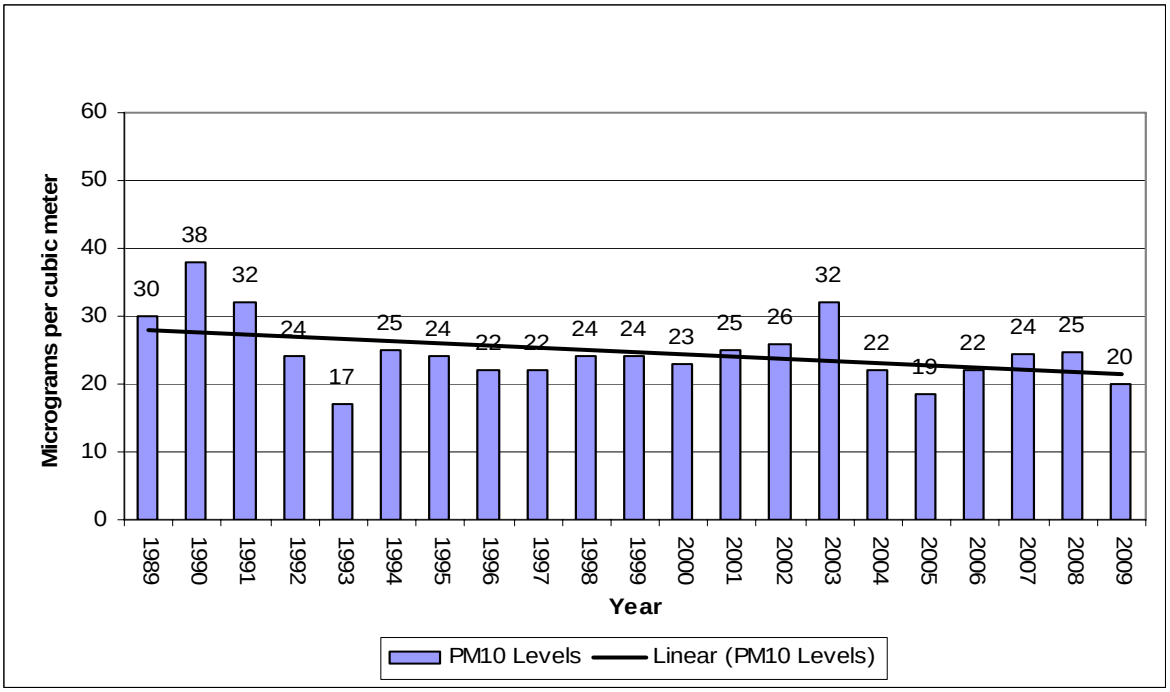
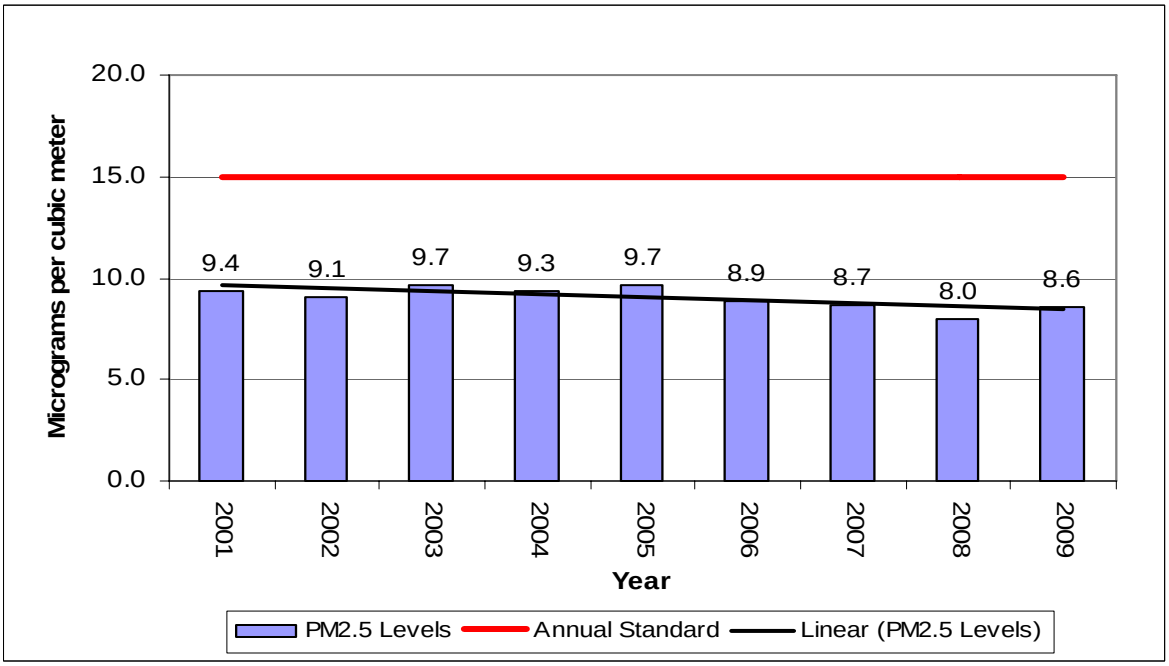


Figure 7-38 – City Hall Site $PM_{2.5}$ Annual Averages



7.7.4 Research Farm Ozone Data

The Research Farm Site was set up in cooperation with the 3M Company and Valero Renewable Fuels Company (previously VeraSun Energy) located in Brookings County which provided the equipment for the site. The sampling is a requirement of the Prevention of Significant

Deterioration (PSD) permits for both facilities. DENR is operating the site and is providing the data to the facilities. The 3M Company has completed their air monitoring report using the data for 2008. Valero Renewable Fuels Company will not be completing the facility upgrade and will not be using the data for 2009.

The site location is outside of the nitrogen dioxide one microgram per cubic meter area modeled for the facilities in and near Brookings. The site collects data for ozone and meteorological parameters. The goal of the monitoring site was impacts from modification of the two facilities and to date the goals have been met. New goals have been added to collect ozone data down wind of a small city and for comparison to the NAAQS. The completion of the 2010 sampling year will provide the first three year comparison of the ozone data to the national standard for ozone. Figure 7-39 shows a current picture of the monitoring site. Table 7-12 contains details on the monitoring site specific to 40 CFR Part 58.

Figure 7-39 – Research Farm Site

Table 7-12 – Research Farm Site Specifics

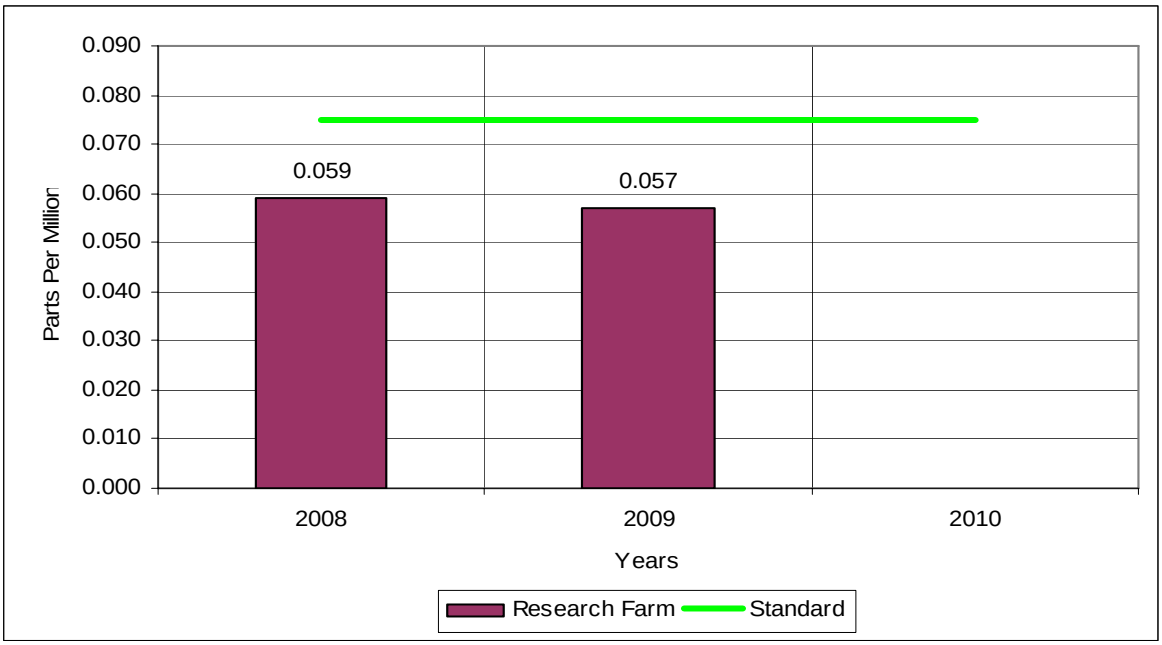
Parameter	Information
Site Name	Research Farm
AQS ID Number	46-011-0003
Street Address	3714 Western Ave.
Geographic Coordinates	UTM Zone 14, NAD 83, E 674766.316 N 4912930.911
MSA	None
Ozone	**(Continuous)**

Parameter	Information
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every 3rd Day
Scale Representation	Regional
Monitoring Objective	High Concentration, Population, and Background
Sampling Method	Thermo 49i
Analysis Methods	Ultraviolet
Data Use	PSD (Comparison to the NAAQS),

7.7.2.1 Research Farm Site Ozone Data

The 2009 sampling year is the second ozone season of testing. The goal is to collect at least three years of data before any changes are made to the site. In the two years of sampling, the Research Farm Site has yearly fourth highest 8-hour averages that are well under the standard of 0.075 ppm. This parameter is meeting the goals of PSD impacts, high concentration, and population and will be continued. The graph in Figure 7-40 shows the first two years of concentration levels.

