DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

September 30, 2016

Mr. Shaun McGrath
Regional Administrator
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Dear Mr. McGrath:

On October 1, 2015, EPA revised the National Ambient Air Quality Standard for ozone by reducing the 8-hour average concentration level from 0.075 to 0.070 parts per million. As required by the Clean Air Act, state initial recommendations for area designations are due to EPA by October 1, 2016.

On January 18, 2011, Governor Daugaard submitted a letter to EPA Region 8 designating the Secretary of the Department of Environment and Natural Resources as his designee for submitting designations and other matters which involves South Dakota's Air Quality Program. In that capacity, I recommend EPA designate all counties in South Dakota as attaining the 2015 revised ozone standard (see Attachment A). Attachment B provides the technical analysis that supports designating all of South Dakota's counties as attaining the 2015 revised ozone standard. Attachment C provides a copy of a report printed from the Air Quality System database showing the design value for each site operating in South Dakota calculated from the calendar years of 2013 to 2015.

Thank you for the opportunity to propose designations for the 2015 revised ozone standard in South Dakota and I look forward to your concurrence. If you have questions, please contact Brian Gustafson at 605-773-3151.

Sincerely,

Steven M. Pirner
Secretary

Attachments

ec: Monica Morales, EPA Region 8 w/attachments

Attachment A
South Dakota Area Designations
2015 Revised Ozone 8-Hour Average Standard

Designated Area	Designation Type
Aurora County	Attainment
Beadle County	Attainment
Bennett County	Attainment
Bon Homme County	Attainment
Brookings County	Attainment
Brown County	Attainment
Brule County	Attainment
Buffalo County	Attainment
Butte County	Attainment
Campbell County	Attainment
Charles County	Attainment
Clark County	Attainment
Clay County	Attainment
Codington County	Attainment
Corson County	Attainment
Custer County	Attainment
Davison County	Attainment
Day County	Attainment
Deuel County	Attainment
Dewey County	Attainment
Douglas County	Attainment
Edmunds County	Attainment
Fall River County	Attainment
Faulk County	Attainment
Grant County	Attainment
Gregory County	Attainment
Haakon County	Attainment
Hamlin County	Attainment
Hand County	Attainment
Hanson County	Attainment
Harding County	Attainment
Hughes County	Attainment
Hutchinson County	Attainment
Hyde County	Attainment
Jackson County	Attainment
Jerauld County	Attainment
Jones County	Attainment
Kingsbury County	Attainment
Lake County	Attainment
Lawrence County	Attainment

Designated Area	Designation Type
Lincoln County	Attainment
Lyman County	Attainment
Marshall County	Attainment
McCook County	Attainment
McPherson County	Attainment
Meade County	Attainment
Mellette County	Attainment
Miner County	Attainment
Minnehaha County	Attainment
Moody County	Attainment
Pennington County	Attainment
Perkins County	Attainment
Potter County	Attainment
Roberts County	Attainment
Sanborn County	Attainment
Shannon County	Attainment
Spink County	Attainment
Stanley County	Attainment
Sully County	Attainment
Todd County	Attainment
Tripp County	Attainment
Turner County	Attainment
Union County	Attainment
Walworth County	Attainment
Yankton County	Attainment
Ziebach County	Attainment

Attachment B
Determining Area Designations

On October 1, 2015, EPA revised the National Ambient Air Quality Standard for ozone. EPA revised the primary ozone standard by reducing the daily maximum 8-hour average concentration level from 0.075 to 0.070 parts per million. In accordance with Section 107(d)(1)(A) of the Clean Air Act, initial recommendations for area designations are due to EPA by October 1, 2016.

The recorded design values for ozone concentrations from the state's monitoring sites show South Dakota is attaining the revised ozone standard throughout the state. The monitoring site with the highest ozone design value was recorded at the SD School Site in the City of Sioux Falls at 91% of the revised standard using data collected from 2013 to 2015. The Badlands Site has the lowest design value concentration at 82% of the standard.

1. Air Monitoring Data

The South Dakota Department of Environment and Natural Resources (DENR) believes South Dakota's ambient air monitoring network of sites is representative of the highest ozone concentration and also represents background levels for the state. Table B-1 displays the three year average calculated design value concentration for each site using data from 2013 to 2015. This data was taken from the report run from the Air Quality Systems database. A copy of the report is enclosed in Attachment C.

