Technical Support Document (TSD)
Iowa
Area Designations For
the
2010 SO_2 Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must designate areas as either "nonattainment," "attainment," or "unclassifiable" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to poor air quality in a nearby area that does not meet the NAAQS. Table 1 below identifies the counties or portions of counties in Iowa that EPA is initially designating "nonattainment" based on monitored violations. EPA is not yet prepared to designate other areas in Iowa, and will address those other areas and their sources in a future final designations action.

Table 1. Nonattainment Area Designations for Iowa

County Name	Iowa Recommended Designation of Areas/Counties	EPA's Designation of Areas/Counties
Muscatine	Unclassifiable	Nonattainment

Background

On June 2, 2010, EPA revised the primary SO_2 NAAQS (75 FR 35520, June 22, 2010) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb), which is met at an ambient air quality monitoring site when the 3-year average of the annual (99^{th} percentile) of the daily maximum 1-hour average concentrations do not exceed 75 ppb, as determined in accordance with Appendix T of 40 CFR part 50. 40 CFR 50.17(a)-(b). EPA has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO_2. The Agency is revoking the two prior primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year because the standards will not add additional public health protection given a 1-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two prior primary standards. Similarly, the secondary standard for SO_2 has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

EPA's SO_2 Designation Approach

Section 107(d) of the CAA provides that not later than 1 year after promulgation of a new or revised NAAQS, state Governors may submit their recommendations for designations and boundaries to EPA. This deadline was in June, 2011. Section 107(d) also requires EPA to provide a notification to states of no less than 120-days prior to promulgating an initial area designation that is a modification of a state's recommendation. EPA has reviewed the State's recommendations and has notified the State Commissioner through a letter signed by the Regional Administrator of any intended modifications. If a state does not submit designation recommendations, EPA will promulgate the designations that it

deems appropriate. If a state disagrees with EPA's intended area designations, it has an opportunity to demonstrate why any proposed modification is inappropriate.

Designations guidance was issued by EPA through a March 24, 2011, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum identifies factors EPA intends to evaluate in determining boundaries for areas designated nonattainment. These 5 factors include: 1) air quality data; 2) emissions and emissions-related data (location of sources and potential contribution to ambient SO_2 concentrations); 3) meteorology (weather/transport patterns); 4) geography/topography (mountain ranges or other air basin boundaries); and 5) jurisdictional boundaries (e.g., counties, air districts, pre-existing nonattainment areas, reservations, metropolitan planning organization), among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO_2 NAAQS.

The March 24, 2011, memo recommended that area boundaries be defaulted to the county boundary unless additional provided information justifies a larger or smaller boundary than that of the county. EPA believes it is appropriate to evaluate each potential area on a case-by-case basis, and to recognize that area-specific analyses conducted by states and/or EPA may support a different boundary than a default county boundary.

In this TSD, EPA discusses its review and technical analysis of the recommendations submitted by the State of Iowa for designations of the 1-hour SO_2 standard and any modifications from these recommendations.

Definition of important terms used in this document:

1) **Designated "nonattainment" area –** an area which EPA has determined, based on a state recommendation and/or on the technical analysis included in this document, has violated the 2010 SO_2
NAAQS, based on the most recent three years of air quality monitoring data, or contributes to a violation in a nearby area.

2) **Recommended nonattainment area –** an area that a state or tribal government has recommended to EPA to be designated as nonattainment.

3) **Violating monitor –** an ambient air monitor meeting all methods, quality assurance and citing criteria and requirements whose valid design value exceeds 75 ppb, as described in Appendix T of 40 CFR part
50.

4) **2010 SO_2 NAAQS -** 75 ppb, national ambient air quality standard for SO_2 promulgated in 2010. Based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations

5) **Design Value** – a statistic that describes the air quality status of a given area relative to the level of the NAAQS.

Nonattainment Designations

Introduction

In Iowa's designation recommendation letter to EPA, dated June 2, 2011, Terry E. Branstad, Governor of Iowa, recommended that 5 counties be designated as attainment for the 2010 SO_2 NAAQS based on monitored air quality data from 2008-2010, with all other counties designated as unclassifiable.

