2010 1-Hour Sulfur Dioxide (SO_2) Standard

Round 3 Designation Recommendations and Data Requirements Rule

Technical Support Document

Iowa Department of Natural Resources
Environmental Services Division

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Executive Summary

The State of Iowa is providing the U.S. Environmental Protection Agency (EPA) with updated recommendations for the third round of designations for the 2010 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). The State recommends each county in Iowa and the portion of Muscatine County currently undesignated for the 2010 1-hour SO_2 NAAQS be designated unclassifiable/attainment. The State is also requesting that EPA redesignate Woodbury County from unclassifiable to unclassifiable/attainment. This document provides technical information that supports these recommendations and fulfills the applicable obligations under the Data Requirements Rule (DRR).

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1. Background

On June 2, 2010, the U.S. Environmental Protection Agency (EPA) signed a final rule revising the sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS). EPA established a new 1-hour (hr) SO_2 primary NAAQS of 75 parts per billion (ppb), based on the three-year average of the annual 99th percentile of daily 1-hr maximum concentrations. The NAAQS revision was published in the Federal register on June 22, 2010 (75 FR 35519).

Whenever the NAAQS are revised the Clean Air Act (CAA) requires EPA to designate areas as attainment, nonattainment, or unclassifiable. For designation purposes, compliance with the NAAQS is typically determined using ambient monitoring data. However, unlike other criteria pollutants, SO_2 is almost exclusively emitted by point sources and "[d]ue to the generally localized impacts of SO_2, [EPA has] not historically considered monitoring alone to be an adequate, nor the most appropriate, tool to identify all maximum concentrations of SO_2" (75 FR 35551). Instead of using only monitoring data to assess compliance with the 1-hr SO_2 NAAQS, which would require a prohibitively expensive SO_2 monitoring network, EPA is using a hybrid approach by including the use of monitoring or modeling data.

In EPA's March 20, 2015, "*Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard*," area designation categories for this standard are defined as:

- Nonattainment: An area that EPA has determined violates the 2010 1-hr SO_2 NAAQS, based on the most recent three years of ambient air quality monitoring data or an appropriate modeling analysis, or that EPA has determined contributes to a violation in a nearby area.

- Attainment: An area that EPA has determined meets the 2010 1-hr SO_2 NAAQS and does not contribute to a violation of the NAAQS in a nearby area based on either: 1) the most recent 3 years of ambient air quality monitoring data from a monitoring network in an area that is sufficient to be compared to the NAAQS per EPA interpretations in the Monitoring Technical Assistance Document (TAD), or 2) an appropriate modeling analysis.

- Unclassifiable: An area where EPA cannot determine based on available information whether the area is or is not meeting the 2010 1-hr SO_2 NAAQS and whether the area contributes to a violation in a nearby area.

EPA is promulgating designations for the 1-hr SO_2 standard for areas throughout the nation in four rounds. EPA completed the first round in 2013 when they designated 29 areas in 16 states as nonattainment based on available monitoring data (78 FR 47191, August 5, 2013). A portion of Muscatine County, Iowa, was designated nonattainment in the first round. No other areas in Iowa or the nation were designated at that time. Subsequently lawsuits were filed because EPA did not finish the designation process within the CAA's three year deadline.

EPA resolved the litigation through a consent decree that contained applicability criteria and deadlines for three additional rounds of designations for the 1-hr SO_2 NAAQS. The consent decree was entered in federal court on March 2, 2015, between EPA and the plaintiffs Sierra Club and Natural Resources Defense Council. The three new rounds of designations are referred to as the second, third, and fourth rounds.

The deadline (meaning designations must be signed for publication in the Federal Register) for the second round of designations was July 2, 2016. Areas affected by the second round either contained a newly violating monitor or a stationary source that had not been announced for retirement (as defined in the consent decree) and that according to the data in EPA's Air Markets Database emitted:

- more than 16,000 tons of SO_2 emissions in 2012; or
- more than 2,600 tons of SO_2 and had an annual average emission rate of 0.45 lbs SO_2/MMBtu or higher in 2012.

In a letter to the Iowa Department of Natural Resource (DNR) dated March 20, 2015, EPA identified three sources in Iowa as meeting the above consent decree criteria: IPL's Burlington Generating Station, IPL's Ottumwa Generation Station, and MidAmerican Energy Co.'s George Neal South facility, located in Des Moines, Wapello, and Woodbury Counties, respectively. On November 4, 2015, the State recommended that those three counties be designated attainment. The technical support document (TSD) accompanying that recommendation was revised on December 23, 2015, to reflect a switch from modeling proposed potential SO_2 emission rates to modeling actual emission rates for IPL's Burlington and Ottumwa Generating Stations. The revised modeling results continued to predict attainment.

On July 12, 2016, EPA finalized the second round of 1-hr SO_2 designations (81 FR 45039). In Iowa, Des Moines and Wapello Counties were designated unclassifiable/attainment while Woodbury County was designated unclassifiable.

The federal consent decree requires that the third and fourth rounds of designations be completed by December 31, 2017, and December 31, 2020, respectively. All areas that have not installed and begun operating a new SO_2 monitoring network meeting EPA specifications by January 1, 2017, must be designated by December 31, 2017. All remaining undesignated areas must be designated by December 31, 2020.

1.1. Data Requirements Rule

To inform area designations in the final two rounds EPA is expected to use data that states must submit pursuant to the federal Data Requirements Rule (DRR, August 21, 2015, 80 FR 51051). The DRR requires states to identify air pollution emitting sources not located in a nonattainment area that emit 2,000 tons per year (tpy) or more of SO_2 and any other source identified as needing further air quality characterization for SO_2. Using the most recent data available at the time (2014) the Iowa DNR identified 11 sources with SO_2 emissions exceeding the 2,000 tpy threshold, see Table 1-1.[1] Neither the DNR nor EPA identified other sources as requiring further air quality characterization. In compliance with EPA's January 15, 2016, deadline, the DNR submitted the DRR source list on December 15, 2015.

Table 1-1 also includes the evaluation method chosen for each area that contains an affected source. The DRR (40 CFR 51.1203(b)) required that states notify EPA by July 1, 2016, whether they will: characterize peak 1-hr SO_2 concentrations in each area through ambient air quality monitoring; characterize peak 1-hr SO_2 concentrations in each area through air quality modeling techniques; or provide federally enforceable emission limitations by January 13, 2017, that limit emissions of applicable sources to less than 2,000 tpy, or provide documentation that the applicable source has permanently shut down. The DNR submitted the required information to EPA in a letter dated June 20, 2016.

[1] As required, sources identified pursuant to the consent decree emissions criteria for the second round of designations were also included in the DRR source list.

Table 1-1. Iowa sources identified and evaluation methods chosen pursuant to the DRR.

County	Facility ID	Facility Name	2014 SO_2 Emissions (tons)	Method
Allamakee	03-03-001	IPL - Lansing Generating Station	5,260	Limit emissions
Clinton	23-01-014	IPL - M. L. Kapp Generating Station	3,024	Limit emissions
Des Moines	29-01-013	IPL - Burlington Generating Station	3,657	Modeling
Linn	57-01-042	IPL - Prairie Creek Generating Station	4,033	Modeling
	57-01-080	ADM Corn Processing - Cedar Rapids	3,071	
Louisa	58-07-001	MidAmerican Energy Co - Louisa Station	8,783	Modeling
Pottawattamie	78-01-026	MidAmerican Energy Co - Walter Scott Jr Energy Center	13,749	Modeling
Scott	82-02-006	MidAmerican Energy Co - Riverside Station	2,167	Limit emissions
Wapello	90-07-001	IPL - Ottumwa Generating Station	9,227	Modeling
Woodbury	97-04-010	MidAmerican Energy Co - George Neal North	6,501	Modeling
	97-04-011	MidAmerican Energy Co - George Neal South	6,813	

1.2. Purpose

The purpose of this document is to provide information that both satisfies the remaining applicable requirements of the DRR and supports the State's amended designation recommendation.

To address the requirements of the DRR the DNR is evaluating SO_2 concentrations in each area using either dispersion modeling or by establishing new emission limits.[2] Since new SO_2 monitoring networks will not be deployed in Iowa for the DRR all areas in the state not currently designated for the 1-hr SO_2 NAAQS must be designated by December 31, 2017.

EPA's March 20, 2015 "*Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard*" lists five factors to be considered when developing boundary designation recommendations:

- Monitoring/Modeling data
- Meteorology
- Jurisdictional boundaries
- Emissions information, including growth, controls, and regional emission reductions
- Topography

The State has evaluated EPA's SO_2 designations guidance and is providing updated designation recommendations for EPA to consider in the third round of designations. These recommendations address all areas in the state not yet designated for the 1-hr SO_2 NAAQS. For purposes of designations and the DRR the dispersion modeling results for the affected sources in Linn, Louisa, and Pottawattamie Counties are discussed in detail in subsequent chapters, as are the emission limitations established for DRR affected sources that are limiting their SO_2 emissions to less than 2,000 tpy.

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[2] In 2015 the State provided updated recommendations and supporting documentation for the second round of designations for Des Moines, Wapello, and Woodbury Counties. The associated TSD (updated December 23, 2015) included dispersion modeling results for IPL - Burlington Generating Station (Des Moines County), IPL - Ottumwa Generating Station (Wapello County), and MidAmerican Energy's George Neal South and George Neal North facilities (Woodbury County). That modeling is sufficient to satisfy the applicable requirements of the DRR under 40 CFR 51.1203(d). However, new information discussed in Section 6.1 supports redesignating Woodbury County from "unclassifiable" to "unclassifiable/attainment."

2. ADM Corn Processing - Cedar Rapids & IPL - Prairie Creek Generating Station (Linn County)

ADM Corn Processing - Cedar Rapids (ADM), a corn wet milling facility, and IPL - Prairie Creek Generating Station (Prairie Creek), an electric generating facility (power plant), are both located in Linn County, Iowa (see Figure 2-1 and Figure 2-2). Dispersion modeling was selected to characterize peak 1-hour SO_2 concentrations in this area. Based on the DNR's technical review an unclassifiable/attainment recommendation for all of Linn County is appropriate.

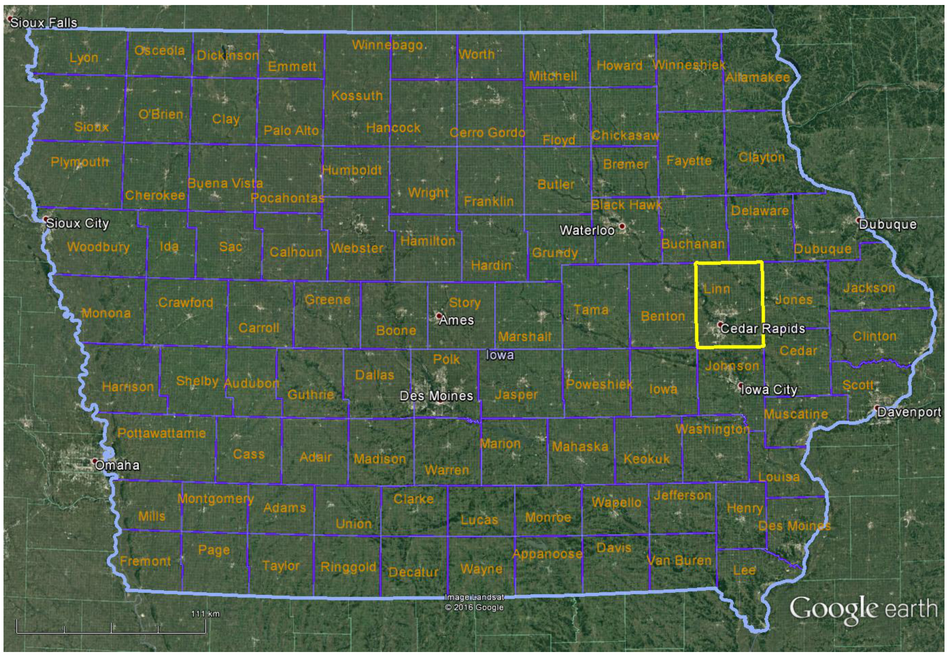

Figure 2-1. Location of Linn County, Iowa.