Table B-1 – Site Design Values Concentrations in South Dakota

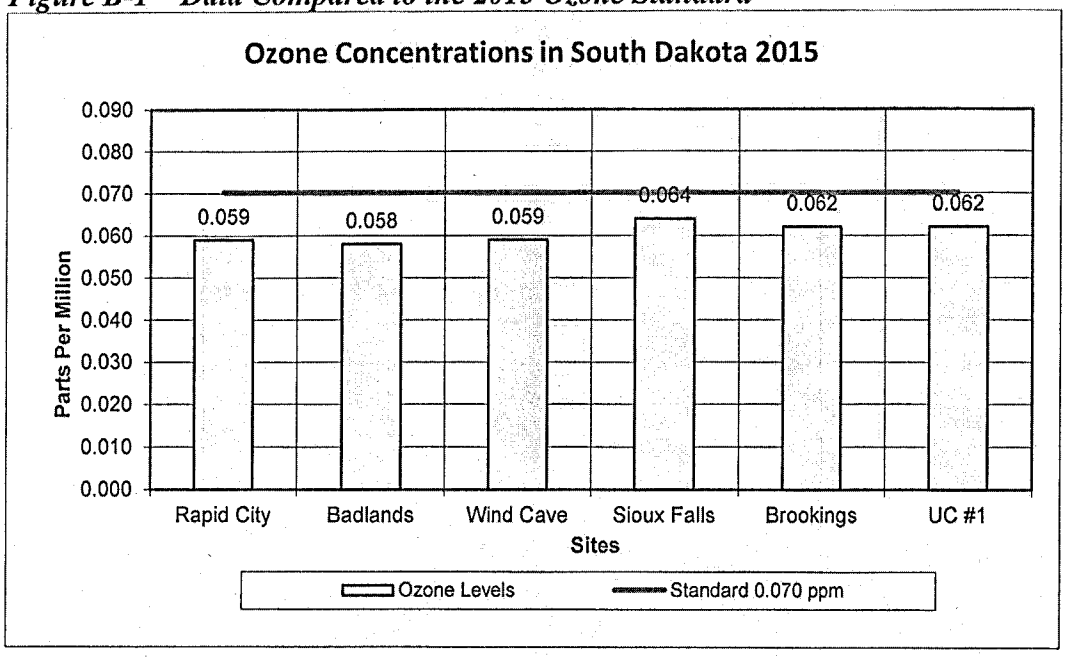
Site	4th Highest Concentration	3-year Average Design Values	Attainment Status	Percent of the Standard
SD School	2013 – 0.067 ppm 2014 – 0.066 ppm 2015 – 0.061 ppm	0.064 ppm	Yes	91%
Brookings Research Farm	2013 – 0.063 ppm 2014 – 0.061 ppm 2015 – 0.063 ppm	0.062 ppm	Yes	89%
Black Hawk	2013 – 0.063 ppm 2014 – 0.056 ppm 2015 – 0.059 ppm	0.059 ppm	Yes	84%
Badlands	2013 – 0.062 ppm 2014 – 0.057 ppm 2015 – 0.057 ppm	0.058 ppm	Yes	82%
Wind Cave	2013 – 0.061 ppm 2014 – 0.057 ppm 2015 – 0.059 ppm	0.059 ppm	Yes	84%
UC #1	2013 – 0.063 ppm 2014 – 0.062 ppm 2015 – 0.061 ppm	0.062 ppm	Yes	89%

Concentrations of ozone are the highest along eastern edge of South Dakota near the borders of Minnesota, Iowa and Nebraska. A comparison of ozone data shows the design values for each site

have concentrations that are at similar levels across the state. This would indicate that a significant amount of the ozone concentrations recorded in South Dakota comes from pollutants transported into the state which sets an unnaturally high background level.

Figure B-1 provides a graph comparison of the three year average design values for each site using the 2013 to 2015 data compared to the 2015 revised ozone standard. As is demonstrated in the graph, all sites are attaining the revised ozone standard of 0.070 parts per million.

Figure B-1 – Data Compared to the 2015 Ozone Standard



Even with all sites having design values and yearly fourth highest days each year below the revised standard for ozone not all days during the last three years of sampling are below the standard concentration level. The SD School Site had a level over the standard of 0.070 parts per million on April 20, 2014 and another on May 27, 2015. The Research Farm Site also had a greater than 0.070 parts per million on May 27, 2015.

Using the Hybrid Single-Particle Lagrangian Intergraded Trajectory modeling system, an assessment was made for both high concentration days. Both days have similar assessment results showing the air parcels transported into South Dakota from the south. See the results in Figure B-2 and Figure B-3 for further details on the assessment. The two back trajectory assessments support DENR's earlier determination that ozone concentrations in South Dakota are influenced by air pollution from other states.