Figure 7-40 – Research Farm Site Ozone Yearly 4th Highest 8-Hour Averages



7.8 Watertown Utility Yard Site

In 2009, one sampling site was operated in the city of Watertown at the Utility Yard Site. Watertown is the fourth largest city in South Dakota with a population of 20,237. The city has an increasing growth rate and industrial base. The industrial base is a mixture of service oriented businesses and light industry. One other air monitoring site was operated in Watertown starting in 1974 and closed 1987. No other air monitoring data has been operated in the city. Figure 7-41 shows a picture of the monitoring site.

Figure 7-41 – Watertown Utility Yard Site

The Utility Yard Site was established in 2003 as part of the implementation of the $PM_{2.5}$ network. The parameters tested at the site include PM_{10} on a sampling frequency of every day and $PM_{2.5}$ at a sampling frequency of every third day. The monitoring site is located in the western third of the city just east of an industrial area. The site is located on the roof of a monitoring shelter. The area around the site has service type businesses and light industry to the west and south. Residential areas are located to the north and east of the site.

During the winter of 2009/2010 the City of Watertown's Maintenance crews used the area east of the monitoring site to store dirt removed when repairing water line breaks. This caused problems at the Utility Yard Site on wind days. As the soil dried out the winds blew the soil to the monitors and caused high concentrations in late 2009 and into the first half of 2010. After notifying the City Maintenance staff of the high concentrations the city staff removed the dirt and reclaimed the area. Table 7-13 contains details on the monitoring site specific to 40 CFR Part 58.

Table 7-13 – Watertown Monitoring Site Specifics

Parameter	Information
Site Name	Utility Yard
AQS ID Number	46-029-0002
Street Address	801 4th Ave. SW, Watertown, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 647,740.74 N 4,973,300.25
MSA	None
PM_{10}	**(Continuous)**

Parameter	Information
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Methods	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-Time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/cyclone
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.8.1 Watertown PM_{10} Data

The PM_{10} monitor operated on an every third sampling schedule until 2006 when a continuous PM_{10} monitor replaced the manual monitors and an every day sampling schedule began. The highest recorded annual average for PM_{10} concentrations was 28 ug/m^3 recorded in the first sampling year of 2003. The lowest annual average concentration of 20 ug/m^3 was recorded on the manual monitor in 2005. In 2009, concentrations were down slightly from the previous year. The annual average trend line indicates concentration levels are steady to slightly declining during the seven years of testing. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-42 contains a graph of the annual averages.

7.8.2 Watertown $PM_{2.5}$ Data

The $PM_{2.5}$ monitors run on an every third day schedule since the $PM_{2.5}$ monitors were setup in 2003. Annual averages for the Utility Yard Site range from a high of 10.7 ug/m^3 in 2005 to a low of 8.5 ug/m^3 in 2009. The 2009 annual average was slightly lower from the previous year and is the lowest concentration recorded at this site. The annual average trend line shows a slight decrease in $PM_{2.5}$ concentration levels over the seven years of testing. This parameter is meeting the goals of high concentration and population and will be continued. Figure 7-43 contains a graph showing the annual average concentration for each year of testing.

Figure 7-42 – Watertown PM_{10} Annual Averages

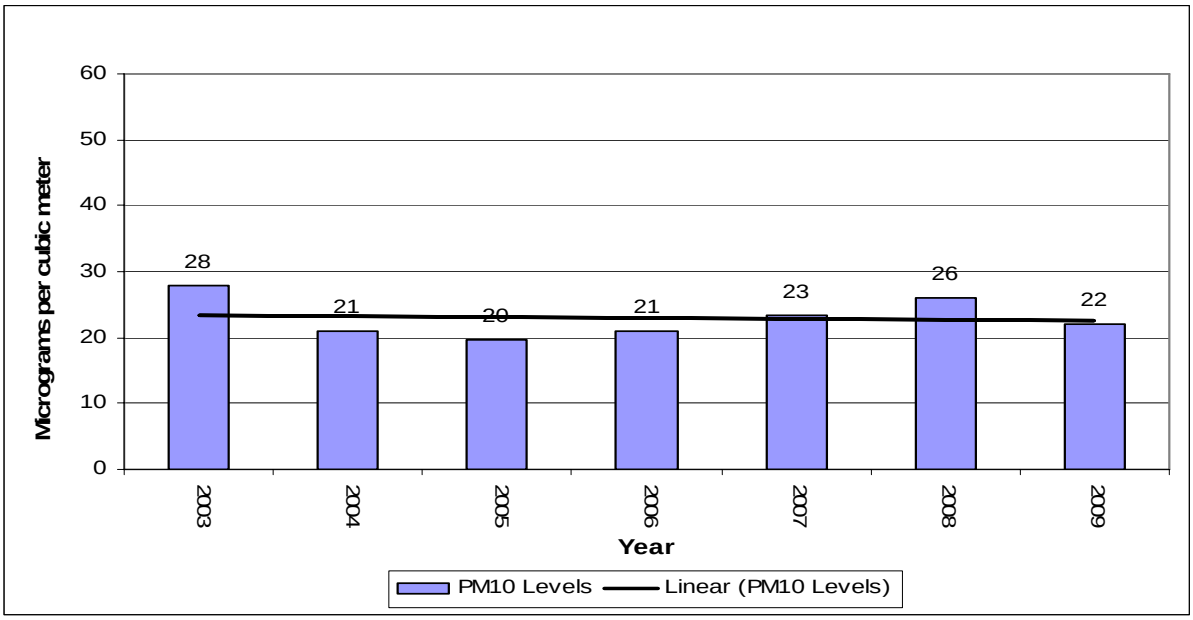
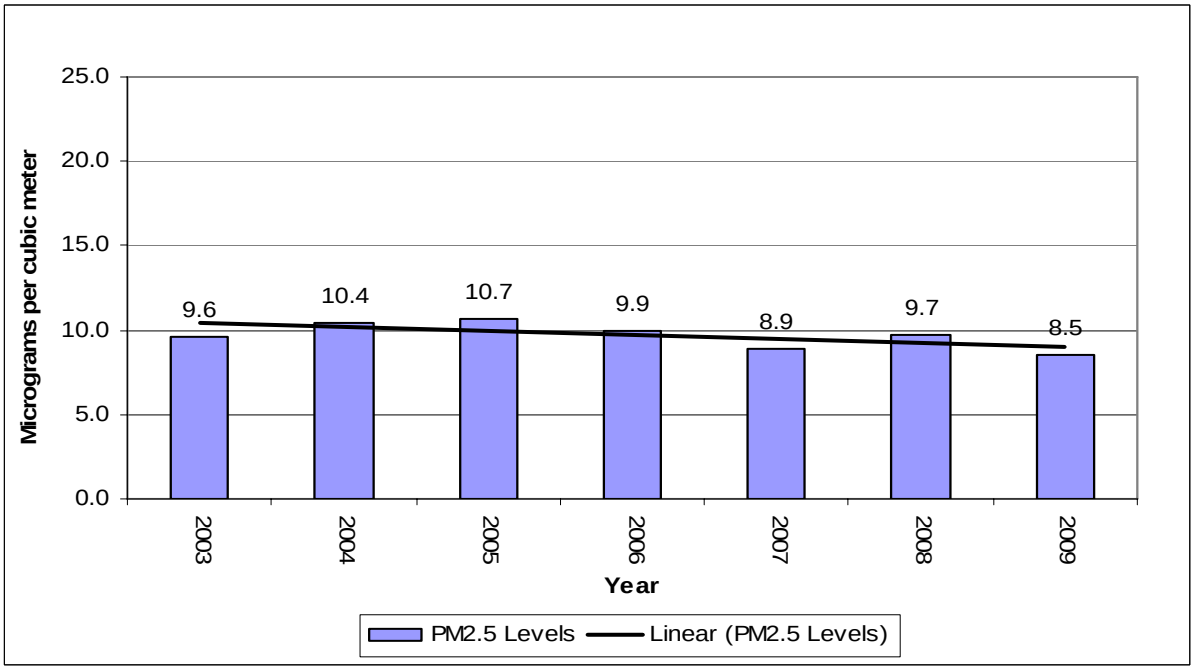


Figure 7-43 – Watertown $PM_{2.5}$ Annual Averages



7.9 Union County Sites

At the beginning of 2009, three new monitoring sites were set up in Union County. No ambient air quality testing has ever been completed in this county. All three sites are located north of Elk Point. The new sites will determine air pollution levels near the location of the proposed Hyperion Energy Center during pre-construction, construction, and post construction. In addition the data will be compared to the NAAQS. The proposed Hyperion Energy Center is

home to an oil refinery and electrical power plant. Because the sites are collecting pre-construction or background data the parameters will be compared between UC #1 and UC #2 sites.