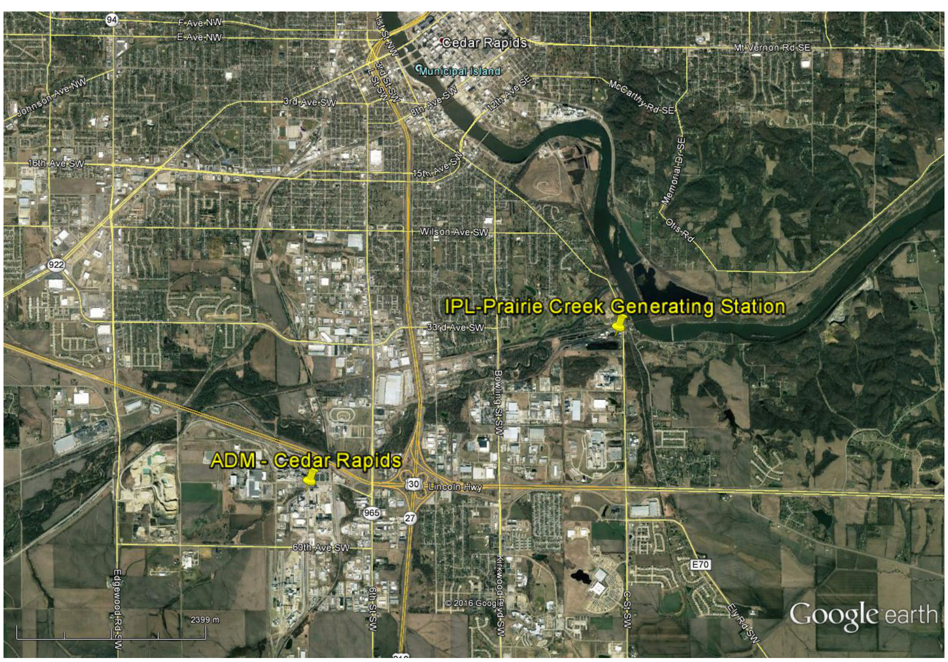

Figure 2-2. Location of ADM Corn Processing and IPL - Prairie Creek.

2.1. Source Characterization and Emission Rates

The pertinent SO_2 emission sources at ADM consist of five coal fired boilers. There are also numerous dryers, coolers, air heaters, and thermal oxidizers that are potential sources of SO_2. At IPL's Prairie Creek Generating Station the primary SO_2 emission sources are four coal fired boilers and two natural gas fired boilers. Intermittent emissions of SO_2 from emergency generators at both facilities and fire water pumps at ADM were excluded from this modeling analysis pursuant to Section 5.5 of EPA's draft "*SO_2 NAAQS Designations Modeling Technical Assistance Document*" (TAD) dated August 2016.

The vast majority of the SO_2 sources at both facilities vent to stacks with well-defined openings. These sources were modeled as point sources in AERMOD. There are two sets of steep tanks at ADM that are more fugitive in nature. These two sets of tanks were modeled as volume sources in AERMOD.

ADM and IPL - Prairie Creek modeled a combination of maximum permitted allowable and actual emissions with actual emissions derived from recent stack tests. Modeled emission rates are provided in Table 2-1 while Table 2-2 and Table 2-3 summarize the stack characteristics used in the 1-hr SO_2 modeling demonstration.

Table 2-1. ADM and IPL – Prairie Creek modeled SO_2 emission rates.

Model ID	**Unit Description**	**Modeling Emission Rate*** (lb/hr)
ADM Corn Processing – Cedar Rapids		
SEP002	Starch Drying	0.0302
SEP006	#2 Fluid Bed Germ Dryer	0.066[A]
SEP015	#1 Fluid Bed Germ Dryer	8.08[A]
SEP016	Fiber Feed	4.70
SEP034	Carbon Furnace	1.55[A]
SEP054	SO2 Dilution Tank	0.12
SEP069	190 Product Scrubbing	0.30
SEP076	Alcohol Loadout	0.02
SEP083	Wet Corn Hopper	1.15
SEP087	Biosolids Dryer	0.183
SEP089	Biosolids Dryer	0.183
SEP111	Corn Wet Milling	0.197
SEP114	Carbon Furnace #2	1.55[A]
SEP117	Corn Wet Milling	0.024
SEP118	Corn Wet Milling	0.05
SEP121	Maltodextrin - Evaporation	0.12
SEP122	Maltodextrin Spray Dryer	0.0206
SEP151	Fructose Evaporation	0.457
SEP152	Fructose Evaporation	0.457
SEP153	Dextrose & Steepwater Evap	0.12[A]
SEP154	Fructose Neutralization	0.017[B]
SEP155	Fructose Neutralization	0.017[B]
SEP159	Fructose Evaporation	0.45
SEP190	RTO #1	5.25[A]
SEP191	RTO #2 & #3	10.50[A]
SEP192	RTO #4 & #5	10.50[A]

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
SEP201	Heavy Gluten Storage Tank	0.196[A]
SEP204	Biomass Storage Tank	0.034[A]
SEP205	Heavy Steepwater Tank	0.182
SEP206	Steepwater Storage Tank	0.182
SEP210	Millhouse Fugitive Emissions	3.49[A]
SEP211	Feedhouse SO2 Scrubbing	3.03[A]
SEP225	Corn Wet Milling	0.062
SEP226	Gluten Filter Vacuum Pump	0.10[A]
SEP230	Gluten Filter Vacuum Pump	0.135[A]
SEP387	Heavy Steepwater Tank	0.20
SEP412	Anaerobic Digesters	1.50
SEP420	Fermentation, Distillation	2.21
SEP422	DDGS Cooler #1	4.48
SEP423	DDGS Cooler #2	4.48
SEP425	DDGS Dryer #1	1.01
SEP426	DDGS Dryer #2	1.01
SEP427	DDGS Dryer #3	1.01
SEP428	DDGS Dryer #4	1.01
SEP429	DDGS Dryer #5	1.01
SEP450	Alcohol Rail Loadout #1	0.10
SEP451	Alcohol Rail Loadout #2	0.10
SEP459	Natural Gas Boiler #1	0.17
SEP460	Natural Gas Boiler #2	0.17
SEP501	Co-Gen Boiler #1 & #2	235.9[C]
SEP502	Co-Gen Boiler #3 & #4	206.1[C]
SEP519	Boiler Room Sewer Tank	0.087
SEP530	Co-Gen Boiler #5	257.0[C]
STEEP	Steep Volume Sources	4.00[A]
IPL - Prairie Creek Generating Station		
B1&2	Boiler #1 & #2	123.9[D]
B#3	Boiler #3	129.3[D]
B#4	Boiler #4	0.81
B#5	Boiler #5	0.17
B6	Boiler #6	0.20

* Modeled emission rates are the maximum permitted allowable emission rates unless otherwise noted.

[A] Average actual emissions (predominantly year 2014 for ADM).

[B] Conservative overestimate of the 2012 actuals for these units.

[C] The modeled emission rates for SEP501, 502 and 530 are approximately 10% greater than the actual average emissions from 2012 through 2014.

[D] The IPL units B1&2 and B#3 emission rates reflect the most recent average hourly continuous emission monitoring system (CEMS) data.

Table 2-2. ADM and IPL - Prairie Creek point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
ADM Corn Processing – Cedar Rapids							
SEP002	608671	4642710	227.44	28.04	2.44	308.15	14.16
SEP006	608819	4642760	225.94	43.28	1.83	324.8	18.06
SEP015	608737	4642779	225.66	44.50	1.52	330.4	18.95
SEP016	608799	4642777	226.01	45.11	1.83	324.8	19.05
SEP034	608812	4642650	225.50	33.53	0.69	344.3	11.72
SEP054	608649	4642589	225.28	14.02	0.20	329.8	0.41
SEP069	608880	4642625	225.02	36.27	0.20	293.7	4.89
SEP076	609202	4642477	224.24	12.19	1.83	1033.2	10.96
SEP083	608630	4642769	226.45	27.74	0.46	331.5	7.76
SEP087	608992	4642623	223.97	15.24	0.10	327.6	VR
SEP089	608992	4642594	223.90	15.24	0.10	327.6	VR
SEP111	608706	4642678	226.72	14.33	0.20	338.7	0.68
SEP114	608818	4642662	225.42	33.53	0.69	344.3	11.72
SEP117	608675	4642642	226.52	15.54	0.08	338.7	0.52
SEP118	608662	4642655	226.88	9.75	0.30	308.2	0.08
SEP121	608662	4642649	226.77	16.46	0.15	338.7	VR
SEP122	608635	4642720	228.12	42.98	1.98	344.3	11.68
SEP151	608779	4642617	225.53	28.96	0.15	369.8	3.10
SEP152	608774	4642601	225.49	28.96	0.15	369.8	3.10
SEP153	608791	4642631	225.53	14.02	0.15	362.0	0.80
SEP154	608689	4642579	225.02	14.02	0.51	317.6	0.28
SEP155	608684	4642574	224.94	14.02	0.51	317.6	0.28
SEP159	608753	4642619	225.55	26.22	0.15	294.3	3.00
SEP190	608774	4642666	225.53	45.72	2.13	408.2	13.97
SEP191	608796	4642666	225.53	45.72	3.05	408.2	14.33
SEP192	608807	4642666	225.53	45.72	3.05	408.2	14.02
SEP201	608666	4642778	225.64	29.87	0.41	324.8	1.09
SEP204	608669	4642767	225.57	29.26	0.46	340.9	0.33
SEP205	608660	4642767	225.77	29.26	0.46	329.8	0.12
SEP206	608647	4642768	226.02	24.69	0.41	329.8	0.16
SEP210	608698	4642710	227.1	45.72	0.76	295.4	14.41
SEP211	608838	4642721	225.25	22.25	0.76	297.0	12.03
SEP225	608775	4642735	225.73	11.89	0.15	320.9	0.34
SEP226	608809	4642781	226.05	17.68	0.86	324.3	0.11
SEP230	608823	4642740	225.63	21.95	0.20	310.4	1.50
SEP387	608719	4642669	226.18	12.80	0.20	329.8	0.67
SEP412	608496	4640743	241.31	13.72	0.20	1088.7	18.29
SEP420	608662.3	4641324	247.73	30.48	1.52	360.9	20.34
SEP422	608720	4640977	245.36	30.48	1.22	340.4	22.03
SEP423	608737.4	4640977.5	245.90	30.48	1.22	340.4	22.03
SEP425	608708	4641099	248.33	54.86	1.07	505.4	20.70

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
SEP426	608742.9	4641100	246.92	54.86	1.07	505.4	20.70
SEP427	608707.4	4641076	247.95	54.86	1.07	505.4	20.70
SEP428	608742.2	4641076.5	246.72	54.86	1.07	505.4	20.70
SEP429	608707.1	4641052.5	247.62	54.86	1.07	505.4	20.70
SEP450	609629.3	4640828	245.42	9.14	2.44	1255.4	5.41
SEP451	608633	4640831.5	245.42	9.14	2.44	1255.4	5.41
SEP459	609067.1	4642242.4	226.26	22.86	1.98	418.7	15.69
SEP460	609067.1	4642233.1	226.46	22.86	1.98	418.7	15.69
SEP501	608807	4642262	225.83	106.68	3.51	454.3	19.65
SEP502	608807	4642262	225.83	106.68	3.51	456.5	19.61
SEP519	608810	4642716	225.52	12.19	0.15	317.0	0.47
SEP530	609046	4642261	226.22	125.58	3.66	427.6	20.99
IPL - Prairie Creek Generating Station							
B1&2	612843.7	4644412.9	221.91	99.67	4.87	516.5	8.10
B#3	612825.9	4644447.5	221.37	61.26	3.79	505.4	8.36
B#4	612742	4644450	220.89	61.26	3.96	438.2	21.87
B#5	612887.1	4644461.9	220.88	32.46	1.98	516.5	12.19
B6	612895.1	4644463.7	220.49	24.38	1.98	426.5	15.75

Table 2-3. ADM volume source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Release Height (m)	Initial Lateral Dimension (m)	Initial Vertical Dimension (m)
STEEPVS1	608692.7	4642764.5	225.62	25.91	18.20	0.58
STEEPVS2	608723.3	4642763	225.56	25.91	18.20	0.58

The emission rate modeled for Unit 4 (Boiler #4) at IPL's Prairie Creek Generating Station reflects a required conversion to natural gas. A federally enforceable consent decree (No. C15-0061 EJM) entered on September 2, 2015, in the United States District Court for the Northern District of Iowa, Cedar Rapids Division, between the United States of America; the State of Iowa; Linn County, Iowa; the Sierra Club; and IPL requires that Unit 4 retire or refuel (switch from combusting coal to natural gas) by June 1, 2018. However, IPL has committed, and will be required, to cease burning coal and to combust only natural gas in this unit as expeditiously as possible.