Figure B-2 - Assessment of meteorology on 4/20/2014

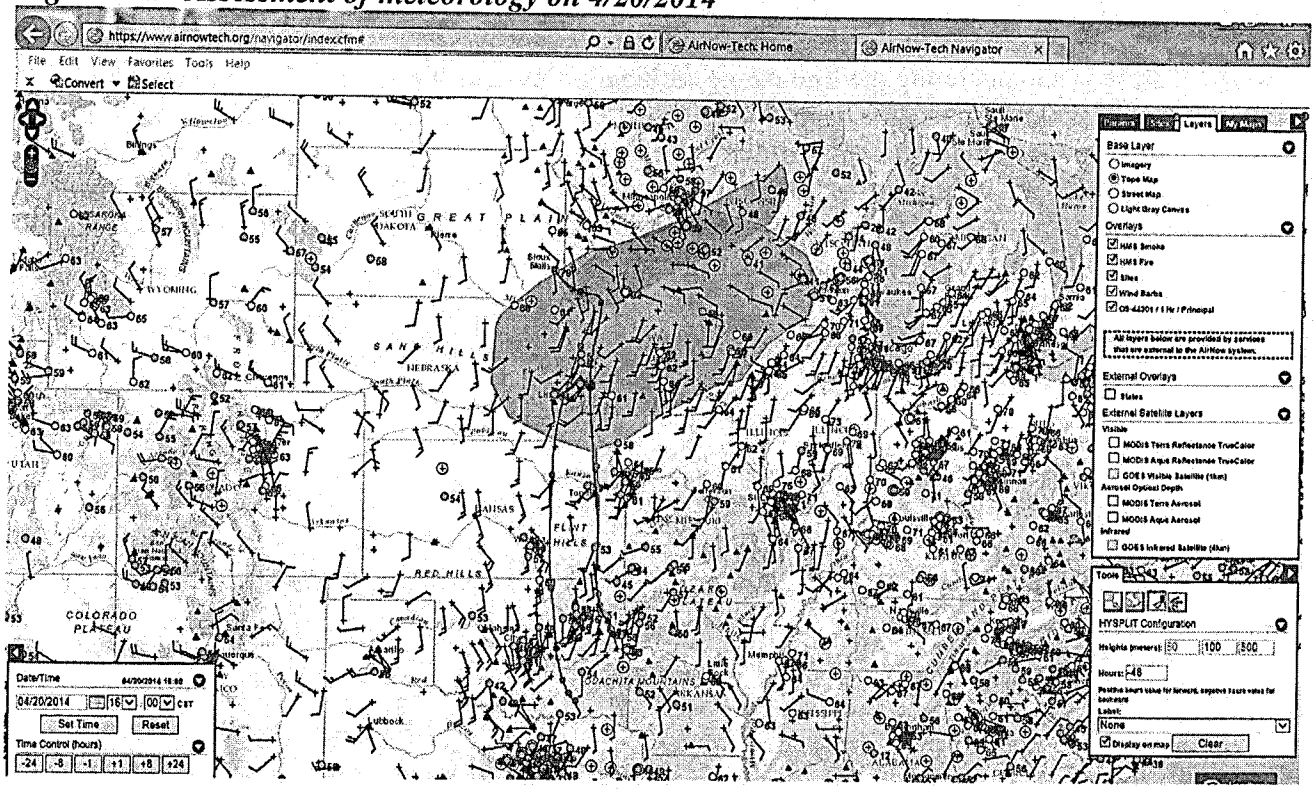
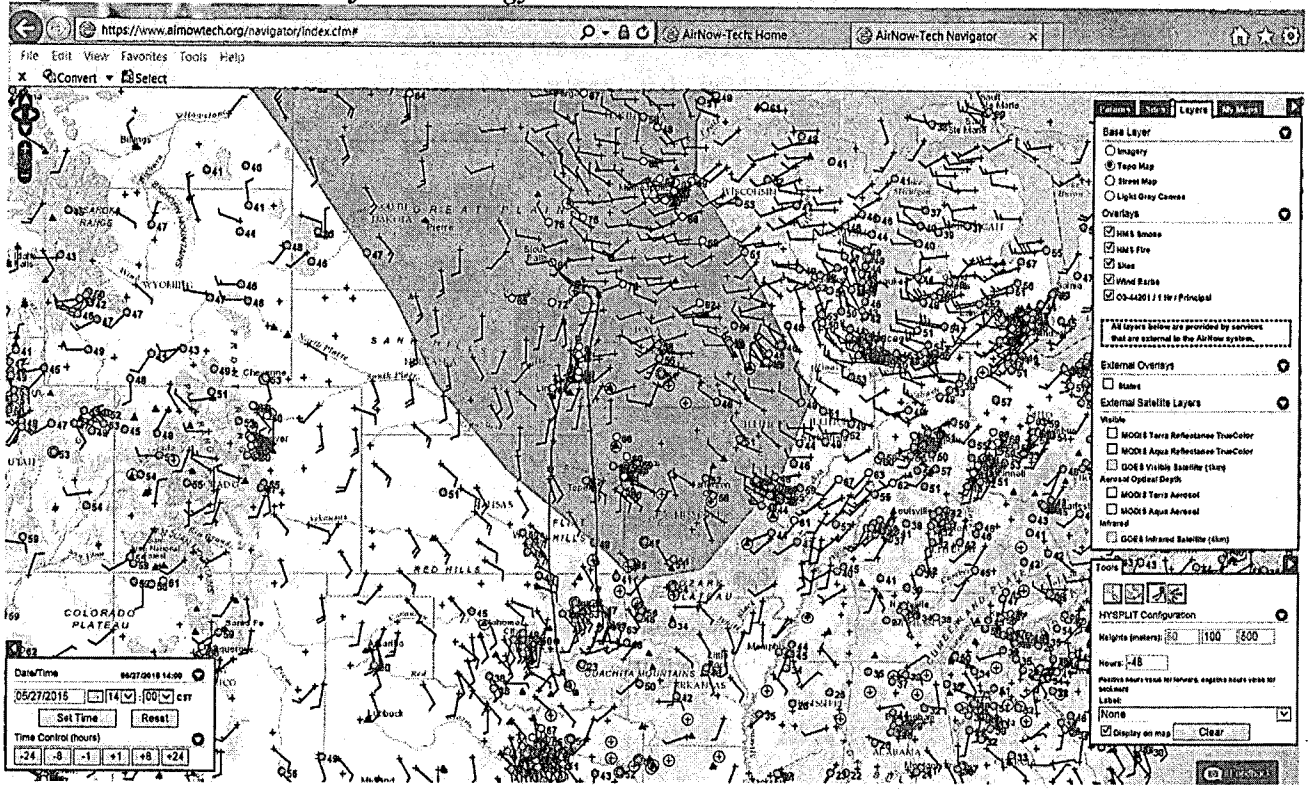