7.9.1 UC #1 Site

UC #1 Site is located about 3 miles south of the proposed Hyperion Energy Center. Sampling began in January 2009 for all but the carbon monoxide analyzer. Operational problems with the new carbon monoxide analyzer needed to be worked out so equipment parameters were within quality assurance measures before data could be used for comparison to the national standard. The goals of the site are background and comparison to the NAAQS.

Figure 7-39 provides a picture of the monitoring site looking to the southeast of the site. Table 7-14 contains details on the monitoring site specific to 40 CFR Part 58. In addition to the parameters listed in Table 7-14 an air toxic monitor is also operated on an every 6th day sampling schedule.

Figure 7-44 – UC #1 Site

Table 7-14 – UC #1 Monitoring Site Specifics

Parameter	Information
Site Name	UC #1
AQS ID Number	46-127-0001
Street Address	31988 457th Ave.
Geographic Coordinates	Lat. + 42.751518 Long. – 96.707208
CBSA	Sioux City, IA-NE-SD

Parameter	Information
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0598-0119
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SLAMS
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 43i Trace Level Thermo
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS)
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 42i Thermo/Fisher
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS)
CO	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental API 300EU Trace Level
Analysis Method	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS)

7.9.2 UC #2 Site

UC #2 Site is located about 1 ½ miles north northwest of the proposed Hyperion Energy Center. Table 7-15 contains details on the monitoring site specific to 40 CFR Part 58. Figure 7-45 contains a picture of the monitoring site looking west.

Figure 7-45 – UC #2 Site

Table 7-15 – UC #2 Monitoring Site Specifics

Parameter	Information
Site Name	UC #2
AQS ID Number	46-127-0002
Street Address	31307 473 Ave.
Geographic Coordinates	Lat. + 42.850975 Log. – 96.747325
CBSA	Sioux City, IA-NE-SD
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data

Parameter	Information
Operational Status	No change planned for 2010
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0598-0119
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SPM
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 43i Trace Level Thermo/Fisher
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 42i Thermo
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Andersen RAAS2.5-100 $PM_{2.5}$ w/cyclone
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

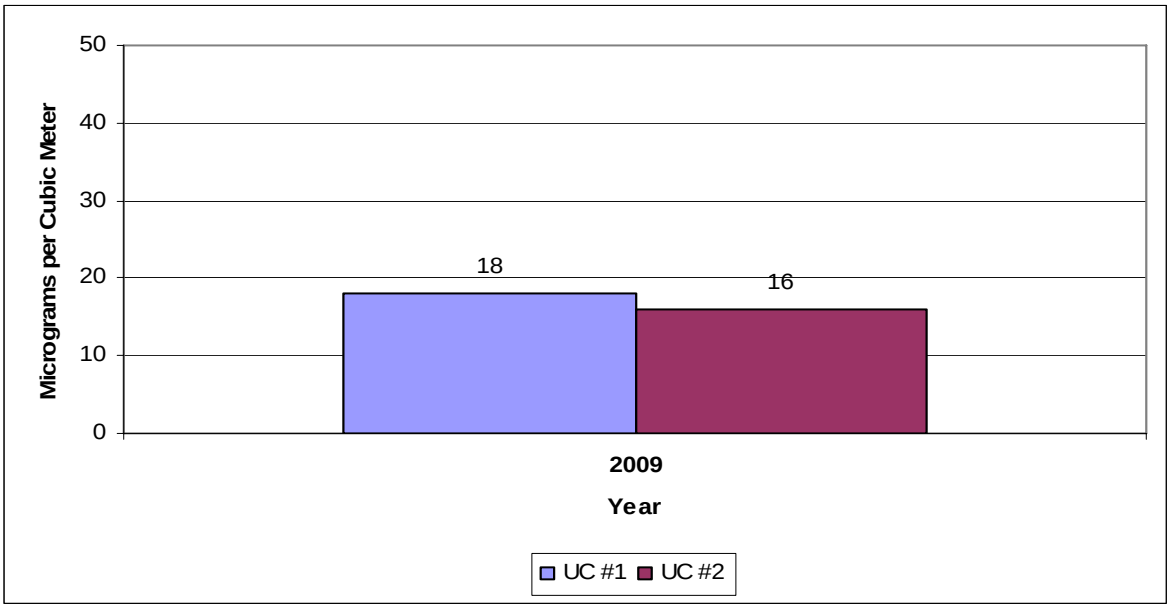
7.9.3 UC #1 and #2 Data Comparison

The average concentrations of PM_{10} in Union County represent concentration levels similar to other sites in eastern South Dakota. The annual average concentrations in eastern part of the state range between 22 to 15 ug/m^3. The Union County sites annual averages ranked in the middle to the lower end of this range. See the annual PM_{10} averages for the two sites in Union County in Figure 7-46.

Impacts from PM_{10} source emissions have localized impacts due to the size and weight of the particles. Therefore, low annual averages close to the same concentration level at both sites

would be expected in a rural area with similar point and fugitive dust sources. Because of minor differences in localized fugitive dust sources such as road traffic, mechanical working of agricultural fields and associated wind speed and direction, 24-hour PM_{10} concentration levels between the two sits could be significantly different for the highest samples.

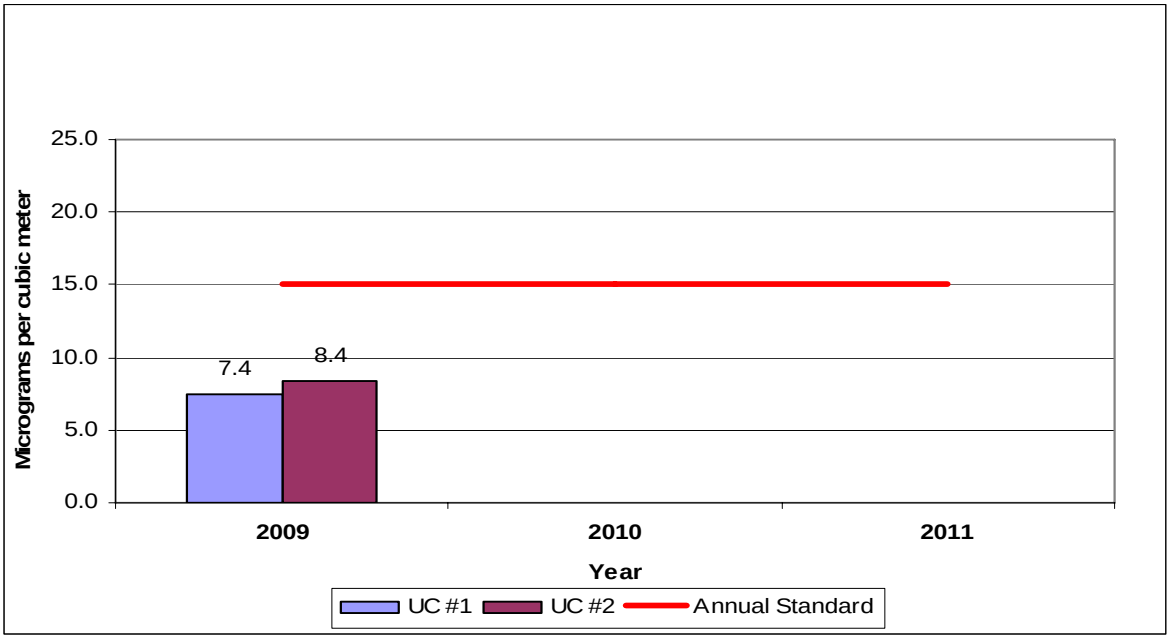
Figure 7-46 – Union County Annual PM_{10} Concentrations



The annual average concentrations for $PM_{2.5}$ at the two sites would be expected to be close to the same level. In this case the annual averages were compared between both continuous monitors (see Figure 7-47). A difference of 1 ug/m^3 appears to indicate some localized difference in sources. When comparing the activities around the two sites the differences include a highway running just north of UC #2 and a small group of homes and business near this site. UC #1 has only one home near the site. One notable item is the difference in the annual averages between the manual and continuous method was only 0.3 ug/m^3 so the difference was not method related and appears to be associated with higher traffic counts or more combustion sources near UC #2.