Beginning no later than December 31, 2017, Unit 4 must combust only natural gas. This requirement will be federally enforceable through air construction permit number 6652 to be issued by the Linn County Air Quality Division.[3] Additionally, between November 1, 2017 and December 30, 2017, Unit 4 is restricted to firing no more than a 50/50 blend of coal and natural gas with no more than 50% of the blend consisting of coal on a daily basis. These deadlines are as expeditious as practicable considering the modifications that must be made to facilitate the fuel conversion. They accommodate, for example,

[3] A public comment period for the draft permit was scheduled for December 1 to December 31, 2016. The final permit will be issued and federally enforceable in early 2017.

the natural gas supply lines modifications that must be completed, the installation of a gas preheater, which may require the purchase of neighboring land, and the time needed to ensure that Unit 4 will be able to provide its capacity without coal being fired long term.

For ADM the dispersion modeling analysis incorporates, and Table 2-2 reflects, updates to permitted stack parameters on four emission points. The modifications are federally enforceable through Authorization to Install (ATI) permits issued by the Linn County Air Quality Division. The stack height for emission point ID 210 (SEP210 in the model) must be raised from 46 to 150 ft (Linn County ATI permit 6925, issued August 17, 2016). ADM expects to complete this stack height increase in December 2016. Emission point 226 (SEP226) must be converted from a horizontal discharge to a vertical, unobstructed discharge (Linn County ATI permit 6974, issued November 30, 2016). Based on the information received in the permit application ADM anticipates completing this modification by January 31, 2017, which is eleven months in advance the December 31, 2017, designations deadline. The stack heights of emissions points 87 and 89 (SEP087 and SEP089) must both be raised to 50 ft and their orientation changed from horizontal to vertical, unobstructed (Linn County permits ATI 6975 and 6976, both issued on November 30, 2016). These stack modifications will be completed by May 31, 2017, the expiration date of the ATIs, which is seven months in advance of EPA's December 31, 2017, designations deadline.

2.2. Nearby Sources of SO_2

The SO_2 emission levels from facilities within 10 km were evaluated to determine if additional sources of SO_2 should be included in the modeling analysis. Table 2-4 summarizes all additional Title V sources within 10 km of ADM or IPL - Prairie Creek and their recent SO_2 emissions. Any source that would contribute a significant portion of the total SO_2 emissions in the area was identified to be included in the modeling analysis. The total average emissions for the area for both Title V and minor sources was 9,324 tpy, of which ADM and IPL - Prairie Creek are the primary contributors, and Cargill and Ingredion are secondary contributors at an average of 193 tpy and 93 tpy, respectively. All other sources combined only contribute 0.1%. In addition, a search was performed for major sources of SO_2 within 10-20 km. No facilities were identified in this area. Therefore the only sources included in the modeling analysis are ADM Corn Processing, IPL - Prairie Creek, Cargill, and Ingredion. Emission rates and stack parameters for Cargill and Ingredion can be found in Appendix A.

Table 2-4. Title V Facilities within 10 km of ADM and IPL - Prairie Creek.

		SO_2 Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
ADM Corn Processing - Cedar Rapids	1350 Waconia Avenue, SW Cedar Rapids, IA 52404	6,275.71	3,163.48	3,071.25	4,170.2 (avg)
IPL - Prairie Creek Generating Station	3300 C St SW Cedar Rapids, IA	3,590.7	2,917.13	8,065.55	4,857.79 (avg)
Cargill Inc.	1710 16th St SE Cedar Rapids, IA	239.4	263.63	75.8	192.94 (avg)
Ingredion (fka Penford Products Co)	1001 1st St SW Cedar Rapids, IA	82.45	149.42	46.02	92.63 (avg)
BioSpringer North America Corp	940 60th Ave SW Cedar Rapids, IA	0	0	0	0 (avg)
Cargill Inc. - Soybean West Plant	1110 12th Ave SW Cedar Rapids, IA	0.07	0.07	0.07	0.07 (avg)

		SO_2 Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
Cargill Inc. - Soybean East Plant	410 C Ave NE Cedar Rapids, IA	0.18	0.16	0.15	0.163 (avg)
Cedar Rapids WPCF	7525 Bertram Rd SE Cedar Rapids, IA	0.98	0.90	2.82	1.57 (avg)
Cedar River Paper Company	4600 C St SW Cedar Rapids, IA	NA	0.02	0.01	0.015 (avg)
Diamond V Mills Inc - North Plant	436 G Ave NW Cedar Rapids, IA	0.04	0.04	0.06	0.05 (avg)
General Mills Operation Inc	4800 Edgewood Rd SW Cedar Rapids, IA	1.29	1.20	1.11	1.20 (avg)
PMX Industries Inc	5300 Willow Creek Dr Cedar Rapids, IA	0.90	0.15	0.37	0.47 (avg)
Quaker Oats Co	418 2nd St NE Cedar Rapids, IA	0.13	0.22	0.17	0.17 (avg)
Red Star Yeast Co LLC	950 60th Ave SW Cedar Rapids, IA	0	0	0	0 (avg)
	Total Average Emissions	**9,317.22**			

* Major sources report emissions every year while minor sources report at most once every three years. Due to the large number of sources within 10 km only Title V sources are listed in this table. An additional 73 minor sources were evaluated most of which had zero to negligible SO_2 emissions from this three year span and therefore were not listed above.

2.3. Dispersion Model

The EPA recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. The most current version (Version 15181) of AERMOD available at the time of the analysis was used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (Version 04274)
- AERMET (Version 14134)
- AERMAP (Version 11103)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD was run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- SO_2 pollutant keyword

2.4. Receptor Grid

Receptors were sited outside of the fence line boundary of ADM, IPL- Prairie Creek, Cargill, and Ingredion. Receptors were placed at the following spacing out to 10 kilometers from these four facilities:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km
- 1000 meters extending from 5 km to 10 km

Consistent with Section 4.2 of the TAD, receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Cedar River. Figure 2-3 shows the receptor grid for the modeling analysis.[4]

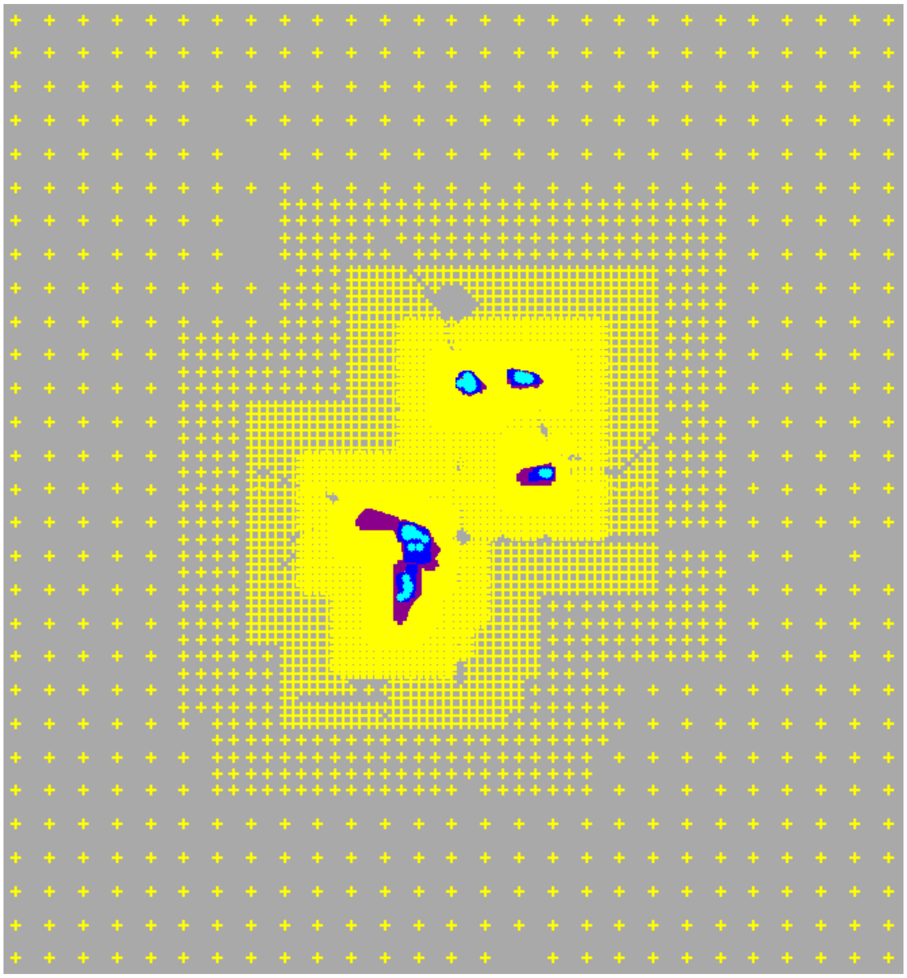

Figure 2-3. Dispersion modeling receptor grid.

[4] This image also depicts receptors being removed over roadways and the airport, which is no longer allowed according to the most recent modeling TAD. A full grid modeling analysis was conducted to address this situation and no exceedances were predicted.

Interpolated terrain elevations were input to the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Linn and Johnson Counties in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

2.5. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface data was collected from the Cedar Rapids (KCID) station with upper air data from the Davenport NWS station (KDVN) for calendar years 2012 through 2014. Based on the results from a representivity study conducted by the DNR,[5] these meteorological data are considered representative of the conditions near ADM and IPL - Prairie Creek. Figure 2-4 shows the 2012-2014 3-year wind rose for the KCID station.

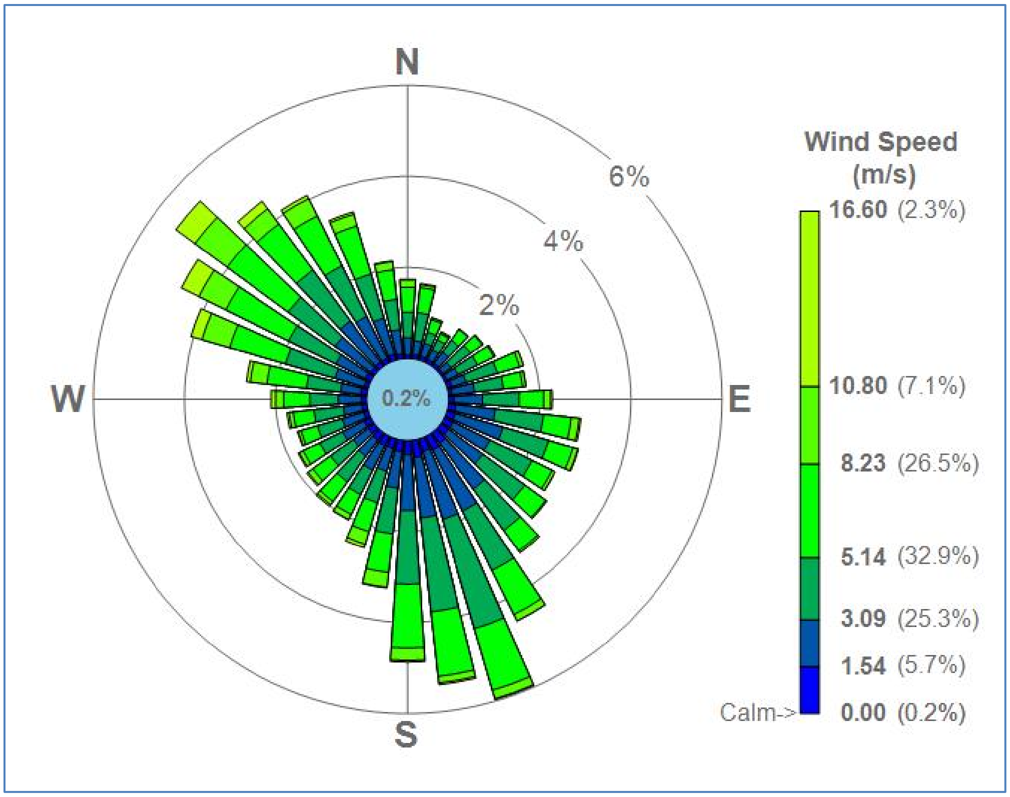

Figure 2-4. Cedar Rapids (KCID) 3-year wind rose (2012-2014).