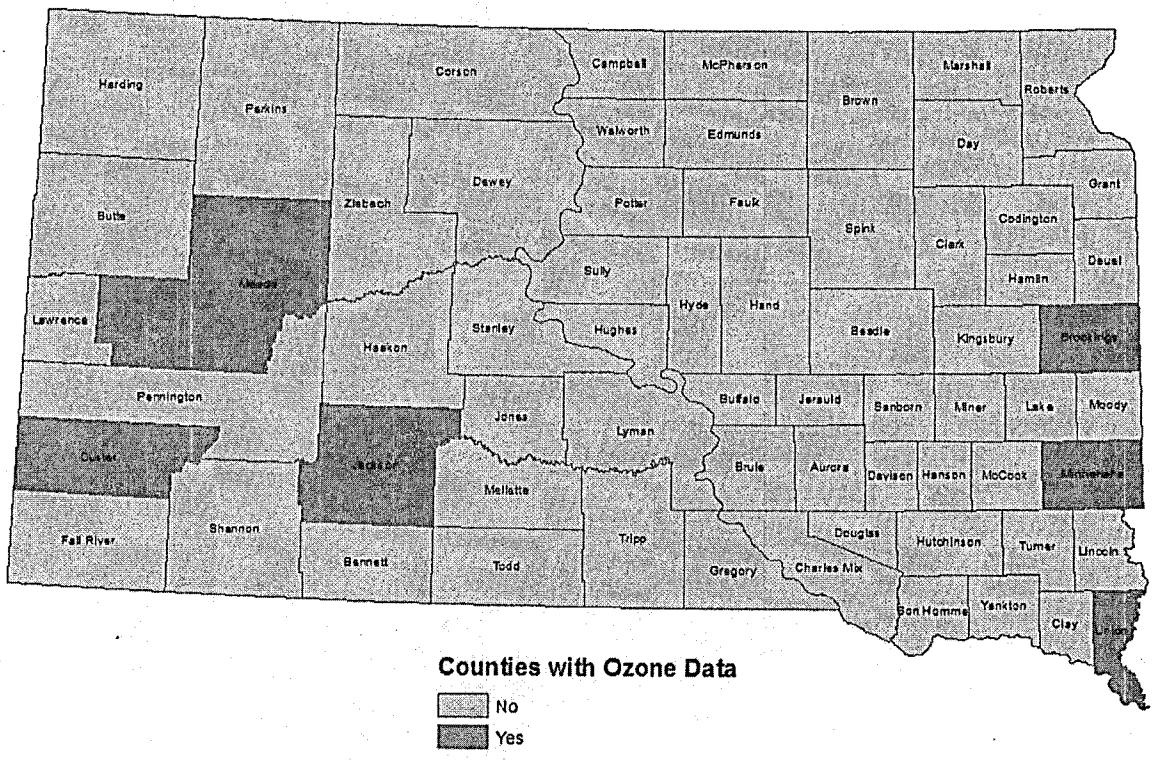
Figure B-3 - Assessment of meteorology on 5/27/2015



2. Ozone Monitoring Network in South Dakota

South Dakota began operating the first ozone ambient air monitoring site in 1999, in Sioux Falls. By 2016, South Dakota expanded its operation to six sites representing six counties in the state. The network of sites locations represents wilderness, rural and urban areas of the state. Currently, the sampling network includes the goals of high concentration, population, source impact, regional background and regional transport. See Figure B-4 for a map of the state showing the counties with ozone air monitoring data.

Figure B-4 – South Dakota Counties with Ozone Ambient Air Monitoring Data



Currently, sampling sites represent the high population centers in the state and include the three Metropolitan Statistical Areas (MSA) in the state Sioux Falls, Rapid City, and Sioux City. The SD School Site, which is South Dakota's National Core (NCore) site, represents South Dakota's largest urban population center in the Sioux Falls MSA. The Black Hawk Site represents the second largest population center in the state, largest in western half of South Dakota, within the Rapid City MSA. The Union County site represents the rural area north of the main population center of Sioux City, Iowa and is within the Sioux City MSA. The Sioux City MSA is a shared MSA in the southeastern part of the state including counties in South Dakota, Iowa and Nebraska.

The Brookings Site represents a small city with populations from 20,000 to 30,000 and source impact in east central part of the state. The site is located in a rural area down wind of the City of Brookings and two major source facilities with volatile organic compound emissions.

The Badlands and Wind Cave sites are in national parks that are Class I areas for visibility protection. Both sites are located in rural areas with very low population and pollution source impacts. Sampling results represent background and long range transport of ozone forming pollutants.

3. Characterization of the State's Meteorology

Generally the majority of daily wind directions during the ozone season have winds out of the south, southeast. There are some variations to the wind direction in the Black Hills area due to topography. Historically, the highest ozone concentrations occur during periods of low wind speeds, hot temperatures, high humidity and full sun days.

The wind rose graph in Figure B-5 was developed using data collected at the Sioux Falls Regional Airport from April 1 to October 31 for each of the three years from 2013 to 2015. The Sioux Falls wind rose, as expected, show a dominate wind direction from the south.

The wind rose graph in Figure B-6 was developed using data collected at the Rapid City Regional Airport from April 1 to October 31 for each of the three years from 2013 to 2015. The Rapid City wind rose show a major part of the time period from the northwest. But many of these days also have high winds so less chance of ozone pollution forming. It may also demonstrate why the sites in the western half of the state have lower design values than the eastern third of the state.