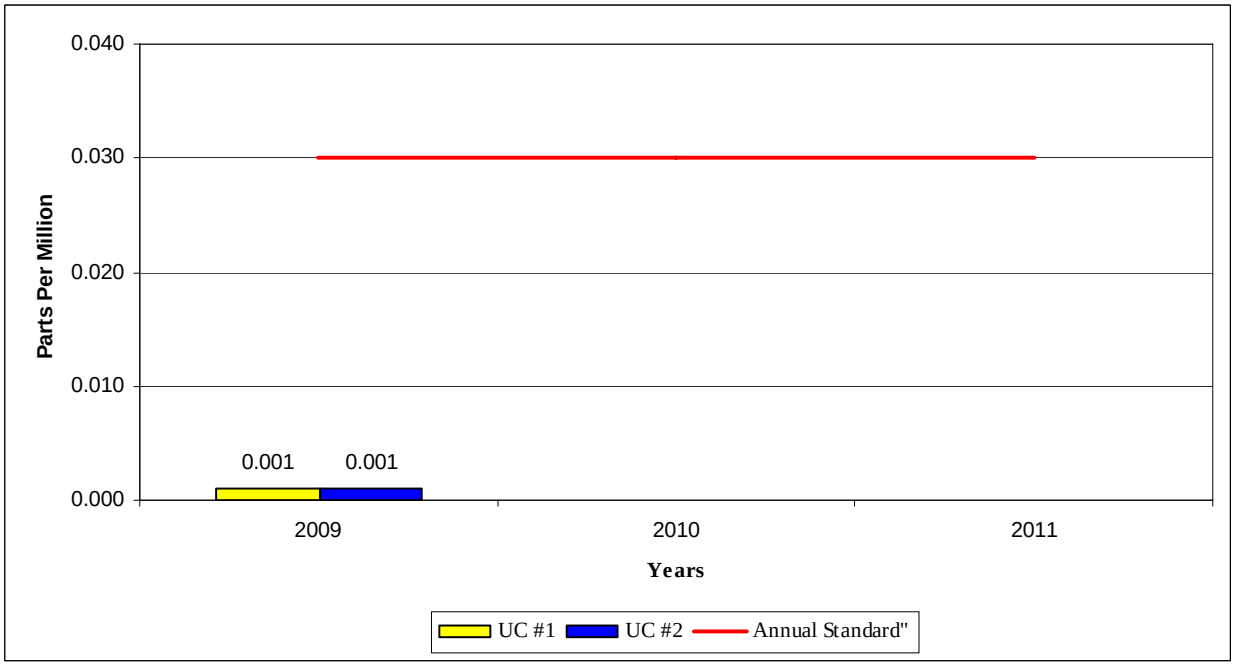
Annual average concentrations in eastern part of the state range from 7.4 to 9.1 ug/m^3. Both sites are within the annual average range observed in eastern South Dakota. UC #1 appears to best represent the current background $PM_{2.5}$ concentrations as it has the lowest annual average and has the least chance of having higher readings due to localized sources. A better comparison can be made when three years of data has been completed for both sites.

Figure 7-47 – Union County Annual $PM_{2.5}$ Concentrations



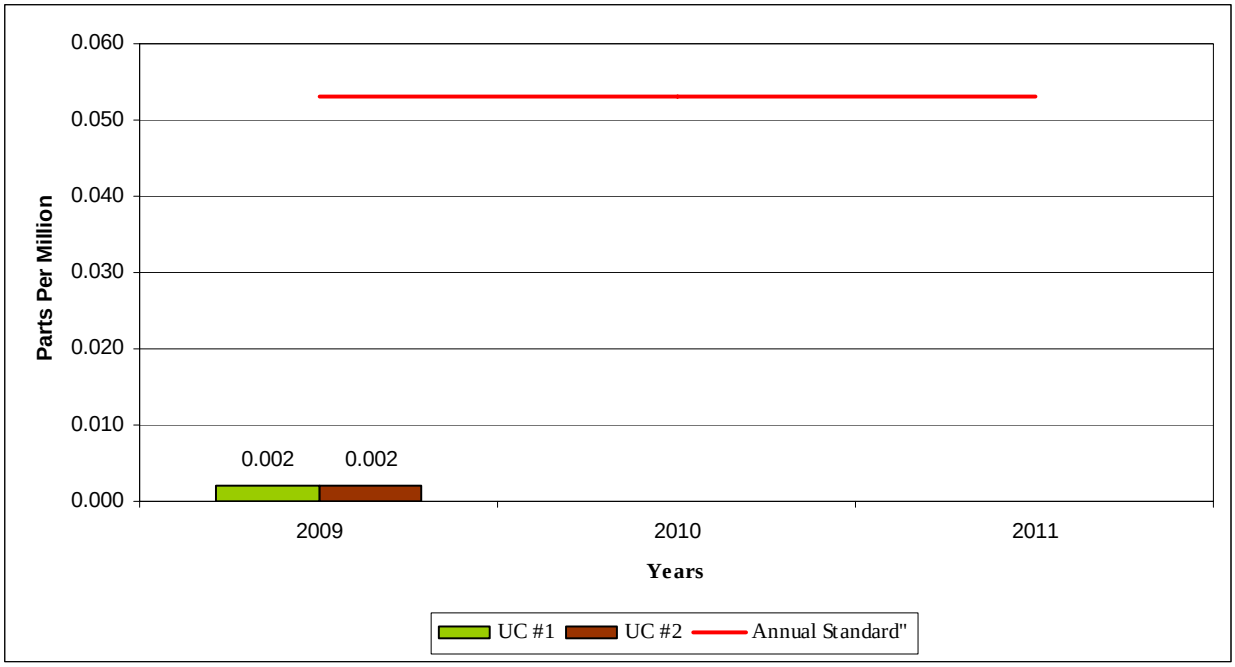
Low annual average concentrations of sulfur dioxide at both sites follow the same trend as other sites in the state. Many hourly concentrations are near the detection limits of the analyzer method being used to collect the data. Differences in concentration levels may be noted between the two sites when comparing the 3-hour or 24-hour averages but overall the levels are low at 0.001 ppm or less. Figure 7-48 shows a graph of the annual average sulfur dioxide concentrations recorded at the two sites.

Figure 7-48 – Union County Annual Sulfur Dioxide Concentrations



Concentrations of nitrogen dioxide follow the same trends as other rural sites in the state like Badlands and Wind Cave sites. Annual average concentrations are very low near the detection level for the analyzer method being used to collect the data. Figure 7-49 shows a graph of the annual average nitrogen dioxide concentrations recorded at the two sites.

Figure 7-49 – Union County Annual Nitrogen Dioxide Concentrations



7.9.4 UC #3 Site

UC #3 Site is located about 3 ½ miles north and 2 miles west of the proposed Hyperion Energy Center. Ozone is the only parameter being operated at this site. Table 7-16 contains details on the monitoring site specific to 40 CFR Part 58. Figure 7-50 contains a picture of the monitoring site looking northeast.

Table 7-16 – UC #3 Monitoring Site Specifics

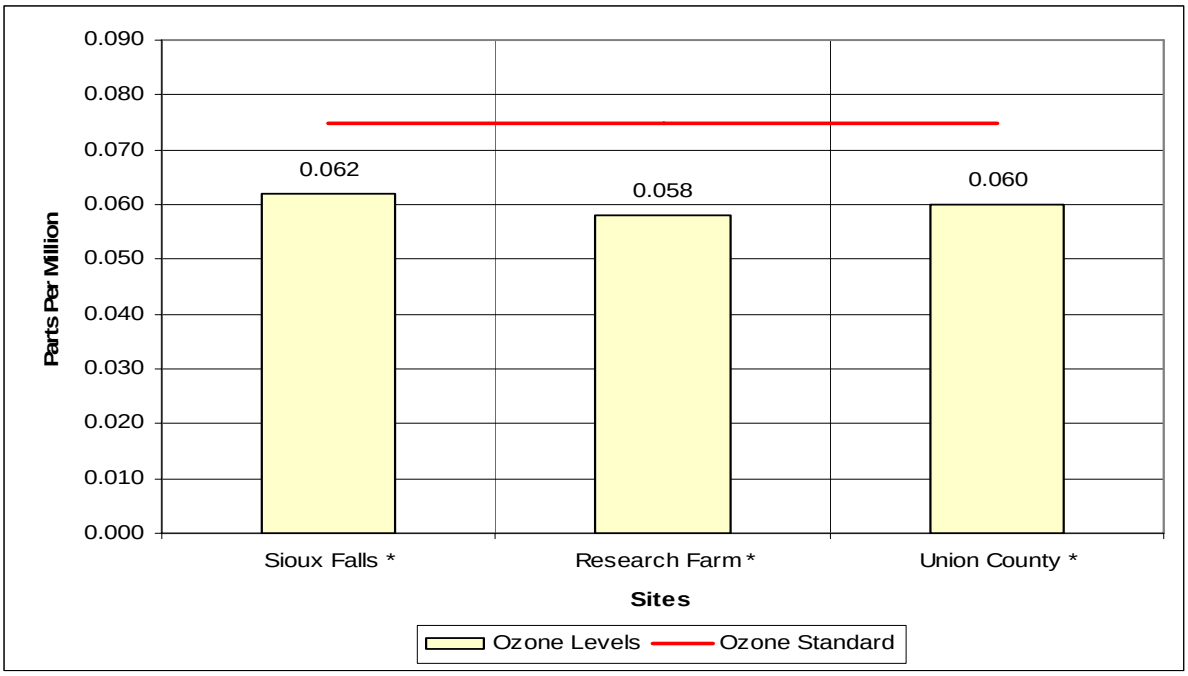
Parameter	Information
Site Name	UC #3
AQS ID Number	46-127-0003
Street Address	31102 47th Ave.
Geographic Coordinates	Lat. + 42.880212 Long. – 96.785339
CBSA	Sioux City, IA-NE-SD
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport

Parameter	Information
Sampling Method	Thermo 49i
Analysis Methods	Ultraviolet
Data Use	PSD and (Comparison to the NAAQS),

Figure 7-50 – UC #3 Site

The ozone 8-hour average for the UC #3 Site recorded a concentration that was similar to levels recorded at the other two sites in the eastern part of the state in 2009 (See Figure 7-51). As expected the SD School Site in Sioux Falls recorded the highest concentration at 0.063 ppm and the lowest ozone concentration of 0.057 ppm was recorded at the Research Farm in rural Brookings County. UC #3 recorded an ozone concentration between the concentrations measured at the other two eastern sites. A better evaluation can be made when three years of data have been collected in Union County.

Figure 7-51 – Eastern South Dakota Ozone Concentrations



8.0 SPECIAL AIR QUALITY MONITORING

8.1 Urban Air Toxics Monitoring Program

South Dakota has two stations that collect samples as part of the Urban Air Toxics Monitoring Program (UATMP). These stations collect 24-hour air samples on a 6-day schedule.

One site is in Sioux Falls (SSSD) at the SD School Site located in southeastern South Dakota. As identified in Table 5-1, Sioux Falls is the largest city in the state. The site is located near School for the Deaf and residential areas. The main industrial area of the city is about 1.5 miles northwest of the site. The site was selected because it represents population exposure to chemical and particulate emissions from the industrial parts of the city. The predominant wind direction is northwest for most of the year with southeast winds during the summer months. The monitor was originally located about 1.2 miles southeast of the existing site (SFSD) and was moved to its existing site in 2008. The previous monitor was setup in March of 2000, sampling for hydrocarbons, halogenated hydrocarbons, and polar compounds. In 2002, carbonyls sampling was added.

The other site is in Union County (UCSD) at UC #1 Site which is also located in southeastern South Dakota. The UC #1 Site is located about 3 miles south of the proposed Hyperion Energy Center. DENR added three new air monitoring sites to the network in 2009 in anticipation of the Hyperion Energy Center's proposed oil refinery and power plant project in Union County in an area north of Elk Point. This project would collect air monitoring data for the first time in Union County. The monitoring project objectives are to gather data to determine current pollution levels that can be compared to the air quality standards before construction of the project begins,

collect data during plant construction, and determine levels during the operation of the facility. Sampling began on or near January 1, 2009.

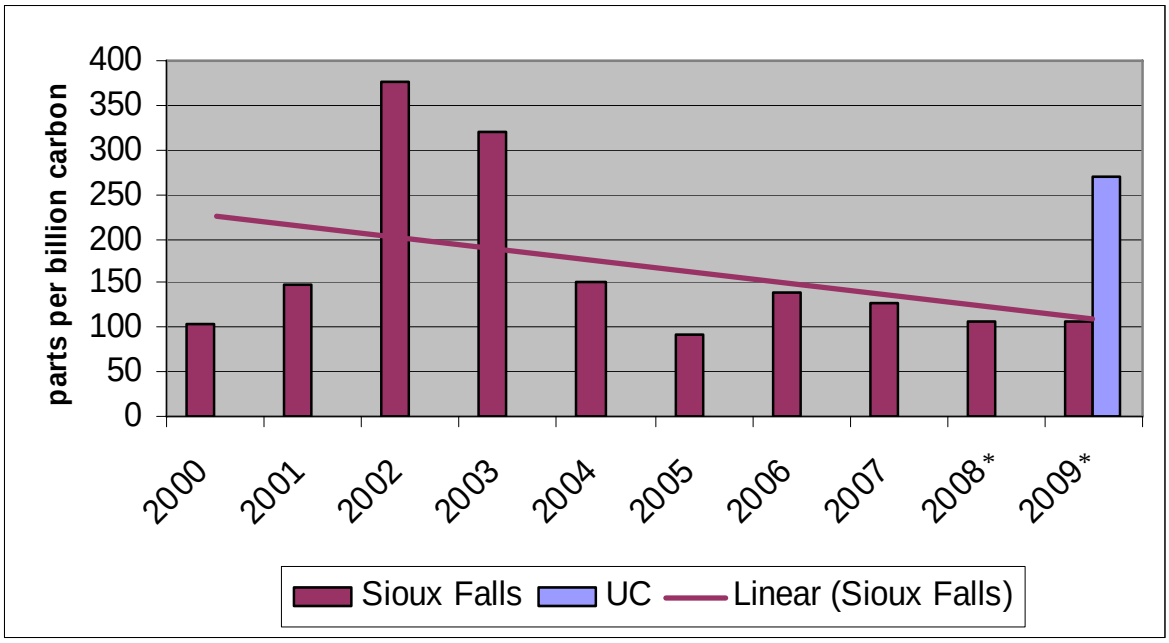
Table 8-1 identifies which site had higher concentrations in 2009, what the overall trend is in Sioux Falls, and what the possible sources are for the five pollutants DENR is evaluating. Sioux Falls had higher concentrations in 2009 for 1,3-Butadiene and Benzene and Union County had the higher concentrations in 2009 for Formaldehyde, Acetaldehyde, and Acrolein. The trend for these five pollutants in Sioux Falls has been decreasing except for Acrolein. This is the first year for the UC #1 Site; therefore, DENR will compare the data in the future to determine if the UC #1 Site continues to have higher concentrations of 1,3-Butadiene, Acetaldehyde, Acrolein.

Table 8-1 – 2009 Air Toxic Sampling Results

Pollutant	Site	Higher Concentration	Trend	Possible Sources
1,3-Butadiene	UC	X	None	Burning tobacco, motor vehicle exhaust, manufacturing and processing facilities, and prescribed fires or other combustion sources
	SF		Decrease	
Formaldehyde	UC		None	Power plants, manufacturing facilities, incinerators, and motor vehicle exhaust
	SF	X	Decrease	
Acetaldehyde	UC	X	None	Burning tobacco, wood combustion in fireplaces and wood stoves, coffee roasting, motor vehicle exhaust, coal refining, waste processing and an intermediate product of young rapid growing plants
	SF		Decrease	
Acrolein	UC	X	None	Burning tobacco and gasoline and formed from the breakdown of certain pollutants found in outdoor air
	SF		Increase	
Benzene	UC		None	Burning coal and oil, motor vehicle exhaust, and evaporation from gasoline service stations and industrial solvents
	SF	X	Decrease	

DENR also opted to have total non-methane organic compounds (NMOC) sampled. NMOC compounds are of particular interest because of their role in ozone formation. The average total NMOC values are shown in Figure 8-1. Since there is only two years of data from the SD School Site, DENR included the NMOC data from the original Sioux Falls Site (SFSD site).

Figure 8-1 – Average Total NMOC



* Air Toxic monitor was moved from the Hilltop Site and to the SD School Site in 2008.

8.2 Speciation Monitoring Program

The chemical speciation network will quantify mass concentrations and significant $PM_{2.5}$ constituents which include trace elements, sulfate, nitrate, sodium, potassium, ammonium, and carbon. This series of analytes is very similar to those measured within the Interagency Monitoring of Protected Visual Environments (IMPROVE) program.

Physical and chemical speciation data are anticipated to provide valuable information for:

1. Assessing trends in mass component concentrations and related emissions, including specific source categories;
2. Characterizing annual and seasonal spatial variation of aerosols;
3. Determining the effectiveness of implementation control strategies;
4. Helping to implement the $PM_{2.5}$ standard by using speciated data as input to air quality modeling analyses;
5. Aiding the interpretation of health studies by linking effects to $PM_{2.5}$ constituents; and
6. Understanding the effects of atmospheric constituents on visibility impairment and regional haze.

South Dakota has one site that collects samples as part of the Speciation Network. This site collects 24-hour air samples on a 6-day schedule. The site is in Sioux Falls at the SD School Site which is located in southeastern South Dakota. The speciation monitor was moved from the KELO site to the SD School Site at the beginning of 2009. The School Site is located on the east central part of the city. The site is about 1.5 miles southeast of the main industrial area in Sioux

Falls. The area around the site is mainly residential. Interstate 229 which is a major commuting road runs north and south about three city blocks east of the monitoring site. The predominant wind direction is northwest for most of the year with southeast winds during the summer months. Carbon samples were taken by the Met One SASS monitor. In September, the Improve URG 3000N sampler was set up to do the carbon sampling.