2.6. Background Concentration

A 1-hr SO_2 background concentration of 7 μg/m^3 was added to the model design value for comparison to the NAAQS. This background concentration was proposed in the submitted modeling protocol and subsequently approved by the DNR. It represents the 2012-2014 design concentration at the Lake Sugema monitor. The DNR has determined that this concentration is more representative of natural background levels in the absence of nearby SO_2 emissions. This is an appropriate background concentration to use because all significant nearby sources of SO_2 are included in the modeling analysis.

[5] The "*2010 - 2015 AERMOD Met Data Technical Support Document*" available at: http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/MeteorologicalData.aspx

The model design value was used in conjunction with the background concentration for comparison to the NAAQS. For SO_2, consistent with EPA guidance, the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hr modeled concentration was added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hr concentration at each receptor using the SO_2 pollutant keyword.

2.7. Modeling Results

Following the AERMOD dispersion modeling approach described above, Table 2-5 summarizes the AERMOD output model design value, background concentration, and total concentration for comparison to the 1-hr SO_2 NAAQS.

Table 2-5. Model predicted concentration (μg/m^3) for the ADM and IPL - Prairie Creek analysis.

Scenario	Model Design Value	Background Concentration	Total Concentration	1-Hour SO_2 NAAQS	Above NAAQS?
ALL	142	7	149	196	No

2.8. Designation Recommendation

The modeling results predict that the largest SO_2 sources in the area, ADM, IPL – Prairie Creek, Cargill, and Ingredion, will not cause or contribute to a violation of the 1-hour SO_2 NAAQS. This analysis incorporates four of the five factors listed in EPA’s March 20, 2015, designations guidance that states should consider when developing boundary designation recommendations. To address the remaining factor, jurisdictional boundaries, the State has selected the county boundary as providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Based on these considerations the State is recommending that Linn County be designated unclassifiable/ attainment for the 1-hr SO_2 NAAQS.

3. MidAmerican Energy - Louisa Generating Station (Louisa County)

MidAmerican Energy Co.'s Louisa Generating Station (Louisa) is a coal-fired electric generating facility located in Louisa County, Iowa, (see Figure 3-1 and Figure 3-2). Dispersion modeling was selected to characterize peak 1-hour SO_2 concentrations in this area. Based on the DNR's technical review an unclassifiable/attainment recommendation for all of Louisa County is appropriate.

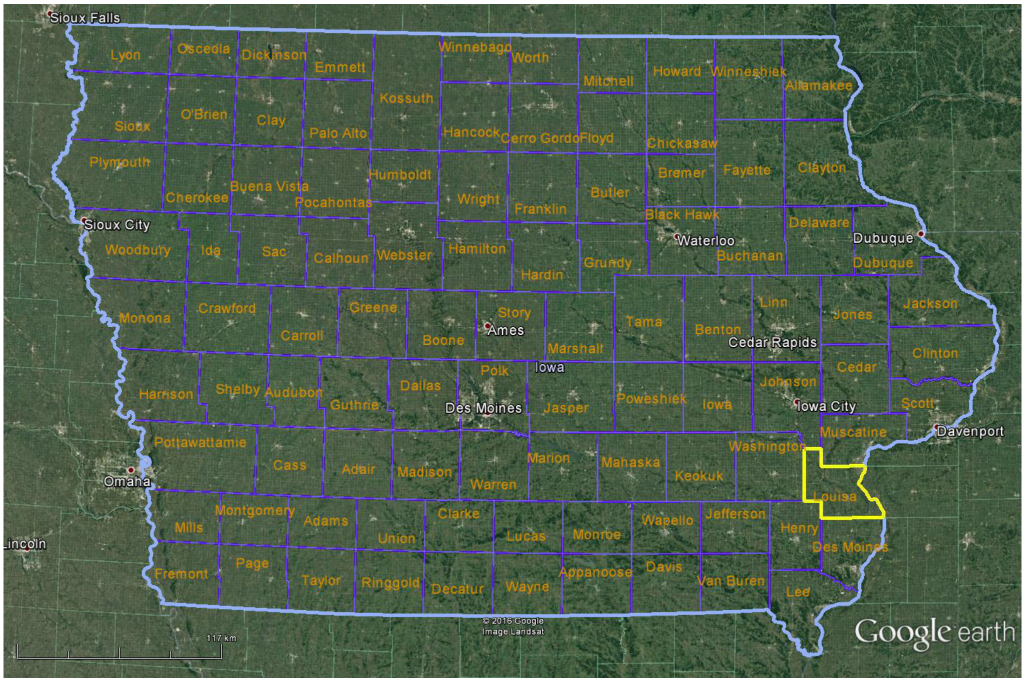

Figure 3-1. Location of Louisa County, Iowa.

Figure 3-2. Location of Louisa Generating Station.

3.1. Source Characterization and Emission Rates

The pertinent SO_2 emission sources at Louisa are a coal-fired main boiler and two auxiliary boilers. Intermittent emissions of SO_2 from emergency generators and oil-firing of the auxiliary boilers were excluded from this modeling analysis pursuant to Section 5.5 of EPA's draft *"SO_2 NAAQS Designations Modeling Technical Assistance Document"* (TAD), dated August 2016.

Auxiliary Boiler 1 and Auxiliary Boiler 2 are considered natural gas units. They are limited to utilizing fuel oil intermittently. Therefore, the units were modeled to represent normal operation with emission rates that reflect potential SO_2 emissions while utilizing natural gas as a fuel.

For the Main Boiler (Model ID EP01) the current 30-day rolling permit limit and actual emissions data was used to develop an hourly emission rate per the approach outlined in the EPA *Guidance for 1-Hour SO_2 Nonattainment Area SIP* Submissions memorandum released on April 23, 2014, as follows:

1. Evaluate existing continuous emission monitoring data for the Main Boiler at the Louisa Generating Station to develop a ratio of 30-day rolling averages to hourly emissions. This ratio was developed as the 99th percentile of the five year dataset from 2010 to 2014.
2. The ratio was used to develop an hourly emission rate using the current 30-day rolling permit limit.
3. The 1-hr emission rate was used in the modeling analysis.

Step 1 above resulted in a ratio of 0.8077. This ratio was then applied to the current 30-day rolling average permit limit (also referred to here as potential to emit or PTE) of 3,449.6 pounds per hour, resulting in the modeled 1-hr emission rate shown in Table 3-1. Table 3-2 summarizes the stack characteristics used in the 1-hr SO_2 modeling demonstration.

Table 3-1. Louisa Generating Station modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate (lb/hr)
EP01	Main Boiler	4,270.89 (PTE)
EP02	Auxiliary Boiler 1 (NG)	0.06 (PTE)
EP03	Auxiliary Boiler 2 (NG)	0.06 (PTE)

Table 3-2. Louisa Generating Station point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
EP01	659586.2	4575826	176.95	185.93	9.14	355.4	25.78
EP02	659550.2	4575698	177.28	24.38	1.35	449.8	7.03
EP03	659546.2	4575698	177.29	24.38	1.35	449.8	7.03

3.2. Nearby Sources of SO_2

The SO_2 emission levels from facilities within 10 km were evaluated to determine if additional sources of SO_2 should be included in the modeling analysis. The sources included in the Muscatine 1-hr SO_2 nonattainment SIP are within 10 km of Louisa and were evaluated as part of the Louisa DRR analysis. These sources included Grain Processing Corporation (GPC), Muscatine Power and Water (MPW), and

Monsanto. Since these sources were included in the modeling by default the magnitude of their emissions was not considered as a possible mechanism to screen them from further analysis.

Table 3-3 summarizes all additional sources within 10 km of Louisa Generating Station and their recent SO_2 emissions. Any source that would contribute a significant portion of the total SO_2 emissions in the area was identified to be included in the modeling analysis. The total average emissions for the area – excluding GPC, MPW, and Monsanto – were 8,603.57 tpy, of which Louisa Generating Station is the primary contributor. All other sources combined only contribute 0.003%. Therefore, the only sources within 10 km included in the modeling analysis were GPC, MPW, and Monsanto. These three facilities were modeled using the same emission rates and source parameters as were used in the Muscatine nonattainment SIP control strategy analysis, with the exception of the boiler at Monsanto (EP195), which was modeled using actual emissions.

In addition, a search was performed for major sources of SO_2 within 10-20 km. Three facilities were identified in this area: HJ Heinz, HNI Corp. - Central Campus, and HNI Corp. - North Campus. These three facilities had a maximum combined SO_2 emission rate of 0.22 tpy during the three-year period 2012-2014. This is only 0.003% of the average emissions from Louisa. As such, these facilities were not added to the modeling analysis.

Table 3-3. Facilities within 10 km of Louisa Generating Station (excluding nonattainment SIP Sources).

		SO_2 Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
MidAmerican Energy Co - Louisa Generating Station	8602 172nd Street Muscatine IA 52761	8,743.23	8,284.62	8,782.81	8603.55 (avg)
Natural Gas Pipeline Co of America	Us Hwy 61 & County Rd	0	0	0.04	0.01 (avg)
Union Tank Car Co Muscatine	2603 Dick Drake Way Muscatine IA	0.01	0.01	0.01	0.01 (avg)
McKee Button	1000 Hershey Ave Muscatine IA	0	0	0	0 (avg)
Bakery Feeds	2579 Pettibone Ave Muscatine IA				0.11
Potters Industries LLC	4907 55th Ave W Muscatine IA				0.11
Acme Materials CO	2544 Pettibone Ave Muscatine IA	0			0
Bridgestone Bandag LLC	6501 49th St S Muscatine IA	0			0
CHS Muscatine	2637 Pettibone Ave Muscatine IA	0			0
Musco Sports Lighting LLC	2107 Stewart Rd Muscatine IA	0			0
Hahn Ready Mix Inc	2470 Industrial Connector Rd				0
Hoffmann Inc	6001 49th St S Muscatine IA				0
Menasha Packaging	3206 Hershey Ave Muscatine IA				0

Facility Name	Address	SO_2 Emissions (tpy)* 2012	2013	2014	Most Recent (or average)
Pretium Packaging LLC	5408 61st Ave W Muscatine IA				0
The Dallas Group of America	5000 W 55th Ave Muscatine IA				0
Tire Environmental Services Inc	1602 Musser St Muscatine IA				0
Bandag, Inc - Plant 4	6501 49th St S Muscatine IA				NA**
Bandag, Inc - Plant 5	6501A 49th St S Muscatine IA				NA**
Custom Feeds, Inc	2392 231 St Muscatine IA				NA**
Earthcare Recycling, Inc	2472 33rd St S Muscatine IA				NA**
Muscatine County Humane Society	920 S Houser St Muscatine IA				NA**
Quick Strip Company	810 Division St Muscatine IA				NA**
	Total Average Emissions	**8,603.79**			

* Major sources report emissions every year while minor sources report at most once every three years. If the latest available inventory for a minor source predates 2012 then the facility's emissions are listed only in the "Most Recent" column. The "Most Recent" column also includes the 3-year average emission rates for major sources.

**No emissions data found (but no SO_2 emissions are anticipated).

3.3. Dispersion Model

The EPA recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. The most current version (Version 15181) of AERMOD available at the time of the analysis was used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (Version 04274)
- AERMET (Version 14134)
- AERMAP (Version 11103)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD was run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- SO_2 pollutant keyword

3.4. Receptor Grid

Receptors were sited outside of the fence line boundary of the Louisa Generating Station in two phases. First, receptors were placed at the following spacing out to 10 kilometers from the Louisa fence line, except for within the Muscatine nonattainment area:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km
- 1000 meters extending from 5 km to 10 km

Second, within the Muscatine nonattainment area receptors were placed in the exact same locations as were used in the nonattainment SIP analysis. The nonattainment area receptor grid was centered on the Musser Park monitor at the northern end of GPC's property, extending away with decreasing resolution using receptor spacing similar to that described above. Additional refined receptor spacing was used within the nonattainment area receptor grid surrounding GPC, MPW, Monsanto, and Louisa Generating Station's northern fence line.