Figure B-5 – Wind Rose for the Sioux Falls Area

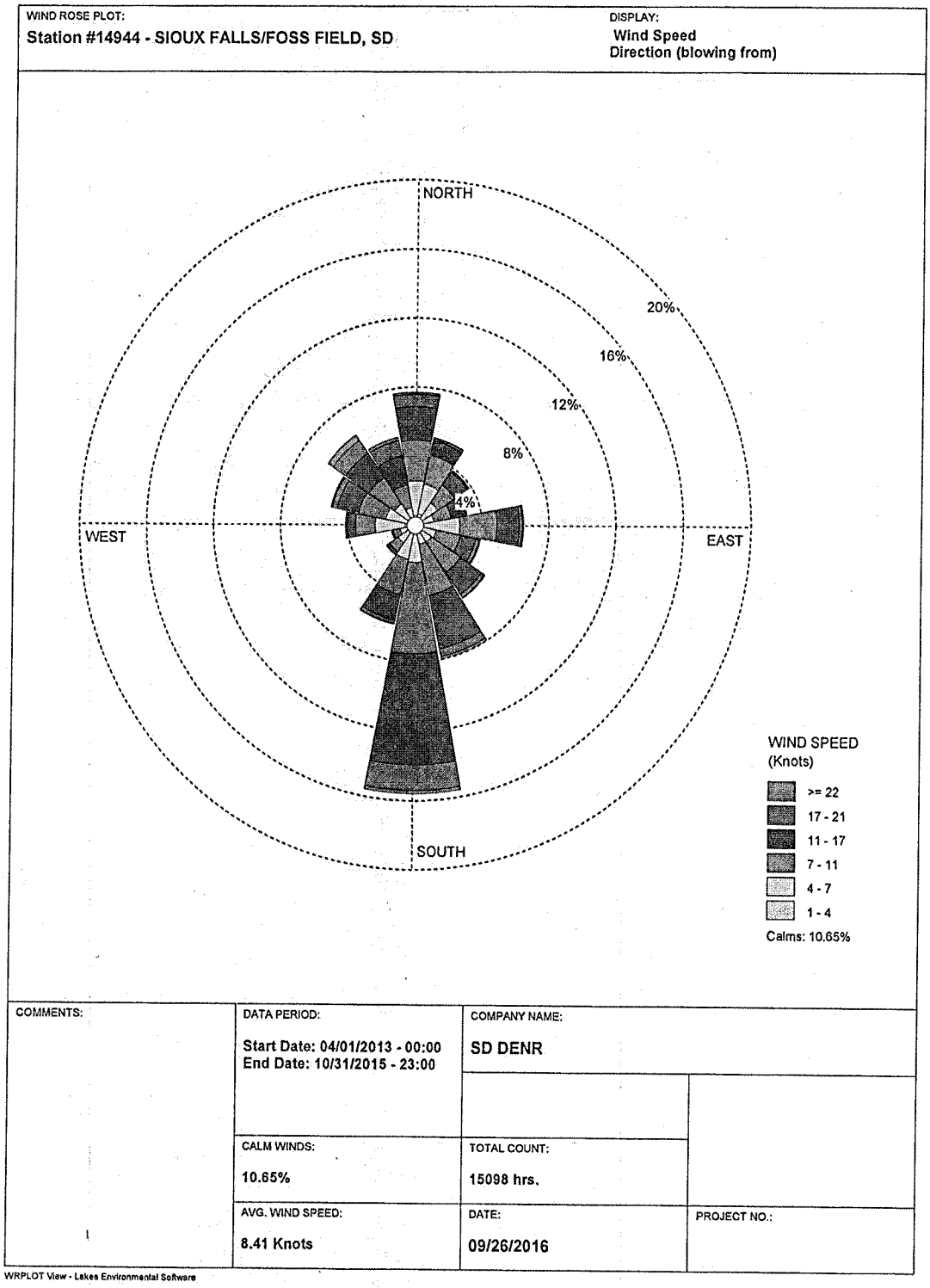
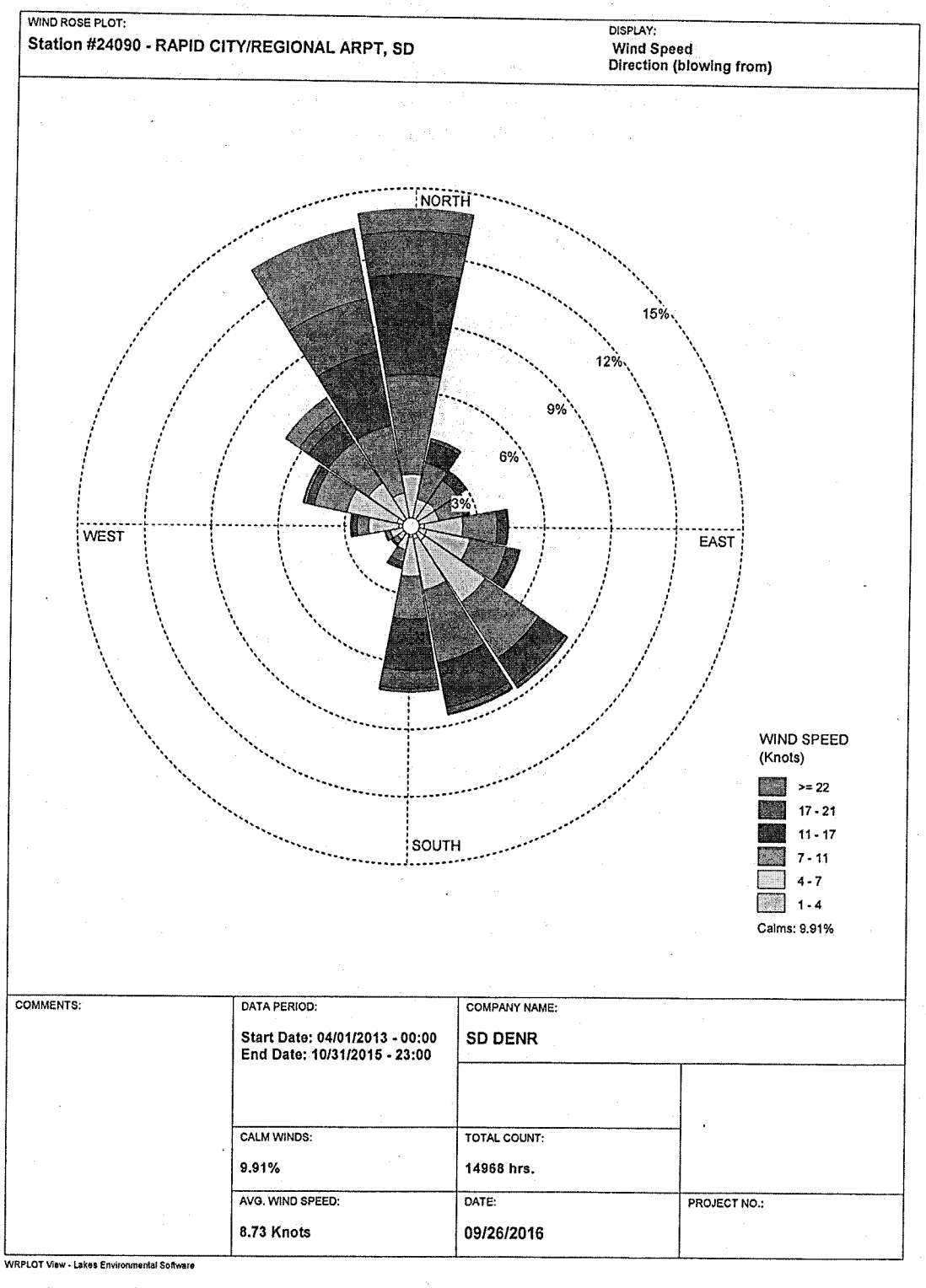