Figure 8-2 shows a comparison of the $PM_{2.5}$ concentrations between the speciation monitor, the manual monitor, and the continuous monitor located at this site. Figure 8-2 indicates a good comparison between the continuous and manual monitors with the speciation monitor recording lower concentrations on an annual basis

Figure 8-2 – Average $PM_{2.5}$ Concentration

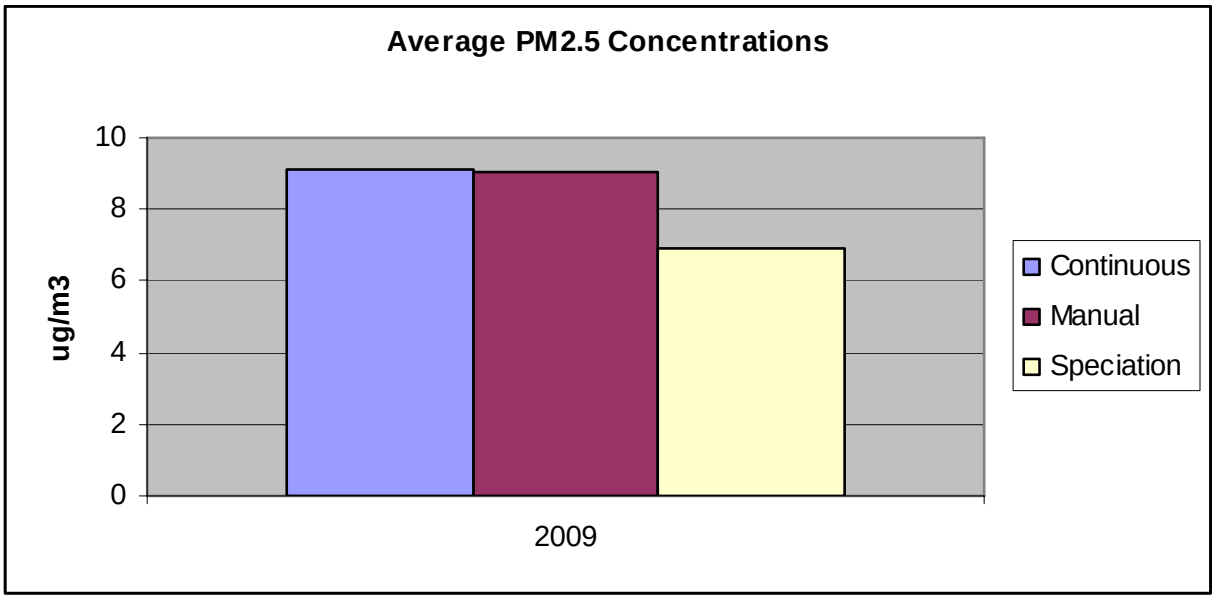


Figure 8-3 shows the average carbon concentration for the SASS through September 2009. Total carbon concentrations appear to have declined since DENR began monitoring in 2002 but have been relatively constant for the last six years. Elemental carbon trends show little change during the test period.

Figure 8-3 – Average Carbon Concentration

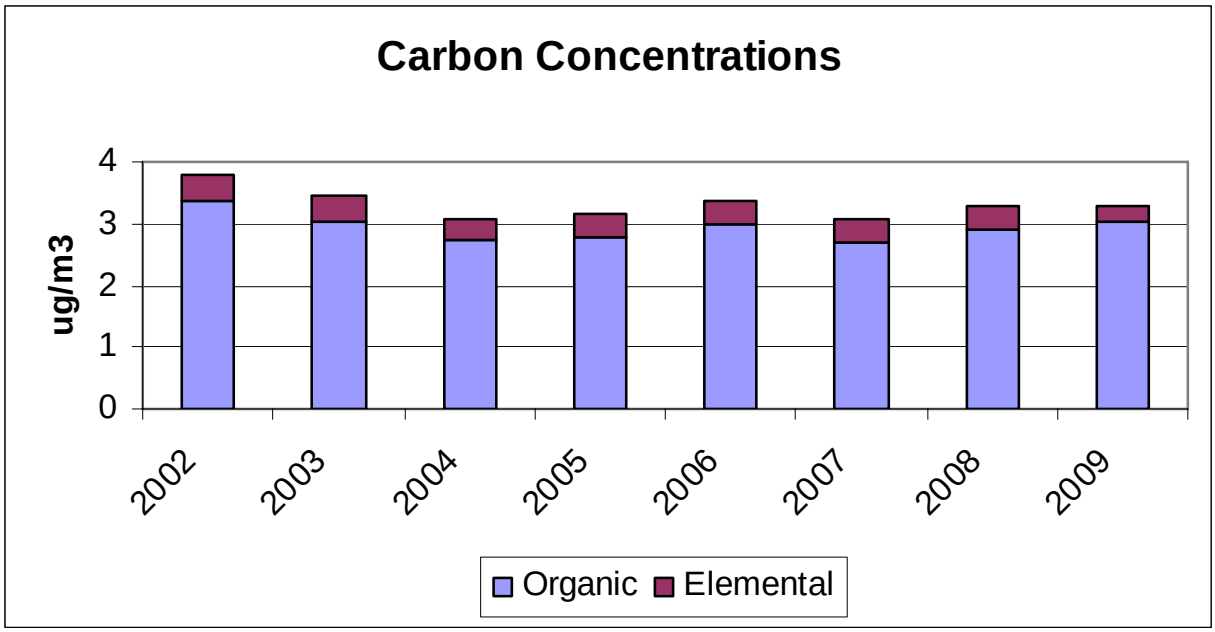
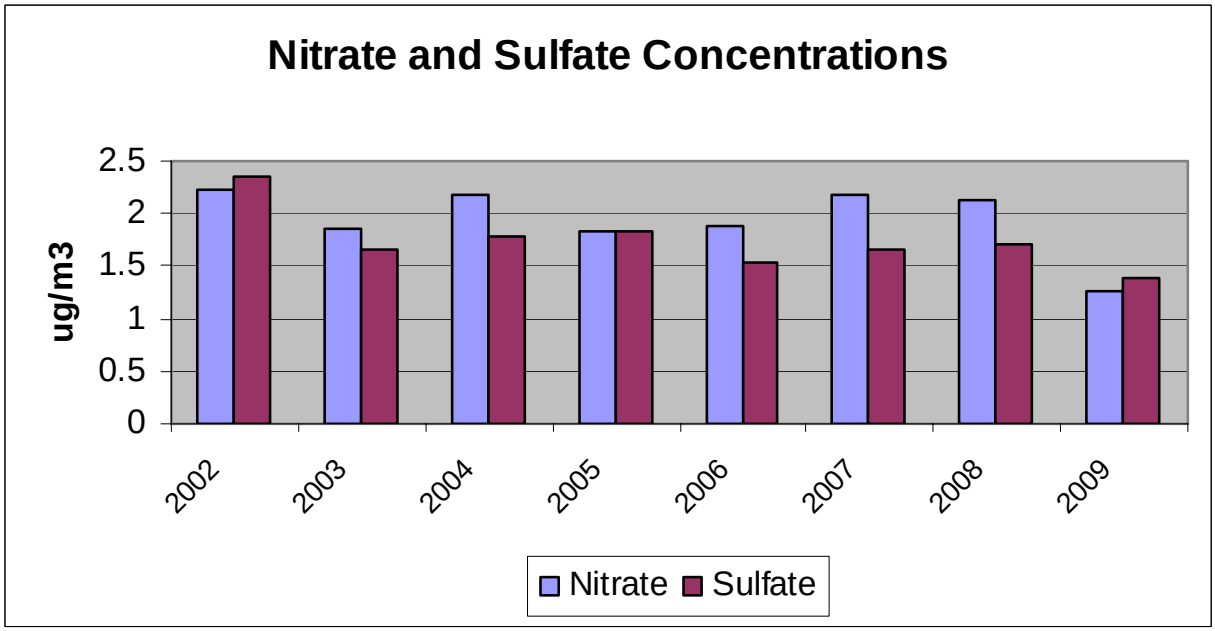


Figure 8-4 shows the average nitrate and sulfate concentrations. The graph shows trends for the concentration of nitrates are at nearly a steady level over the eight year period. Sulfates in the $PM_{2.5}$ samples declined an average of 0.5 ug/m^3 during the testing period.

Figure 8-4 – Average Nitrate and Sulfate Concentrations



9.0 QUALITY ASSURANCE REQUIREMENTS

Table 9-1 provides information on how the South Dakota air monitoring network is meeting the quality assurance requirements in 40 CFR Part 58, Appendix A. "POC" in Table 9-1 means Parameter Occurrence Code and is used to distinguish between different monitoring types the same pollution parameter at the same site or monitors with different sampling frequency and data uses. In most cases the numbering system in the "POC" column means: "1 and 2" – Data from manual monitors with sampling frequency of every third or every six day; and "3" – Data from continuous monitors with hourly values. Table 9-1 includes six manual PM_{10} sites of which one is co-located and nine manual $PM_{2.5}$ sites of which one is co-located. The numbers in the "Precision Checks" columns indicates the number of checks completed during the calendar year. The numbers in the "Accuracy Audits" columns indicates the number of checks completed during each calendar quarter.