Consistent with Section 4.2 of the TAD, receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Mississippi River. Figure 3-3 shows the receptor grid for the modeling analysis.

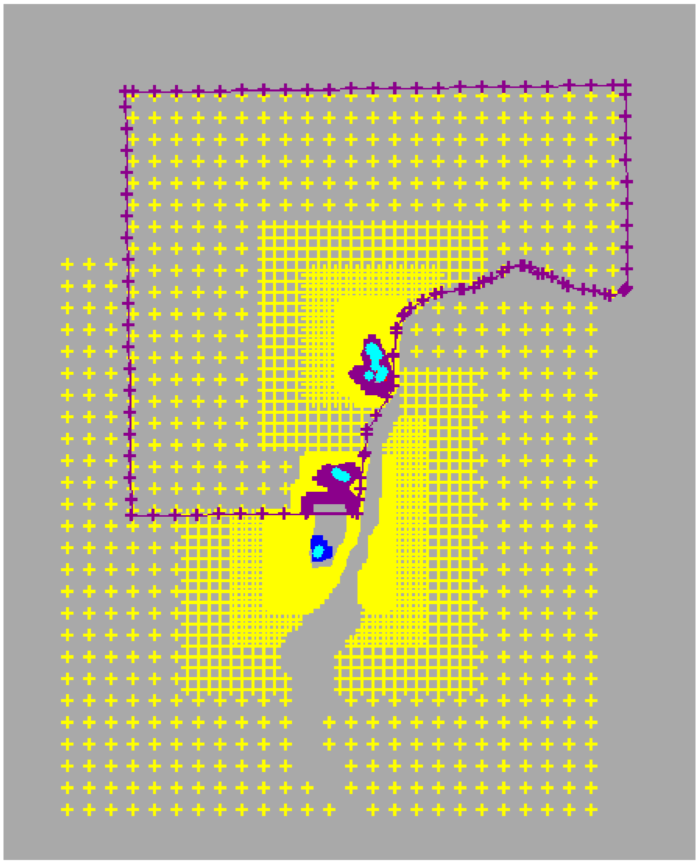

Figure 3-3. Dispersion modeling receptor grid surrounding Louisa Generating Station.

Interpolated terrain elevations were input to the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Louisa and Muscatine Counties in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

3.5. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface data was collected from the Iowa City (KIOW) station with upper air data from the Davenport NWS station (KDVN) for calendar years 2012 through 2014. Based on the results from a representivity study conducted by the DNR,[6] these meteorological data are considered representative of the conditions near the Louisa Generating Station. Figure 3-4 shows the 2012-2014 3-year wind rose for the KIOW station.

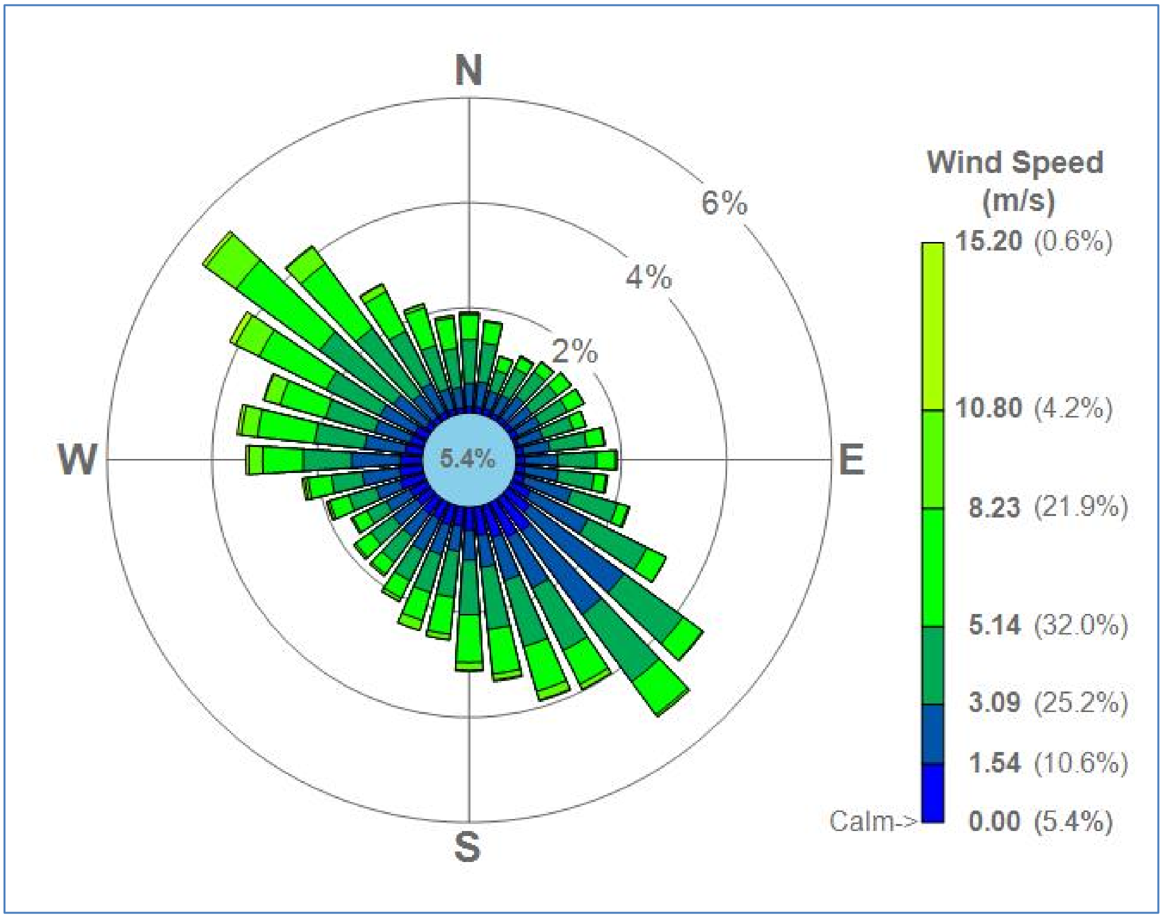

Figure 3-4. Iowa City (KIOW) 3-year wind rose (2012-2014).

3.6. Background Concentration

A 1-hr SO_2 background concentration of 7 μg/m^3 was added to the model design value for comparison to the NAAQS. This background concentration was proposed in the submitted modeling protocol and subsequently approved by the DNR. It represents the 2012-2014 design concentration at the Lake

[6] The "*2010 - 2015 AERMOD Met Data Technical Support Document*" available at: http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/MeteorologicalData.aspx

Sugema monitor. The DNR has determined that this concentration is more representative of natural background levels in the absence of nearby SO_2 emissions. This is an appropriate background concentration to use because all significant nearby sources of SO_2 are included in the modeling analysis.

The model design value was used in conjunction with the background concentration for comparison to the NAAQS. For SO_2, consistent with EPA guidance, the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hr modeled concentration was added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hr concentration at each receptor using the SO_2 pollutant keyword.

3.7. Modeling Results

Following the AERMOD dispersion modeling approach described above, Table 3-4 summarizes the AERMOD output model design value, background concentration, and total concentration for comparison to the 1-hr SO_2 NAAQS. The Muscatine nonattainment SIP analysis includes multiple scenarios depending on which boilers (Units 7, 8, or 9) are operating at MPW. Each scenario was evaluated as part of this analysis, along with Louisa's individual maximum concentration. The maximum concentration of 194 µg/m^3 is less than the 1-hr SO_2 NAAQS, and is attributable to sources in the nonattainment area.

Table 3-4. Model predicted concentration (µg/m^3) for the Louisa Generation Station analysis.

Scenario	Model Design Value	Maximum Design Value	Background Concentration	Total Concentration	1-Hour SO_2 NAAQS	Above NAAQS?
ALL	184.19	186.86	7	194	196	No
U7OFF	184.19					
U7ONLY	186.86					
U8OFF	186.53					
U8ONLY	184.19					
U9OFF	184.19					
U9ONLY	186.53					
Louisa Only	70.17					

3.8. Designation Recommendation

The modeling results predict that neither the SO_2 emissions from Louisa, nor emissions from the sources in the nonattainment area, will cause or contribute to a violation of the 1-hour SO_2 NAAQS. This analysis incorporates four of the five factors listed in EPA's March 20, 2015, designations guidance that states should considered when developing boundary designation recommendations. To address the remaining factor, jurisdictional boundaries, the State has selected the county boundary as providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Based on these considerations the State is recommending that Louisa County be designated unclassifiable/attainment for the 1-hr SO_2 NAAQS. Information regarding the designation recommendation for the portion of Muscatine County outside of the Muscatine nonattainment area is in Section 6.2.

4. MidAmerican Energy - Walter Scott Jr. Energy Center (Pottawattamie County)

MidAmerican Energy Co.'s Walter Scott Jr. Energy Center (Walter Scott) is a coal-fired electric generating facility located in Pottawattamie County, Iowa (see Figure 4-1 and Figure 4-2). Dispersion modeling was selected to characterize peak 1-hour SO_2 concentrations in this area. Based on the DNR's technical review an unclassifiable/attainment recommendation for all of Pottawattamie County is appropriate.

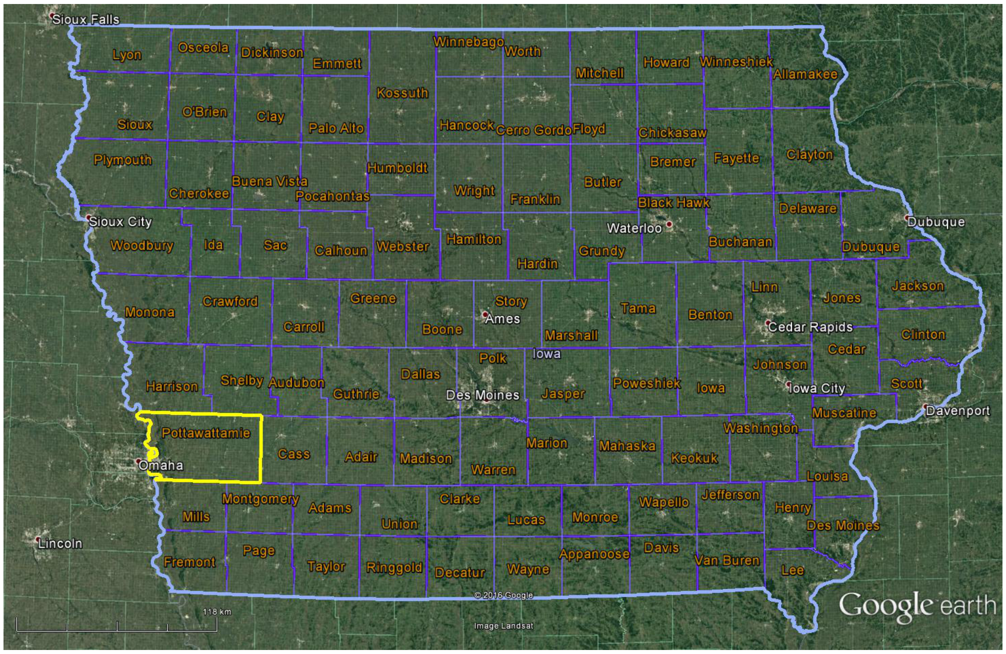

Figure 4-1. Location of Pottawattamie County, Iowa.