Figure B-6 – Wind Rose for the Rapid City Area



4. South Dakota's Population

The estimated population of the State of South Dakota is 867,677 in 2015. Sioux Falls, Rapid City, and Sioux City represent the three MSAs in South Dakota. Sioux Falls is the largest MSA with an estimated population of 228,261 in 2015. The Sioux Falls MSA includes the counties of Minnehaha, Lincoln, McCook, and Turner. The Sioux City MSA has an estimated population of 169,069 and includes counties in South Dakota, Iowa and Nebraska. The Rapid City MSA has an estimated population of 144,781 which includes the counties of Meade and Pennington.

Table B-2 provides a list of the top 10 most populated counties in the state and the largest city within each county. The city with the highest population is Sioux Falls with a population of 171,544.

Table B-2 – Ten Highest Population Counties in South Dakota

Number	County	Population	Largest City	Population
1	Minnehaha	185,197	Sioux Falls	171,544
2	Pennington	108,702	Rapid City	73,569
3	Lincoln	52,849	Sioux Falls	171,544
4	Brown	38,785	Aberdeen	28,102
5	Brookings	33,897	Brookings	23,657
6	Codington	27,939	Watertown	22,073
7	Meade	26,986	Sturgis	6,688
8	Lawrence	24,827	Spearfish	11,283
9	Yankton	22,702	Yankton	14,557
10	Davison	19,858	Mitchell	15,669

Only two counties Minnehaha and Pennington have populations greater than 100,000 people. Three of the ten counties with the highest populations have ozone air monitoring sites. These monitoring sites demonstrate the areas of the state with the highest population density are attaining the revised ozone standard.

Many of the other counties in South Dakota are rural with low population densities and very little ozone forming pollutant emissions from permitted sources. For this reason some counties have no sampling results. However, DENR believes the ozone concentrations recorded at the Badlands and Wind Cave monitoring sites are representative of the concentrations in the rural areas of western South Dakota. Union County and the Brookings sites represent the rural area along the eastern edge of the state. This is proven when comparing annual concentrations with the sites in Sioux Falls, Brookings and Union County #1. The remaining rural areas in the central part of the state without monitoring data would be similar to the Brookings, Union County, Badlands, or Wind Cave sites.

Based on the monitoring data which reflects the highest and lowest potential ozone concentrations in the state, South Dakota is attaining the 2015 revised ozone National Ambient Air Quality Standard in every county of the state.

4. South Dakota's 2014 Ozone Forming Pollutants Emission Inventory

Table B-3 contains 2014 oxides of nitrogen (NOx) emissions data for South Dakota by county derived from EPA's National Emission Inventory (NEI) and South Dakota's air emission inventory database. The non-point source emissions are estimated by EPA while the point source are Title V source air emissions calculated by DENR using operational reports provided by the facilities. The total emissions column is the point and non-point source emissions added together.

Table B-3 – 2014 NEI NOx Emissions (Tons per Year)

County	NOx Emissions Point Source (tons)	NOx Emissions Non-point Source (tons)	Total Emissions (tons)
Aurora	0	420	420
Beadle	44	789	833
Bennett	0	659	659
Bon Homme	15	388	403
Brookings	260	451	711
Brown	165	946	1,111
Brule	0	524	524
Buffalo	0	283	283
Butte	290	1,025	1,316
Campbell	0	388	388
Charles Mix	0	595	595
Clark	66	513	579
Clay	9	314	324
Codington	142	398	540
Corson	0	1,311	1,311
Custer	0	811	812
Davison	35	341	375
Day	0	611	611
Deuel	0	323	323
Dewey	0	1,092	1,093
Douglas	0	306	306
Edmunds	159	662	821
Fall River	1	2,470	2,471
Faulk	0	522	522
Grant	10,560	444	11,004
Gregory	0	534	535
Haakon	1	945	947
Hamlin	0	301	301
Hand	0	742	743
Hanson	0	270	270
Harding	0	1,392	1,392
Hughes	29	512	541
Hutchinson	0	481	481
Hyde	0	463	464

County	NOx Emissions Point Source (tons)	NOx Emissions Non-point Source (tons)	Total Emissions (tons)
Jackson	0	915	915
Jerauld	0	317	317
Jones	0	586	586
Kingsbury	0	468	468
Lake	60	326	386
Lawrence	41	265	306
Lincoln	46	468	514
Lyman	0	922	922
Marshall	0	446	446
McCook	0	337	337
McPherson	0	521	521
Meade	1	1,631	1,631
Mellette	0	689	689
Miner	0	307	307
Minnehaha	379	796	1,175
Moody	0	315	315
Pennington	1,246	1,223	2,469
Perkins	0	1,336	1,336
Potter	0	476	476
Roberts	12	571	583
Sanborn	0	347	347
Shannon	0	910	910
Spink	52	889	941
Stanley	0	767	767
Sully	0	559	559
Todd	0	720	720
Tripp	1	878	878
Turner	218	412	631
Union	0	388	388
Walworth	0	484	484
Yankton	27	395	422
Ziebach	0	967	967
Statewide Total	13,864	42,858	56,722