The South Dakota Ambient Air Monitoring Network is meeting the quality assurance requirements specified in 40 CFR Part 58, Appendix A including the SPM $PM_{2.5}$ continuous monitors.

Table 9-1 – 40 CFR Part 58, Appendix A Requirements

Site Name	AQS ID	POC	Parameter	Precision Checks	Accuracy Audits			
					1st	2nd	3rd	4th
Aberdeen	46-013-0003	1	PM_{10}	10		1	1	2
		1	$PM_{2.5}$	15		2	2	2
Brookings	46-011-0002	1	PM_{10}	7		1	1	1
		1	$PM_{2.5}$	24		1	1	1
SF KELO	46-099-0006	1	PM_{10}	8		2	1	1
		1	$PM_{2.5}$	15			2	2
SD School	46-099-0007	3	PM_{10}	25		1	1	1
		1	$PM_{2.5}$	15		2	2	2
		3	$PM_{2.5}$	25		1	1	1
		3	Ozone	50	1		1	1
		1	SO_2	48	1		1	1
		1	NO_2	50	1		1	1
Watertown	46-029-0002	3	PM_{10}	24		1	1	1
		1	$PM_{2.5}$	16		2	2	2
Badlands	46-071-0001	3	PM_{10}	26	1		1	1
		3	$PM_{2.5}$	25	1		1	1
		3	SO_2	50		1		1
		3	NO_2	49		1		1
		3	Ozone	37		1		1

Site Name	AQS ID	POC	Parameter	Precision Checks	Accuracy Audits			
					1st	2nd	3rd	4th
Wind Cave	46-033-0132	3	PM_{10}	26	1		1	1
		3	$PM_{2.5}$	21		1	1	1
		1	$PM_{2.5}$	19		2	2	2
		3	Ozone	39	1	1	1	
		3	SO_2	50		1	1	
		3	NO_2	52		1	1	1
Black Hawk	46-093-0001	1	PM_{10}	8		1	1	1
		1	Ozone	50	1		2	1
RC National Guard	46-103-0013	1	PM_{10}	16		2	2	2
RC Credit Union	46-103-0020	3	PM_{10}	21		1	1	1
		3	$PM_{2.5}$	22		1	1	1
		1	$PM_{2.5}$	21			2	2
RC Library	46-103-1001	2	PM_{10}	16		2	2	2
		1	$PM_{2.5}$	19	1		3	3
UC #1	46-127-0001	3	PM_{10}	21		1	1	1
		3	$PM_{2.5}$	25		1	1	1
		3	SO_2	47		1	1	
		3	NO_2	47		1	1	
		3	CO	25				
UC #2	46-127-0002	3	PM_{10}	25		1	1	1
		3	$PM_{2.5}$	25		1	1	1
		1	$PM_{2.5}$	16		2	2	2
		3	SO_2	48		1	1	
		3	NO_2	36		1		
UC #3	46-127-0003	3	Ozone	47		1	1	

Tables 9-2 and 9-3 show details on how the South Dakota Ambient Air Monitoring Network is meeting the requirements in 40 CFR Part 58, Appendix E.

Table 9-2– 40 CFR Part 58, Appendix E Requirements

Site Name	AQS ID	Parameter	Probe Inlet Height Above Ground (meters)	Horizontal/ Vertical Distance From Supporting Structures (meters)	Distance From Trees (meters)	Distance From Roads (meters)
Aberdeen	46-013-0003	PM_{10}	10	0/2	NA	16.7
		$PM_{2.5}$	10	0/2	NA	16.7
Brookings	46-011-0002	PM_{10}	7	0/2	NA	154
		$PM_{2.5}$	7	0/2	NA	154
SF KELO	46-099-0006	PM_{10}	6	0/2	10	26
		$PM_{2.5}$	6	0/2	11	27
SD School	46-099-0008	PM_{10}	4.6	0/2	32	56
		$PM_{2.5}$	4.7	0/2	32	56
		Ozone	3.6	0/1	32	56
		SO_2	3.6	0/1	32	56
		NO_2	3.6	0/1	32	56
Watertown	46-029-0002	PM_{10}	5.1	0/2	NA	34
		$PM_{2.5}$	5.1	0/2	NA	32
Badlands	46-071-0001	PM_{10}	4.6	0/2	NA	44
		$PM_{2.5}$	4.7	0/2	NA	45
		SO_2	4.1	1/2	NA	46
		NO_2	4.1	1/2	NA	46
Wind Cave	46-033-0132	PM_{10}	4.3	0/2	32	90
		$PM_{2.5}$	2.7	0/2	30	90
		Ozone	3.3	1/1.1	30	90
		SO_2	3.3	1/1.1	30	90
		NO_2	3.3	1/1.1	30	90
Black Hawk	46-093-0001	PM_{10}	3.1	0/2	NA	117
		Ozone	2.4	1/1	NA	117
RC National Guard	46-103-0013	PM_{10}	6.5	0/2	70	50
RC Credit Union	46-103-0016	$PM_{2.5}$	3.5	0/2	5	40
		PM_{10}	3.5	0/2	5	40
RC Library	46-103-1001	PM_{10}	8.9	0/2	NA	31
		$PM_{2.5}$	8.9	0/2	NA	37
UC #1	46-127-0001	PM_{10}	4.6	0/2	23	40
		$PM_{2.5}$	4.6	0/2	23	40
		SO_2	3.6	0/1	23	40
		NO_2	3.6	0/1	23	40
		CO	3.6	0/1	23	40

Site Name	AQS ID	Parameter	Probe Inlet Height Above Ground (meters)	Horizontal/ Vertical Distance From Supporting Structures (meters)	Distance From Trees (meters)	Distance From Roads (meters)
UC #2	46-127-0002	PM_{10}	4.6	0/2	46	52
		$PM_{2.5}$ [1]	4.7	0/2	46	52
		$PM_{2.5}$ [2]	4.6	0/2	46	52
		SO_2	3.6	0/1	46	52
		NO_2	3.6	0/1	46	52
UC #3	46-127-0003	Ozone	3.7	0/1	43	23

[1] – Continuous monitor;
[2] – Manual monitor; and
"NA" means Not Applicable.

Table 9-3 – 40 CFR Part 58, Appendix E Requirements

Site Name	AQS ID	Parameter	Distance/ Direction To Nearest Obstacle (meter)	Height of Obstruction Above Probe Inlet (meter)	Distance To Point/Area Source (meters)
Aberdeen	46-013-0003	PM_{10}	NA	NA	2,012
		$PM_{2.5}$	NA	NA	2,012
Brookings	46-011-0002	PM_{10}	NA	NA	357
		$PM_{2.5}$	NA	NA	357
SF KELO	46-099-0006	PM_{10}	10/west	3	800
		$PM_{2.5}$	11/west	3	800
SD School	46-099-0008	PM_{10}	10/west	0	2,090
		$PM_{2.5}$	10/west	0	2,090
		Ozone	10/west	0	2,090
		SO_2	10/west	0	2,090
		NO_2	10/west	0	2,090
Watertown	46-029-0002	PM_{10}	NA	NA	805
		$PM_{2.5}$	NA	NA	805
Badlands	46-071-0001	PM_{10}	NA	NA	10,000+
		$PM_{2.5}$	NA	NA	10,000+
		SO_2	NA	NA	10,000+
		NO_2	NA	NA	10,000+
Wind Cave	46-033-0132	PM_{10}	NA	NA	10,000+
		$PM_{2.5}$	NA	NA	10,000+
		Ozone	NA	NA	10,000+
		SO_2	NA	NA	10,000+
		NO_2	NA	NA	10,000+
Black Hawk	46-093-0001	PM_{10}	NA	NA	1,100
		Ozone	NA	NA	1,100
RC National Guard	46-103-0013	PM_{10}	17/west	40	350
RC Credit Union	46-103-0016	$PM_{2.5}$	5/NW	10	2400
		PM_{10}	5/NW	10	2400
RC Library	46-103-1001	PM_{10}	2.1/south	0.8	1,609
		$PM_{2.5}$	2.1/south	0.8	1,609
UC #1	46-127-0001	PM_{10}	23/east	7.4	4,800
		$PM_{2.5}$	23/east	7.4	4,800
		SO_2	23/east	8.2	4,800
		NO_2	23/east	8.2	4,800
		CO	23/east	8.2	4,800
UC #2	46-127-0002	PM_{10}	46/north	19.4	11,700
		$PM_{2.5}$ [1]	46/north	19.4	11,700

Site Name	AQS ID	Parameter	Distance/ Direction To Nearest Obstacle (meter)	Height of Obstruction Above Probe Inlet (meter)	Distance To Point/Area Source (meters)
		$PM_{2.5}$ [2]	46/north	19.4	11,700
		SO_2	46/north	20.2	11,700
		NO_2	46/north	20.2	11,700
UC #3	46-127-0003	Ozone	43/north	20.3	24,100

[1] – Continuous monitor;
[2] – Manual monitor; and
"NA" means Not Applicable.