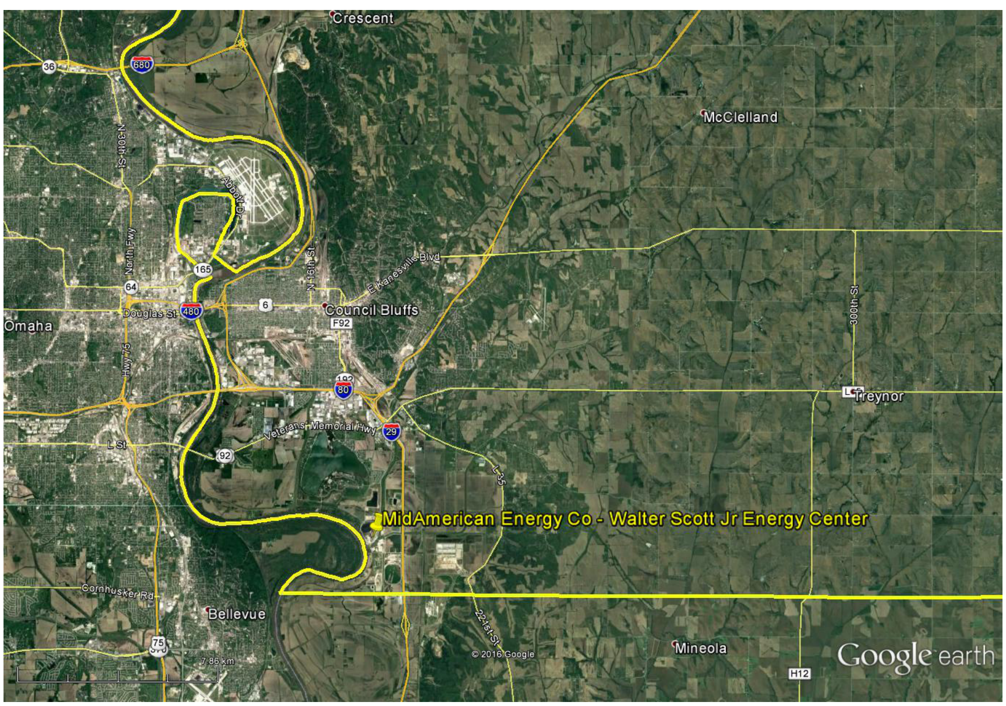

Figure 4-2. Location of MidAmerican's Walter Scott Jr Energy Center.

4.1. Source Characterization and Emission Rates

The pertinent SO_2 emission sources at Walter Scott are two coal-fired main boilers and an auxiliary boiler. Intermittent emissions of SO_2 from emergency generators were excluded from this modeling analysis pursuant to Section 5.5 of EPA's draft "*SO_2 NAAQS Designations Modeling Technical Assistance Document"* (TAD), dated August 2016.

The Unit 4 Auxiliary Boiler is considered a natural gas unit. The unit was modeled to represent normal operation with an emission rate that reflects potential SO_2 emissions while utilizing natural gas as a fuel. The Unit 3 Boiler (Model ID EP003) was modeled using actual hourly emission rates from 2012-2014. For the Unit 4 Boiler the current 30-day rolling permit limit and actual emissions data was used to develop an hourly emission rate per the approach outlined in the EPA *Guidance for 1-Hour SO_2 Nonattainment Area SIP* Submissions memorandum released on April 23, 2014, as follows:

1. Evaluate existing continuous emission monitoring data for the Unit 4 Boiler at Walter Scott to develop a ratio of 30-day rolling averages to hourly emissions. This ratio was developed as the 99th percentile of the five year dataset from 2010 to 2014.
2. The ratio was used to develop an hourly emission rate using the current 30-day rolling permit limit.
3. The 1-hr emission rate was used in the modeling analysis.

Step 1 above resulted in a ratio of 0.8436. This ratio was then applied to the current 30-day rolling average permit limit of 0.1 lb/MMBtu (and the unit's maximum rated capacity of 7,675 MMBtu/hr), resulting in the modeled 1-hr emission rate shown in Table 4-1. Table 4-2 summarizes the stack characteristics used in the 1-hr SO_2 modeling demonstration.

Table 4-1. Walter Scott Energy Center modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate (lb/hr)
EP003	Unit 3 Boiler	Variable Actual Hourly (CEMS)
EP141	Unit 4 Boiler	909.8 (PTE)
EP142	Auxiliary Boiler (NG)	0.21 (PTE)

Table 4-2. Walter Scott Energy Center point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
EP003	261898.2	4562476.9	294.72	167.64	7.62	355.4	Varies hourly
EP141	262145.9	4562589.8	294.70	167.95	7.53	347.0	24.92
EP142	262017.0	4562476.0	294.50	88.39	1.75	427.6	20.54

4.2. Nearby Sources of SO_2

The SO_2 emission levels from facilities within 10 km of Walter Scott, which includes a portion of Nebraska, were evaluated to determine if additional sources of SO_2 should be included in the modeling analysis. Table 4-3 summarizes all additional Iowa sources and their recent SO_2 emissions. The Nebraska Department of Environmental Quality (NDEQ) was contacted to retrieve an inventory of Nebraska sources within 10 km or more of Walter Scott and no additional facilities were identified by the NDEQ. All sources that contribute a significant portion of the total SO_2 emissions in the area are included in the modeling analysis. The total average emissions for the area are 18,502.6 tpy, of which Walter Scott is the primary contributor. All other sources combined only contribute 0.03%. Therefore, no additional Iowa sources were included in the modeling.

Table 4-3. Iowa Facilities within 10 km of Walter Scott Jr. Energy Center.

Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
Walter Scott Jr Energy Center	7215 Navajo St Council Bluffs, IA	28,146.8	13,593.3	13,749.3	18,496.5 (avg)
Griffin Pipe Products Inc	2601 9th Ave Council Bluffs, IA	5.35	2.59	0.27	2.74 (avg)
SIRE	10868 189th St Council Bluffs, IA	1.59	3.48	2.10	2.39 (avg)
Bunge North America Inc	19560 Bunge Ave Council Bluffs, IA	1.09	0.55	0.51	0.72 (avg)
Gable Corp	10420 Bunge Ave Council Bluffs, IA	N/A	N/A	0.01	0.01 (avg)
CHS McPherson Refinery Inc	825 Tank Farm Rd Council Bluffs, IA	0	0	0	0 (avg)
Tyson Fresh Meats	2700 23rd Ave Council Bluffs, IA				0.1
Mercy Hospital Infectious Waste Treatment Facility	800 Mercy Dr Council Bluffs, IA				0.08
Con Agra Foods	1023 S 4th St Council Bluffs, IA				0.03
Cargill	2401 S 37th St Council Bluffs, IA			0.01	0.01
Warren Distribution Inc	2850 River Rd Council Bluffs, IA				0.01
Barton Solvents Inc	2135 9th Ave Council Bluffs, IA			0	0
Jim Hawk Truck Trailers Inc	2918 S 9th St Council Bluffs, IA			0	0
Midwest Walnut Co	1914 Tostevin St Council Bluffs, IA			0	0
Western Engineering Co	330 29th Ave Council Bluffs, IA			0	0
Alter Metal Recycling	2603 9th Ave Council Bluffs, IA				0
Bartlett Grain Company – Ave L	1030 Ave L Council Bluffs, IA				0
Bartlett Grain Company	2600 S 4th St Council Bluffs, IA				0
Buckeye Terminals LLC	829 Tank Farm Rd Council Bluffs, IA				0
Bunge North America Inc – 3300 1st Ave	3300 1st Ave Council Bluffs, IA				0
Cohron Ready Mix LLC	10001 192nd St Council Bluffs, IA				0

Facility Name	Address	2012	2013	2014	Most Recent (or average)
Cresline Plastic Pipe Co.	2100 S 35th St Council Bluffs, IA				0
Future Foam Inc	400 N 10th St Council Bluffs, IA				0
GBW Railcar Services LLC	1101 S 21st St Council Bluffs, IA				0
Growmark Inc	2200 South Ave Council Bluffs, IA				0
Jennie Edminson Memorial Hospital	933 East Pierce St Council Bluffs, IA				0
Katelman Steel Fabrication	2030 2nd Ave Ste 1 Council Bluffs, IA				0
Omaha Standard Co	3501 S 11th St Council Bluffs, IA				0
Ready Mixed Concrete Company	1220 S 8th St Council Bluffs, IA				0
Reliance Battery Manufacturing Co	813 22nd Ave Council Bluffs, IA				0
Tetra LLC	1430 Veterans Memorial Hwy Council Bluffs, IA				0
Plumrose USA Inc	2650 23rd Ave Council Bluffs, IA				NA**
Century Link Communications	301 W 65th St Council Bluffs, IA				NA**
Rhoden Auto Center	3400 S Expressway St Council Bluffs, IA				NA**
Total Average Emissions		**18,502.6**			

* Major sources report emissions every year while minor sources report at most once every three years. If the latest available inventory for a minor source predates 2012 then the facility's emissions are listed only in the "Most Recent" column. The "Most Recent" column also includes the 3-year average emission rates for major sources.

**No emissions data found (but no SO_2 emissions are anticipated).

In addition, a search was performed for major sources of SO_2 within 10-20 km. One Iowa facility was identified in this area: Trajet Products Inc. However, this facility had no SO_2 emissions during the three-year period 2012-2014. As such, this facility was not added to the modeling analysis.

The NDEQ identified two sources of SO_2 within 10-20 km of Walter Scott (see Table 4-4). One of these, the Omaha Public Power District (OPPD) North Omaha facility, had SO_2 emissions large enough to warrant its inclusion in the modeling analysis. OPPD, a power plant, has shut down three of its coal boilers as of early 2016, but has two additional coal boilers that have been included at their actual CEMS hourly SO_2 emissions. A constant temperature and flow have been used for the units at OPPD. Emission rates and stack parameters for OPPD can be found in Appendix B.

Table 4-4. Nebraska Facilities within 20 km of Walter Scott Energy Center.

Facility Name (Distance to Walter Scott)	Address	SO_2 Emissions 2011 NEI (tpy)
OPPD North Omaha (19 km)	444 S 16th St Omaha, NE	14,070
Eppley Airfield (18 km)	4501 Abbott Dr. Omaha, NE	36

4.3. Dispersion Model

The EPA recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. The most current version (Version 15181) of AERMOD available at the time of the analysis was used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (Version 04274)
- AERMET (Version 14134)
- AERMAP (Version 11103)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD was run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- SO_2 pollutant keyword

4.4. Receptor Grid

Receptors were sited outside of the fence line boundary of Walter Scott in the following format.

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 10 km

Consistent with Section 4.2 of the TAD, receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Missouri River. Figure 4-3 shows the receptor grid for the modeling analysis, with OPPD located approximately 4.5 km north of the receptor grid.

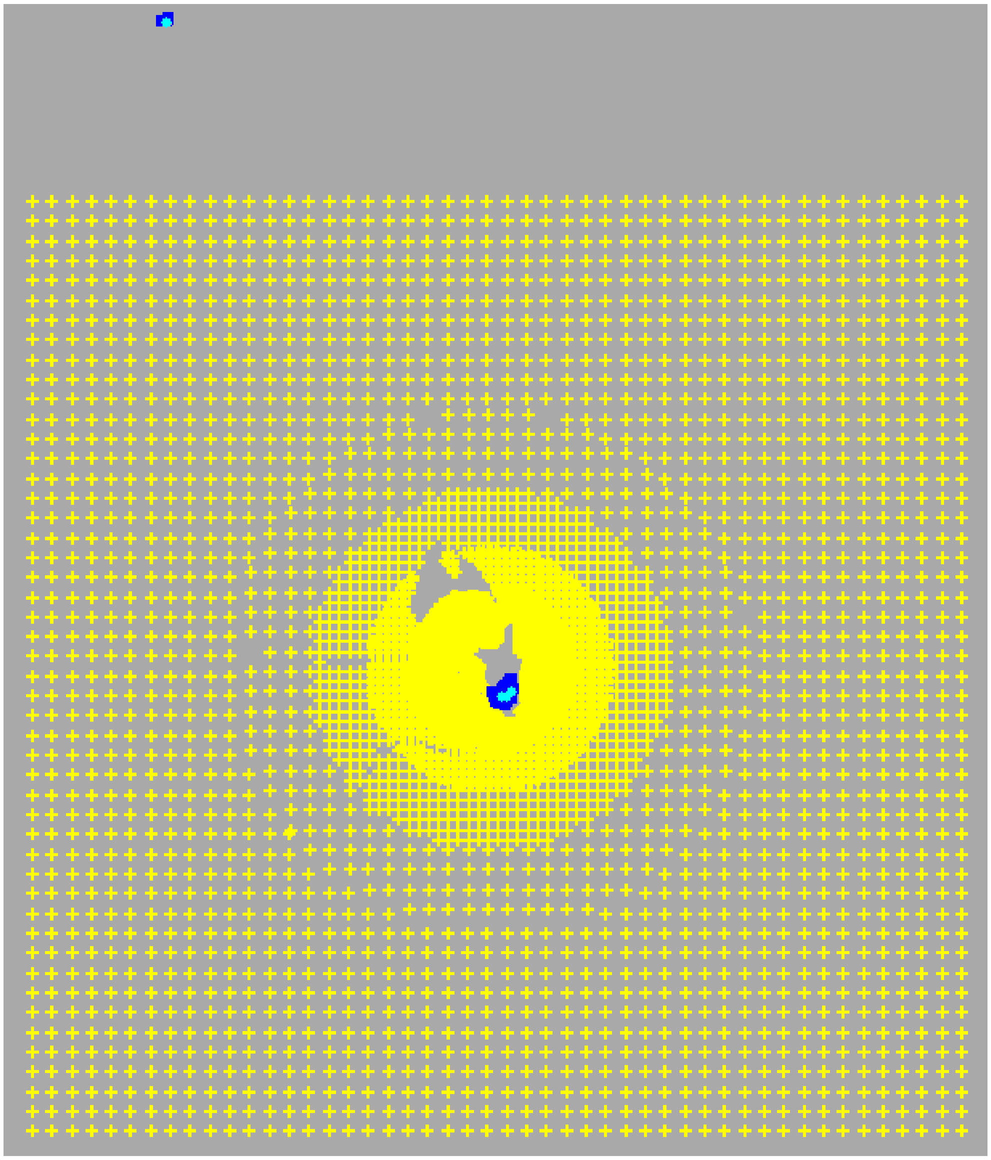

Figure 4-3. Dispersion modeling receptor grid surrounding Walter Scott.