Based on EPA's technical analysis, EPA notified the Governor of Iowa (in the 120 day letter) of its intention to designate the entire county of Muscatine, Iowa as nonattainment (Table 1). In response to EPA's 120-day letter explaining our intention of designating Muscatine County, Iowa as nonattainment, the Iowa Department of Natural Resources (IDNR) prepared and submitted a technical analysis rebutting our presumptive county-wide nonattainment boundary. This technical analysis examined several factors, including monitoring data, meteorological data, proximity and magnitude of emissions. As a component of the technical analysis, IDNR provided a windrose analysis of exceedance days that included the violating monitor at Musser Park and 2 additional SO_2 monitors in the area. This windrose analysis identifies several SO_2 sources in Muscatine County that contribute to the violating monitor at Musser Park. In addition to the daily windrose analysis, IDNR submitted hourly monitoring and wind direction information identifying the predominant SO_2 source(s) causing the violation at the Musser Park monitor and locating them to the south, within a revised nonattainment boundary IDNR proposed that EPA adopt. Finally, although EPA is not relying upon it at this time, IDNR provided dispersion modeling that it believes would help inform the extent of the nonattainment boundary and included all major sources surrounding the Musser Park monitor along with a conservative background value. Upon reviewing the analysis provided by IDNR, EPA finds that a smaller than county-wide boundary is appropriate and that the boundary recommended by IDNR includes those sources that are appropriate to initially identify as contributing to the violation observed at the monitor. Therefore, EPA is finalizing the nonattainment boundary for Muscatine, Iowa proposed by IDNR. This boundary is based on violations observed at the Musser Park monitor and a design value established over the years 2009 and 2011. EPA is not yet reaching a conclusion concerning areas, and their sources, that are outside of the finalized nonattainment boundary, and will address these areas in a future final designations action.

Upon receipt of IDNRs recommendation and technical analysis supporting a smaller nonattainment boundary than proposed by EPA in our 120-day letter, we analyzed IDNR's submission and integrated its analysis, apart from IDNRs dispersion modeling, into the five factor analysis we prepared for Muscatine County in our 120-day letter. The five factor analysis prepared for the 120-day letter included a review of:

1. Air Quality Data
2. Emissions and Emissions Related Data
3. Meteorology
4. Geography and Topology
5. Jurisdictional Boundaries

This technical support document also includes an additional review of other relevant information supplied by the IDNR in its submission that contribute to the five factors analysis found in a later section.

Nonattainment Designations
Technical analysis for Muscatine County, Iowa

Introduction

This technical analysis for Muscatine County, Iowa identifies a portion of the county with a monitor (AQS ID 191390020) that violates the 2010 SO_2 NAAQS based on 2009-2011 data, and evaluates nearby counties for contributions to SO_2 concentrations in the area. EPA has evaluated this county and nearby counties based on the weight of evidence of the factors recommended in the March 24, 2011, EPA guidance.

Figure 1 is a map of the area in Iowa that EPA is initially designating nonattainment for the 2010 1- hr SO_2 NAAQS, including source information and the location of the monitor violating the standard.