10.0 NETWORK MODIFICATIONS FOR 2010 and 2011

Through this plan DENR is requesting that EPA approve the following modifications to the state's ambient air monitoring network listed in the following sections.

10.1 New Sites

No new sites are planned for 2010 and 2011 as a result of the current air monitoring network evaluation. DENR will continue to look at the following areas for the need to modify the air monitoring network:

1. With the change in deicing operations in Rapid City, DENR will continue to evaluate the need for other air monitoring sites in the city if problems with dust are noted. A new air monitoring site was requested by the Rapid City Area Air Quality Board after hearing a presentation by the City Street Department on the changes being implemented;
2. As monitoring rules are finalized by EPA there may be a need for modifications to the ozone testing site locations;
3. With the change in the lead standard DENR will continue to review emissions inventories to determine if any new monitoring sites will be needed to show the state is attaining the revised standard; and
4. EPA finalized revisions to the sulfur dioxide and nitrogen dioxide standards. DENR will be evaluating the rule changers and the impact on the air monitoring network.

10.2 Modifications

DENR is planning the following site parameter modifications in 2010:

1. A carbon monoxide analyzer, NOy analyzer, and PMcoarse monitor will be added to the SD School Site as part of the development of the NCore site by the end of 2010;
2. A modification to equipment type will be made to begin the process of replacing the RAAS $PM_{2.5}$ manual monitors which were purchased in 1997 and are beginning to have a lot of malfunctions. The RAAS $PM_{2.5}$ monitors have been discontinued by the

manufacturer and replacement parts will no longer be available after 2011. Current plans are to replace the RAAS $PM_{2.5}$ manual monitors with Thermo Partisol 2000s;

3. The sulfur dioxide and nitrogen dioxide analyzers at the Wind Cave Site were evaluated and it was determined that they should be moved to the Credit Union Site at the end of 2010. The Badlands and Wind Cave sites both are collecting background data for sulfur dioxide and nitrogen dioxide. Concentrations at both sites are very low (less than 10% of the standards) and the concentration levels are the very close to being the same for each site;
4. Manual $PM_{2.5}$ monitors will be removed from the Wind Cave and Credit Union sites. Only the $PM_{2.5}$ continuous monitors will be operated at these locations. Concentrations of $PM_{2.5}$ are low so there is no need to continue both sampling methods at these sites; and
5. The PM_{10} parameter at the KELO Site was evaluated and will be shutdown because there are no recorded 24-hour concentrations greater than the standard and none of the 24-hour samples have concentrations greater than 80% of the standard. The SD School Site, the other site in Sioux Falls, records slightly higher concentrations than the KELO Site so the SD School Site represents the highest concentration site for the city. The KELO Site will continue to be operated because the PM2.5 concentrations at this site are among the highest in the state.

10.3 Sites Closed

No site closings are being requested as a result of the 2010 Annual Ambient Air Monitoring Network Plan.

11.0 REQUEST FOR WAIVER

There were no sampling schedule frequency waivers or spatial averaging for $PM_{2.5}$ sites requested for the 2010 sampling year and none are proposed for 2011.

12.0 COMMENTS ON THE ANNUAL PLAN

One comment was received before the public notice period on the proposed plan. The comment came from the Rapid City Area Air Quality Board. The Rapid City Area Air Quality Board is concerned the changes in the Rapid City sanding and deicing operation by the city could cause concentrations of PM_{10} to increase over the standard in the areas that sand is used for traction during ice events. The board requests that DENR evaluate the need for a new air monitoring site in Rapid City. The request for a new monitoring site is for the southeast part of the Rapid City near the Robbinsdale or Grandview area of the city. The letter received from the board recommends that DENR review the need for a monitoring site in this part of the city to ensure that the National Ambient Air Quality Standards are met. Attachment A contains a copy of the comment letter received from the Rapid City Area Air Quality Board.

DENR responded to the request with a letter dated October 6, 2010. DENR plans to continue to have staff in Rapid City look for possible fugitive dust problems and if found determine a

location for a representative site in that area. Attachment A contains a copy of the response letter sent to the Rapid City Area Air Quality Board.

13.0 CONCLUSIONS

The ambient air quality monitoring network has demonstrated or is in the process of demonstrating that South Dakota is attaining the federal NAAQS. The Air Quality Program is working to ensure that any changes in the air quality of the state are reviewed for possible health effects to the public. The ambient air quality monitoring network is continually reviewed to ensure that there is adequate coverage of populated areas in the state. As the state's population and industry changes, monitoring sites will be added or moved to new locations.

No new sites are being planned and none of the current sites will be closed as a result of the review of the sites in this annual plan. Parameters in the current air monitoring network will be moved to new locations or closed out as was indicated in the sections above. New parameters will be added to the NCore site in Sioux Falls as required by EPA. A list of the proposed network modifications are listed in Section 10.

There is an ongoing effort to maintain trained staff regarding the latest monitoring techniques and procedures to perform these studies. It is anticipated that the ambient air monitoring network will operate in much the same manner as it has in the past. This will include the identification of pollution problems, measurement and evaluation of the extent of the problem, and determination of action to be taken to protect the environment and the health of the people of South Dakota.

Attachment A

Comments and Responses on the 2010 Annual Ambient Air Monitoring Network Plan

CITY OF RAPID CITY

RAPID CITY, SOUTH DAKOTA 57701-5035

Growth Management Department

300 Sixth Street

Rapid City Area Air Quality Board
city web: www.rcgov.org

Phone: 605-394-4157
Fax: 605-394-6636

June 16, 2010

Brad Schultz
SD DENR
Joe Foss Building
523 E. Capitol
Pierre, SD 57501

Re: Request for review of the need for an air quality monitor in southeast Rapid City

Dear Mr. Schultz:

The Rapid City Area Air Quality Board discussed the need for an air quality monitor in the southeast area of Rapid City in the location of the Robbinsdale or Grandview area at their Board meeting on June 14, 2010. The Board feels that with the changes implemented in the City of Rapid City sanding program a new monitor is required to ensure that the change in sanding operations is not creating fugitive dust problems.

The Board briefly discussed the Robbinsdale monitor that previously monitored the area and is aware that the monitor was removed because of the low concentrations recorded and the cost to maintain the monitor. Currently the only indication of the affect of the sanding operation on air quality is by visual observation, complaints received or by review of the data from the library site which is the closest to the area affected by the changes in sanding operations.

The Board recommends that the South Dakota Department of Natural Resources review the need for a monitor in the southeast area of the community to monitor the affects of the new sanding operation and ensure that the National Ambient Air Quality Standards are met.

Thank you for your consideration.

Sincerely,

Bob Riggio, Chair
Rapid City Area Air Quality Board

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www.state.sd.us/denr

November 3, 2010

Mr. Clint Allen, Chair
Rapid City Area Air Quality Board
City of Rapid City
Growth Management Department
300 6th Street
Rapid City, South Dakota 57701-5035

RE: Rapid City Ambient Air Quality Monitoring Network Comment Letter

Dear Mr. Clint Allen:

Thank you for the Rapid City Area Air Quality Board's June 16, 2010, letter in which the Board recommends that the South Dakota Department of Environment and Natural Resources (DENR) review the need for a monitor in the southeast area of the community. The letter addresses concerns with the changes made by the City of Rapid City's road sanding operation and the possibility of an increase in ambient air particulate matter concentrations from this change in the southeast part of the city.

DENR shares the Board's concerns that switching from the chemical deicer to river sand for icy roads could cause an increase in dust levels. The DENR air quality staff in Rapid City have been instructed to look for any visible changes to the air quality in the eastern half of the city and we are reviewing the data from the Library site for any increase in dust levels.

In addition, DENR will work with the city to ensure clean sand that meets the requirements in the Administrative Rules of South Dakota, Chapter 74:36:17 is used on the road and the city sweeps up the material as quickly as possible after the icy road conditions end. These steps are important in keeping dust levels as low as possible.

Currently, DENR has not determined if the sanding change is causing an air quality problem; but will continue to review the Library site data, visual observations, and complaints to determine if a monitoring site in the area is warranted. The Board can assist us by having your staff pass on complaints related to dusty roads in the area.

The Rapid City Area Air Quality Board has and continues to be a significant partner with DENR on maintaining good air quality in the Rapid City area. Good air quality benefits the individuals that work, live and visit the Rapid City area.

Thank you again for your letter and we will keep you apprised of our review. Please contact me by home or by email if you have any questions.

Sincerely,

Brad Schultz
Environmental Senior Scientist
Air Quality Program
605-773-6038