Interpolated terrain elevations were input to the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Pottawattamie (IA) and Douglas (NE) Counties in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

4.5. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface and upper air data was collected from the Omaha (KOMA) NWS station for calendar years 2012 through 2014. Based on the results from a representivity study conducted by the DNR,[7] these meteorological data are considered representative of the conditions near Walter Scott. Figure 4-4 shows the 2012-2014 3-year wind rose for the KOMA station.

[7] The "*2010 - 2015 AERMOD Met Data Technical Support Document*" available at: http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/MeteorologicalData.aspx

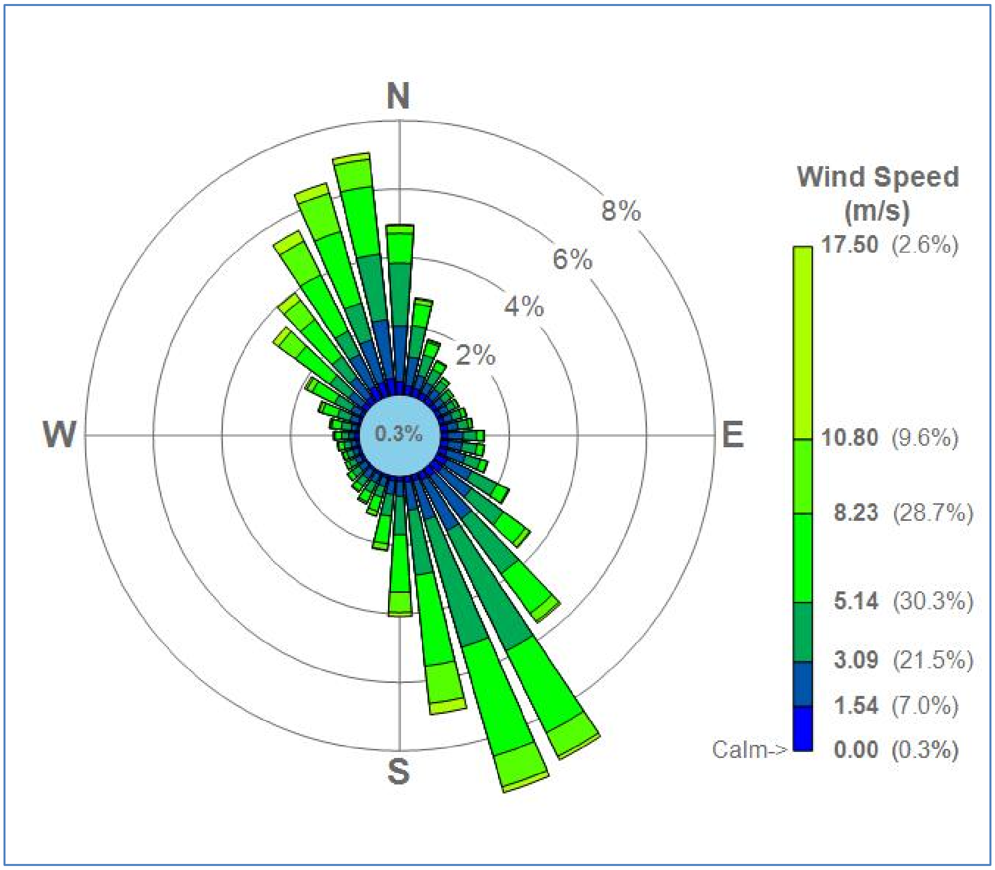

Figure 4-4. Omaha (KOMA) 3-year wind rose (2012-2014).

4.6. Background Concentration

A 1-hr SO_2 background concentration of 7 µg/m^3 was added to the model design value for comparison to the NAAQS. This background concentration was proposed in the submitted modeling protocol and subsequently approved by the DNR. It represents the 2012-2014 design concentration at the Lake Sugema monitor. The DNR has determined that this concentration is more representative of natural background levels in the absence of nearby SO_2 emissions. This is an appropriate background concentration to use because all significant nearby sources of SO_2 are included in the modeling analysis.

The model design value was used in conjunction with the background concentration for comparison to the NAAQS. For SO_2, consistent with EPA guidance, the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hr modeled concentration was added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hr concentration at each receptor using the SO_2 pollutant keyword.

4.7. Modeling Results

Following the AERMOD dispersion modeling approach described above, Table 4-5 summarizes the AERMOD output model design value, background concentration, and total concentration for comparison to the 1-hr SO_2 NAAQS.

Table 4-5. Model predicted concentration (µg/m³) for the Walter Scott analysis.

Scenario	Model Design Value	Background Concentration	Total Concentration	1-Hour SO_2 NAAQS	Above NAAQS?
ALL	127.0	7	134	196	No

4.8. Designation Recommendation

The modeling results predict that SO_2 emissions from MidAmerican Energy's Walter Scott Jr. Energy Center will not cause or contribute to a violation of the 1-hour SO_2 NAAQS. This analysis incorporates four of the five factors listed in EPA's March 20, 2015, designations guidance that states should consider when developing boundary designation recommendations. To address the remaining factor, jurisdictional boundaries, the State has selected the county boundary as providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Based on these considerations the State is recommending that Pottawattamie County be designated unclassifiable/attainment for the 1-hr SO_2 NAAQS.

5. Sources Limiting their Maximum Permitted Allowable Emissions

Three DRR sources in Iowa are subject to federally enforceable emission limits that restrict their potential SO_2 emissions to below 2,000 tpy. These sources are IPL - Lansing Generating Station in Allamakee County, IPL - M. L. Kapp Generating Station in Clinton County, and MidAmerican Energy Co. - Riverside Station in Scott County.

To comply with 40 CFR 51.1203(e) the DNR must submit documentation to EPA by January 13, 2017, showing that the necessary enforceable requirements have been adopted, are in effect, and have been made federally enforceable by January 13, 2017. In Iowa these requirements are addressed in one of two ways, either emission limits and operating conditions established in air construction permits issued pursuant to the State's SIP-approved preconstruction permitting program, or through restrictions established in a consent decree between the United States of America; the State of Iowa; Linn County, Iowa; the Sierra Club; and IPL. The details of each facility's applicable restrictions are discussed below. Since nearly all SO_2 emissions at each facility are attributable to coal combustion only the limitations on the coal-fired boilers are reviewed.

5.1. IPL - Lansing Generating Station (Allamakee County)

Unit 4 is the only remaining coal-fired boiler at IPL's Lansing Generating Station. Units 1, 2, and 3 are permanently shut down and their air construction permits have been rescinded.[8] A federally enforceable consent decree (No. C15-0061 EJM) entered on September 2, 2015, in the United States District Court for the Northern District of Iowa, Cedar Rapids Division, between the United States of America; the State of Iowa; Linn County, Iowa; the Sierra Club; and IPL requires that, commencing no later than 30 operating days after December 31, 2016, and continuing thereafter, Lansing Unit 4 must achieve and maintain a 30-day rolling average emission rate for SO_2 of no greater than 0.075 lb/MMBtu. Assuming continuous operation, the 0.075 lb/MMBtu emission limit, in combination with the unit's maximum rated capacity of 2,603 MMBtu/hr, will limit the facility's maximum permitted allowable SO_2 emissions to 855 tpy. The 0.075 lb/MMBTU SO_2 emission limit goes into effect on December 31, 2016 (with the first compliance date 30 days thereafter). At the request of the facility, through applications received on February 26, 2016, the DNR will include the 0.075 lb/MMBtu emission limit in a federally enforceable air construction permit.

There are no other SO_2 sources in Allamakee County subject to the DRR. The State is recommending that Allamakee County be designated unclassifiable/attainment.

5.2. IPL - M. L. Kapp Generating Station (Clinton County)

At IPL's M. L. Kapp Generating station all coal combustion activities have ceased. Unit 1 is permanently shut down and its air construction permit has been rescinded.[9] Unit 2 switched fuel from coal to natural gas ahead of the August 31, 2015, deadline established in the federally enforceable consent decree referenced above (No. C15-0061 EJM). Since Unit 2 must only burn natural gas and is prohibited by Condition 14.A in air construction permit 78-A-157-P9 from burning more than 10,746,943,000 cubic

[8] The air construction permit for Units 1 and 2 at IPL's Lansing Generating Station (permit number 74-A-097-S2) was rescinded on February 4, 2011. The air construction permit for Unit 3 (permit number 73-A-132-S5) was rescinded on July 3, 2013. Copies of the permit rescission letters are available upon request.

[9] The air construction permit for Unit 1 at IPL's M. L. Kapp Generating Station (permit number 74-A-177-S) was rescinded on February 4, 2011. A copy of the permit rescission letter is available upon request.

feet of natural gas per rolling 12-month period, this source has the potential to emit approximately 3 tpy of SO_2.

There are no other SO_2 sources in Clinton County subject to the DRR. The State is recommending that Clinton County be designated unclassifiable/attainment.

5.3. MidAmerican Energy - Riverside Station (Scott County)

Two of the three coal-fired boilers at MidAmerican Energy Co.'s - Riverside Station have permanently retired from service and no longer have air construction permits.[10] The remaining boiler, Unit 9, is restricted to burning only natural gas by a federally enforceable condition established in air construction permit 93-A-339-S2. This constraint, in combination with Unit 9 having a maximum rated capacity of 1,202 MMBtu/hr, limits potential SO_2 emissions from this source to approximately 3 tpy.

There are no other SO_2 sources in Scott County subject to the DRR. The State is recommending that Scott County be designated unclassifiable/attainment.

[10] The air construction permits for Units 7 and 8 (72-A-009-S1 and 72-A-010-S1, respectively) were rescinded on September 4, 2015. A copy of the rescission letter is available upon request.

6. Remaining Areas in Iowa

6.1. Woodbury County

On December 23, 2015 the DNR provided to EPA a modeling analysis[11] of SO_2 emissions from MidAmerican Energy Co.'s George Neal South and George Neal North generating stations. There is one coal-fired boiler at George Neal South (identified as Unit 4). At that time there were three coal-fired boilers at George Neal North (identified as Unit 1, Unit 2, and Unit 3). However, the DNR chose to model Units 1 and 2 as burning only natural gas because a consent agreement between MidAmerican and the Sierra Club required those units to cease utilization of coal as a fuel by April 16, 2016. On July 12, 2016 (81 FR 45039) EPA chose to designate Woodbury County as unclassifiable because the consent agreement between MidAmerican and the Sierra Club was not federally enforceable.

New information supports a designation of unclassifiable/attainment. The DNR rescinded the air construction permits for George Neal North Units 1 and 2, permit numbers 05-A-878-P1 and 07-A-951-P1, respectively, on September 9, 2016. With the rescission of those permits Units 1 and 2 are now prohibited from operating. Since the original modeling (which reflected Units 1 and 2 burning natural gas) predicted attainment with the NAAQS there is no need to update the analysis to reflect the removal of these two sources.