Figure 1. Muscatine County, IA Nonattainment Boundary

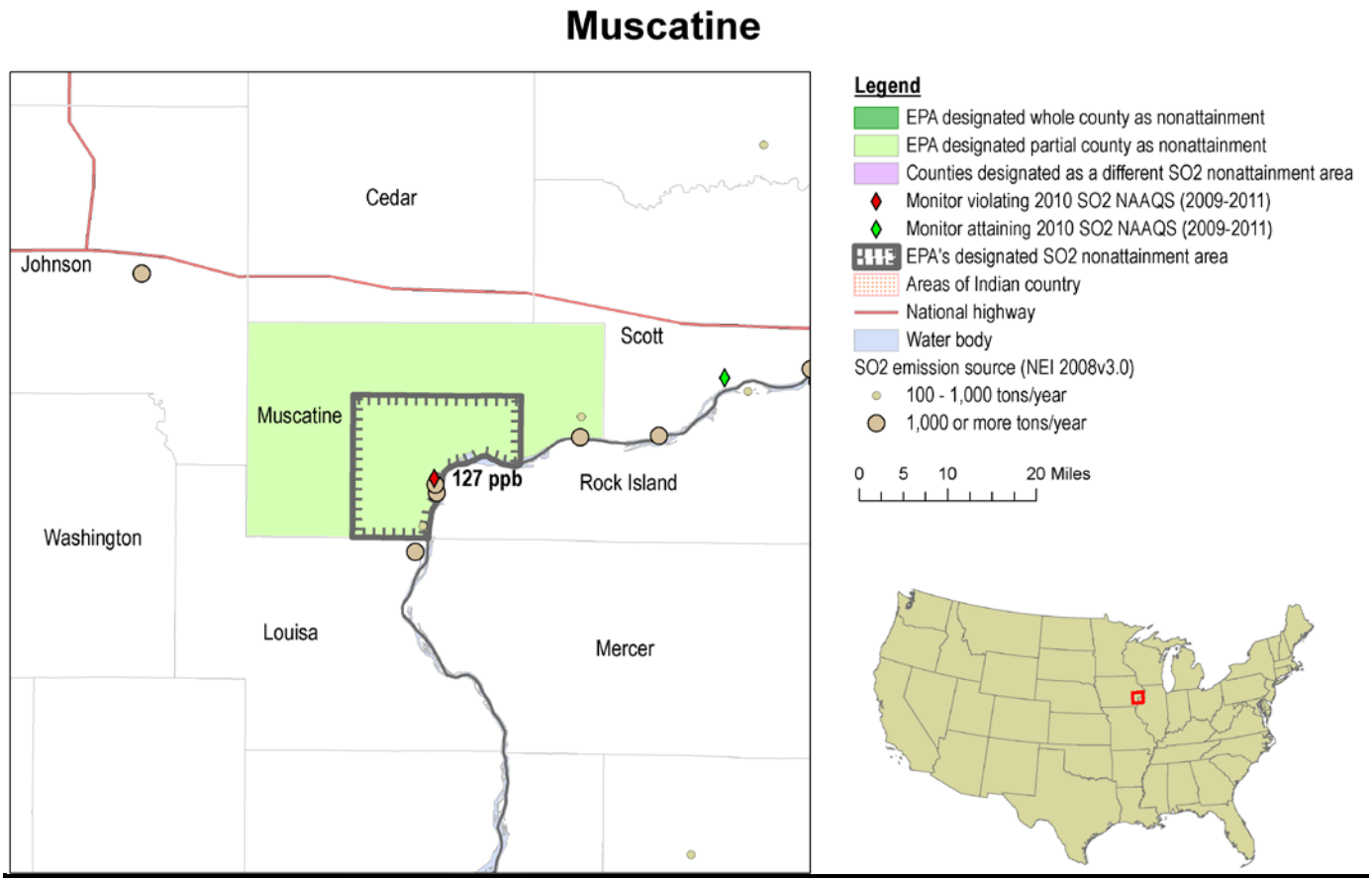
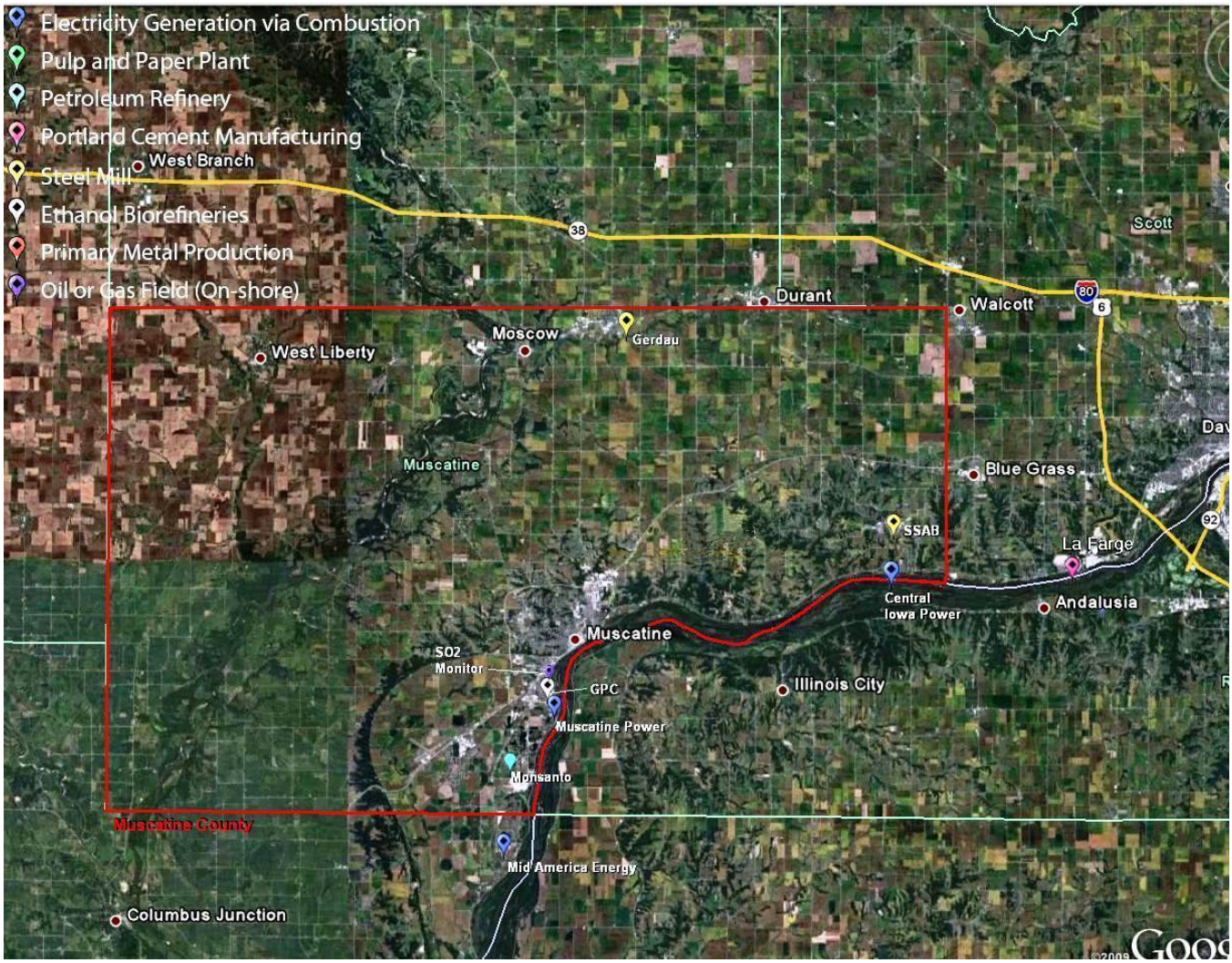