Table B-4 contains the ten counties with the highest emissions from point sources in 2014. Grant County emitted the highest total tons of oxides of nitrogen emissions in South Dakota in 2014 at 11,004 tons per year. In 2014, Grant County has the largest point source with emissions of oxides of nitrogen in the state, the Big Stone Power Plant which is a coal fired power generation plant at 10,560 tons per year. In 2015, the Big Stone Power Plant began operating new air pollution control devices which significantly reduced all air pollution. The new controls reduced the oxide of nitrogen emissions to less than 2,000 tons per year. In 2015, Grant County now joins the remaining counties in the state which have total emission levels from point source oxides of nitrogen less than 2,000 tons per year.

Table B-4 – 2014 NOx Emissions from Point Sources (tons per year)

#	County	Tons
1	Grant	10,560
2	Pennington	1,246
3	Minnehaha	379
4	Butte	290
5	Brookings	260
6	Turner	218
7	Brown	165
8	Edmunds	159
9	Codington	142
10	Clark	66
	Total	**13,486**

Table B-5 contains 2014 volatile organic compound (VOC) emissions data for South Dakota by county derived from EPA's National Emission Inventory (NEI) and South Dakota's air emission inventory database. The non-point source emissions are estimated by EPA while the point source are Title V source air emissions calculated by DENR using operational reports provided by the facilities. The total emissions column is the point and non-point source emissions added together.

There is a significant difference between the point and non-point source emissions of volatile organic compounds. Emissions from point sources are minimal compared to the estimates from non-point source.

Table B-5 – 2014 NEI Emissions of VOC

County	VOC Emissions Point Source (tons)	VOC Emissions Non-point Source (tons)	Total Emissions (tons)
Aurora	0	2,523	2,943
Beadle	76	4,091	5,000
Bennett	0	6,076	6,735
Bon Homme	58	2,629	3,090
Brookings	802	2,931	4,444
Brown	276	5,744	7,130
Brule	1	3,285	3,810
Buffalo	0	2,019	2,302
Butte	6	9,275	10,597
Campbell	0	2,549	2,938
Charles Mix	0	4,268	4,864
Clark	2	2,775	3,356
Clay	0	1,916	2,240
Codington	333	2,532	3,405
Corson	0	7,531	8,842
Custer	0	14,435	15,246
Davison	68	2,362	2,806

County	VOC Emissions Point Source (tons)	VOC Emissions Non-point Source (tons)	Total Emissions (tons)
Day	0	3,017	3,628
Deuel	0	1,983	2,306
Dewey	0	7,586	8,679
Douglas	0	1,812	2,118
Edmunds	60	3,407	4,288
Fall River	1	9,755	12,226
Faulk	0	3,157	3,679
Grant	158	2,218	13,380
Gregory	0	5,091	5,626
Haakon	1	6,786	7,733
Hamlin	0	1,622	1,923
Hand	0	4,508	5,251
Hanson	0	1,643	1,914
Harding	0	12,977	14,369
Hughes	20	3,333	3,894
Hutchinson	0	2,748	3,230
Hyde	0	2,934	3,398
Jackson	0	7,846	8,761
Jerauld	0	2,065	2,383
Jones	0	4,035	4,622
Kingsbury	0	2,451	2,920
Lake	53	1,893	2,332
Lawrence	91	14,887	15,284
Lincoln	257	3,667	4,437
Lyman	0	6,506	7,429
Marshall	0	2,824	3,270
McCook	0	2,012	2,349
McPherson	0	3,300	3,821
Meade	1	15,057	16,690
Mellette	0	5,639	6,328
Miner	0	1,805	2,112
Minnehaha	532	8,581	10,288
Moody	0	1,842	2,157
Pennington	289	21,668	24,426
Perkins	1	8,984	10,321
Potter	0	2,934	3,410
Roberts	188	3,425	4,197
Sanborn	0	2,107	2,454
Shannon	0	9,461	10,371
Spink	37	4,298	5,277
Stanley	0	5,455	6,222
Sully	0	3,445	4,004
Todd	0	6,718	7,438

County	VOC Emissions Point Source (tons)	VOC Emissions Non-point Source (tons)	Total Emissions (tons)
Tripp	1	6,698	7,577
Turner	100	2,146	2,877
Union	0	2,529	2,917
Walworth	1	2,566	3,051
Yankton	131	2,472	3,024
Ziebach	0	6,800	7,767
Statewide Total	3,549	327,632	331,182

The top 10 counties with the highest volatile organic compound emissions from point sources account for 86% of all point source emissions in South Dakota. This leaves many counties with low or no volatile organic compound emissions from a point source. See Table B-6 for more information on the top ten counties with volatile organic compound emissions from point sources.

Table B-6 – 2014 VOC Emissions from Point Sources (tons per year)

#	County	Tons
1	Brookings	802
2	Minnehaha	532
3	Codington	333
4	Pennington	289
5	Brown	276
6	Lincoln	257
7	Roberts	188
8	Grant	158
9	Yankton	131
10	Turner	100
	Total	3,065

With significant reductions to oxides of nitrogen emissions in Grant County starting in 2015, all counties have low emission levels for both ozone forming pollutants. With sampling sites being operated in a good cross section of the state representing highest population centers, rural and wilderness areas and geographical east and west sampling locations the results indicated all counties are attaining the 2015 revised ozone standard.