This supports the State's request to redesignate Woodbury County to unclassifiable/attainment.

6.2. Remainder of Muscatine County

In 2013 EPA designated a portion of Muscatine County as nonattainment for the 2010 1-hr SO_2 NAAQS. The nonattainment designation was published in the Federal Register on August 5, 2013, (78 FR 47191) with an effective date of October 4, 2013. The extent of the nonattainment area is defined in the Code of Federal Regulations (CFR) at 40 CFR 81.316 using the sections and townships listed in Table 6-1.

Table 6-1. Summary of the legal description of the 1-hr SO_2 nonattainment area in Muscatine County.

Sections 1-3, 10-15, 22-27, 34-36 of T77N, R3W (Lake Township)
Sections 1-3, 10-15, 22-27, 34-36 of T76N, R3W (Seventy-six Township)
T77N, R2W (Bloomington Township)
T76N, R2W (Fruitland Township)
All sections except 1, 12, 13, 24, 25, 36 of T77N, R1W (Sweetland Township)

The nonattainment area encompasses all relevant SO_2 sources and the locations of expected maximum 1-hour SO_2 concentrations in Muscatine County. On May 17, 2016, the DNR submitted to EPA the required attainment plan containing the control measures necessary to provide for attainment of the 2010 1-hr SO_2 NAAQS throughout the nonattainment area. Additionally, the analysis of Louisa Generating Station (LGS) discussed in Chapter 3 shows that LGS will not cause or contribute to a 1-hour SO_2 NAAQS violation in Muscatine County. Therefore, the remainder of Muscatine county is attaining the 1-hr SO_2 standard and the State is recommending that it be designated unclassifiable/attainment.

6.3. All Other Counties

There are no SO_2 sources subject to the DRR in any of the remaining counties in Iowa. The State is recommending that each remaining county in Iowa be designated unclassifiable/attainment.

[11] Iowa DNR, *2010 1-Hour Sulfur Dioxide Standard Designation Recommendations*, Technical Support Document, December 23, 2015

Appendix A. Cargill and Ingredion Source Data

Table A-1. Cargill and Ingredion modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
Cargill		
CEP1	Starch Flash Dryer #3	0.80 [A]
CEP32	Carbon Furnace	0.493 [A]
CEP40	Mill Aspiration System	0.07 [A]
CEP41	Steephouse Aspiration System	0.23 [A]
CEP61	Mod House Wet Scrubber	0.003 [A]
CEP70	Mod Scrubber	0.003 [A]
CEP71	Tank Aspiration	0.002 [A]
CEP90	Starch Flash Dryer #4	0.80 [A]
CEP100	Gas Boiler	0.13
CEP101	Gas Boiler	0.16
CEP109	Gluten Drum Filter	0.31
CEP116	Starch Spray Dryer	0.31 [A]
CEP161	Mod Tank Scrubber	0.001 [A]
CEP162	Flash Dryer	0.42
CEP247	Wetbran Conveyor	0.017 [A]
CEP248	Slurry Tank #6	0.366 [A]
CEP249	East Gluten Filter Vacuum Pump	0.002 [A]
CEP250	Middle Gluten Filter Vacuum Pump	0.005 [A]
CEP251	West Gluten Filter Vacuum Pump	0.005 [A]
CEP252	Slurry Tank #7	0.366 [A]
CEP254	Slurry Tank #5	0.366 [A]
CEP410	RTO	0.38 [A]
CEP450	Slurry Tank #8	0.044
CWETFEED	Wetfeed Fugitives	0.017 [A]
CSTPHSE	Steephouse Fugitives	0.12 [A]
Ingredion		
PEP015	Dryer #1	0 [A]
PEP023	#2 Starch Flash Dryer	0 [A]
PEP030	Starch Dryer #3 - North Stack	0 [A]
PEP042	Starch Dryer #3 - South Stack	0 [A]
PEP106	Main Fermentation Vent	0 [A]
PEP109	Distillation	0 [A]
PEP122	Vacuum Pump	0 [A]
PEP241	Steep & Surge Tanks	0.01 [A]
PEP251	Gluten Filters	0.001 [A]
PEP255	Gluten Meal Recycle System	0 [A]
PEP260	Germ Rotary Tube Dryer #6	2.6 [A]
PEP261	#4 Germ Rotary Tube Dryer	0 [A]
PEP262	#3 Germ Rotary Tube Dryer	0 [A]

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
PEP263	#2 Germ Rotary Tube Dryer	0 [A]
PEP264	#1 Germ Rotary Tube Dryer	0 [A]
PEP265	B & M Germ Fluidized Bed Predryer	3.98 [A]
PEP271	#6 Gluten Filter Vacuum Pump	0 [A]
PEP275	Gluten Meal Dryer	3.06 [A]
PEP279	Bldg 5 Process Tanks	0.024 [A]
PEP290	Starch Slurry Tanks - Bldg 8	0.006 [A]
PEP437	Vacuum Pump - Dryer #4	0 [A]
PEP458	Dryer #4	0 [A]
PEP477	Treating Tanks 19-39	0.0046 [A]
PEP478	Tanks - Bldg 77 & 96	0.0046 [A]
PEP481	Starch Treating Tanks - Bldg 68	0.0046 [A]
PEP521	Package Boiler #1	0.059 [A]
PEP522	Package Boiler #2	0.059 [A]
PEP524A	Boiler #3	0.02 [A]
PEP752	R&D Scrubber	0 [A]
PEP16E	HSW Railcar - BLDG 16	0.001 [A]
PEP03A	Steephouse Bldg Vent #1	0.04 [A]
PEP03B	Steephouse Bldg Vent #2	0.04 [A]
PEP03C	Steephouse Bldg Vent #3	0.04 [A]
5A_0001	Bldg 5 Vent	0.095
5A_0002	Bldg 5 Vent	0.095
4A_001	Bldg 4 Vent	0.19
16E_1A	Bldg 16 Wet Feed Area Loadout	0.008 [A]
16E_1B	Bldg 16 Wet Feed Area Loadout	0.008 [A]

* Modeled emission rates are the maximum permitted allowable emission rates unless otherwise noted.

[A] Reflects most current reported actual emission rate.

Table A-2. Cargill and Ingredion point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
Cargill							
CEP1	612322.9	4647237.5	219.46	18.29	1.19	314.3	29.40
CEP32	612241.2	4647270.7	219.46	31.70	0.46	379.8	10.39
CEP40	612232.4	4647334.2	220.25	11.89	0.94	307.6	VR
CEP41	612225.3	4647338.7	219.58	21.64	1.22	307.6	9.85
CEP61	612265.5	4647236.3	219.46	18.29	0.25	297.6	6.72
CEP70	612276.0	4647246.5	219.46	19.52	0.25	299.8	12.85
CEP71	612312.5	4647270.6	219.46	21.64	0.41	299.8	10.91
CEP90	612323.6	4647272.9	219.33	25.60	2.21	314.3	10.14
CEP100	612156.3	4647238.0	219.29	47.24	2.74	422.0	5.24
CEP101	612123.7	4647245.9	219.29	8.23	1.40	455.4	27.07
CEP109	612184.8	4647303.7	219.58	15.24	0.95	304.3	10.50

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
CEP116	612038.7	4647338.7	220.10	34.75	1.02	365.0	30.38
CEP161	611997.0	4647309.3	220.00	12.80	0.30	305.4	11.64
CEP162	611995.4	4647299.0	219.97	36.80	1.96	322.0	9.47
CEP247	612085.5	4647300.1	220.49	20.42	0.20	333.2	0.36
CEP248	612026.9	4647349.9	219.46	17.98	0.25	316.5	VR
CEP249	612191.6	4647290.6	219.58	10.97	0.23	302.6	1.91
CEP250	612189.0	4647291.1	219.58	10.97	0.25	302.6	3.76
CEP251	612187.0	4647291.5	219.58	10.97	0.25	302.6	4.36
CEP252	612012.6	4647366.5	219.46	17.37	0.25	322.0	VR
CEP254	612068.9	4647363.7	220.83	14.94	0.25	316.5	VR
CEP410	612230.2	4647276.6	219.94	35.97	1.73	408.2	9.67
CEP450	612026.9	4647321.5	219.46	35.05	0.25	322.0	14.33
Ingredion							
PEP015	610587.3	4647206	217.14	34.69	1.27	318.2	19.64
PEP023	610556.4	4647234	217.36	36.06	2.03	320.9	8.88
PEP030	610583.3	4647227	216.99	30.33	1.52	324.3	12.58
PEP042	610590.3	4647210	217.06	30.85	1.32	315.9	7.87
PEP106	610567.1	4647174	217.67	24.38	0.46	194.3	16.96
PEP109	610514.7	4647178	218.24	21.76	0.08	283.2	6.21
PEP122	610473.3	4647312	218.85	19.51	0.08	322.0	7.24
PEP241	610448.8	4647157	219.31	24.14	1.07	299.8	11.09
PEP251	610409.2	4647180	219.80	20.09	0.61	295.9	24.26
PEP255	610402	4647179	219.91	17.37	0.27	355.4	5.83
PEP260	610447	4647178	219.34	20.73	0.91	349.8	10.13
PEP261	610441	4647185	219.43	20.76	0.71	310.9	5.94
PEP262	610442	4647181	219.41	20.76	0.71	349.8	5.94
PEP263	610444	4647178	219.39	20.76	0.71	349.8	5.94
PEP264	610448	4647172	219.32	20.76	0.71	349.8	5.94
PEP265	610422	4647168	219.52	27.71	1.52	337.0	12.48
PEP271	610408	4647166	219.81	15.85	0.13	320.9	33.79
PEP275	610379	4647180	220.09	35.66	1.45	323.7	14.12
PEP279	610420.3	4647156	219.60	18.75	0.71	308.2	8.32
PEP290	610497.1	4646998	220.59	11.28	0.46	310.9	VR
PEP437	610552.3	4646997	219.21	22.25	0.22	320.9	7.73
PEP458	610574.8	4647021	218.61	39.20	1.83	322.0	8.88
PEP477	610554.5	4647020	218.85	22.98	0.36	310.9	16.63
PEP478	610612.5	4647039	219.10	11.89	0.41	310.9	7.25
PEP481	610527.8	4647007	219.34	21.64	0.51	310.9	4.66
PEP521	610497.3	4647347	218.60	42.37	1.37	422.0	9.71
PEP522	610486.3	4647341	218.94	42.37	1.37	422.0	9.71
PEP524A	610501.7	4647328	218.05	6.10	1.82	572.0	6.53
PEP752	610270	4647132	221.75	9.14	0.20	294.3	11.64
PEP16E	610468.2	4647250.8	218.85	4.57	0.61	349.8	VR

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
PEP03A	610438.5	4647121.7	219.89	26.52	0.46	305.4	8.62
PEP03B	610445.2	4647108.7	219.84	26.52	0.46	305.4	8.62
PEP03C	610437.2	4647112.7	219.77	22.86	0.89	305.4	VR

Table A-3. Cargill and Ingredion volume source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Release Height (m)	Initial Lateral Dimension* (m)	Initial Vertical Dimension* (m)
Cargill						
CWETFEED	612074.3	4647323.1	220.51	10.59	5.50	9.85
CSTPHSE	612190.7	4647342.0	221.02	8.56	13.48	7.97
Ingredion						
5A_0001	610395.1	4647162.2	220.08	7.54	6.94	7.02
5A_0002	610406.7	4647168.0	219.84	7.54	6.94	7.02
4A_001	610437	4647157	219.44	5.56	6.61	6.10
16E_1A	610502.4	4647239.7	218.39	5.33	5.43	4.96
16E_1B	610498.4	4647248.1	218.41	5.33	5.43	4.96

*Dimensions based on building where located unless otherwise specified.

Appendix B. OPPD North Omaha Source Data

Table B-1. OPPD North Omaha modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate (lb/hr)
OPPDB	Boiler #4	Variable Actual Hourly (CEMS)
OPPDC	Boiler #5	Variable Actual Hourly (CEMS)

Table B-2. OPPD North Omaha point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
OPPDB	253421.4	4579505.2	303.58	62.18	2.93	422.0	36.88
OPPDC	253401.9	4579524.4	303.58	62.18	3.51	422.0	36.58