6. South Dakota Topography

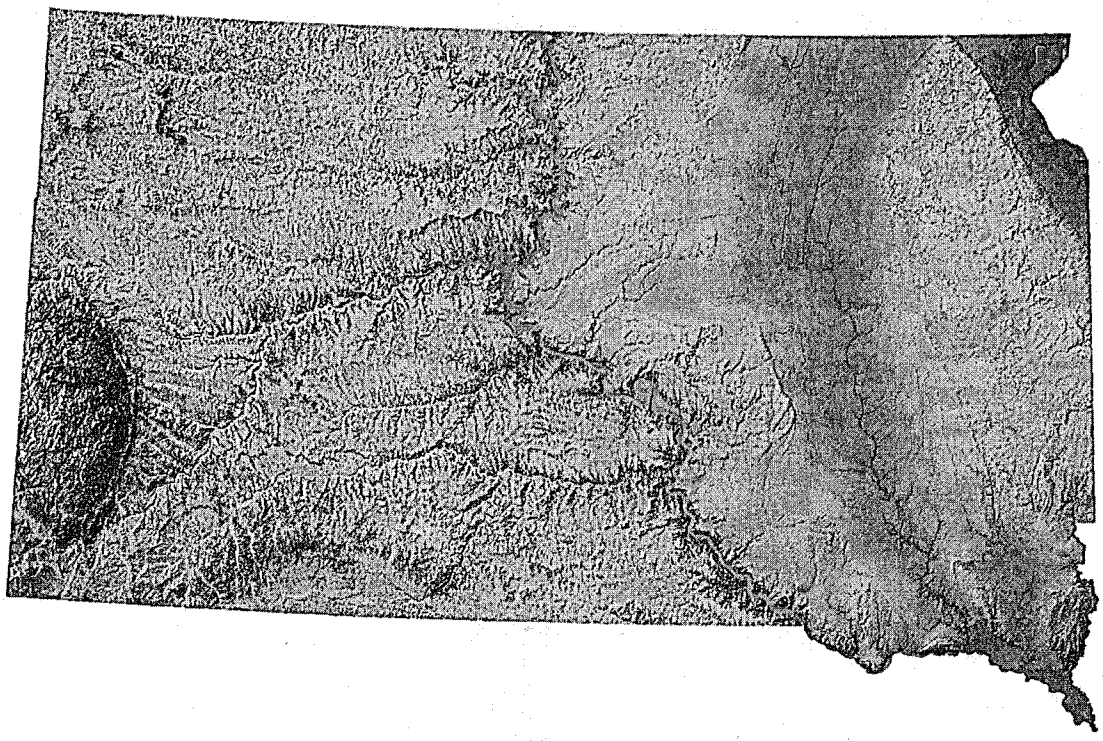
The state of South Dakota is a large geographic area with a low population density. Most of the South Dakota terrain is flat to rolling hills. The exception is the Black Hills Region which is a mountainous area ranging from 3,000 to 7,242 feet of elevation on Harney Peak, the highest point in the state.

The flat to rolling terrain allows good dispersion of air pollutants over a large part of the state. In these areas there are few problems with inversions and stagnation of air pollution. The mountainous Black Hills region has some potential for stagnation of air pollution in the valleys. But low

population and minimal air pollution from the industrial sources keeps most of the area free of air pollution problems. See the topography map in Figure B-7.

The state's large geographic area combined with limited resources presents a problem with providing ozone data for all counties. As stated before, ozone levels are similar when comparing the monitoring sites in the state so topography appears to have little effect on concentrations of ozone. Currently, there are six ozone air monitoring sites in the state which DENR considers representative of areas in the state without ozone monitoring data. Therefore, DENR is justified in designating each county in South Dakota as attaining the 2015 revised ozone standard.

Figure B-7 – Topography of South Dakota



Attachment C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Sep. 15, 2016

Pollutant: Ozone(44201)
Standard Units: Parts per million(007)
NAAQS Standard: Ozone 8-hour 2015
Statistic: Annual 4th Maximum **Level:** .07

Design Value Year: 2015
REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.
State: South Dakota

Site ID	Poc	STREET ADDRESS	2015 Valid Days	2015 Percent Complete	2015 4th Max	2015 Cert& Eval	2014 Valid Days	2014 Percent Complete	2014 4th Max	2014 Cert& Eval	2013 Valid Days	2013 Percent Complete	2013 4th Max	2013 Cert& Eval	3 - Year Percent Complete	3 - Year Design Value	D. V. Validity
46-011-0003		3714 Western Ave, Brookings, SD 57006	121	99	.063	Y	121	99	.061	Y	122	100	.063	Y	99	.062	Y
46-033-0132		WIND CAVE NATIONAL PARK, SOUTH DAKOTA	121	99	.059	Y	120	98	.057	Y	122	100	.061	Y	99	.059	Y
46-071-0001		BADLANDS PO BOX 6 HEADQUARTERS	121	99	.057	Y	121	99	.057	Y	122	100	.062	Y	99	.058	Y
46-093-0001		7108 SHEARER ST - BLACK HAWK ELEMENTARY	122	100	.059	Y	120	98	.056	Y	105	86	.063	Y	95	.059	Y
46-099-0008		2001 E 8th St	121	99	.061	Y	117	96	.066	Y	108	89	.067	Y	95	.064	Y
46-127-0001		31986 475th Ave	122	100	.061	Y	122	100	.062	Y	114	93	.063	Y	98	.062	Y

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').