Figure 2 is a map of the area analyzed showing the location of the air quality monitors in the area, the Muscatine County line in red, and significant sources of SO_2 in the greater Muscatine Co. area.

Figure 2: Muscatine County Showing SO_2 Monitor and Sources of SO_2



On June 2, 2011, Governor of Iowa, Terry E. Branstad, recommended that 5 counties in Iowa with SO_2 monitors reporting ambient concentrations below the 75ppb standard be designated attainment and all other areas of the state be designated unclassifiable for the 2010 SO_2 NAAQS based on monitored air quality data from 2008-2010. At that time, the State provided no further information or analysis supporting its attainment recommendations other than the monitored values for the years 2008 through 2010.

On February 6, 2013, EPA sent a letter to the Governor of Iowa notifying the State of our intention of designating all of Muscatine County, Iowa as the presumptive nonattainment boundary, and initiating the required 120-day minimum period for state review prior to EPA issuing a final designation. EPA's proposal was based upon available monitoring data for the 3-year period of the monitor's operation spanning years 2009 through 2011 indicating a violation at the Musser Park monitor, and the application of 40 CFR Part 50 Appendix T 3(d) to replace missing data during this 3-year period and allow for the calculation of a valid design value.

A monitor's design value indicates whether that monitor attains a specified air quality standard. The 2010 SO_2 NAAQS is met at a monitoring site when the identified design value is valid and less than or equal to 75 ppb as described in Appendix T of 40 CFR Part 50. However, even though the monitor was in place and operating for over the minimum necessary 3-year period, data from the Musser Park monitor in Muscatine, Iowa could not be validated using the standard procedure found in Appendix T because a substantial amount of data had been flagged from the years 2008, 2009 and 2010.

The data was flagged as a result of a malfunction of the internal calibration system of the monitor. The malfunction wasn't detected immediately, and the monitor continued to collect data for over a year. The malfunction was discovered following performance of a reference procedure on the monitor's SO_2 calibration system. Following the reference procedure a reference audit was completed which informed IDNR and EPA that the monitor had been operating out of specification. Following the audit, EPA and IDNR reviewed the results and jointly agreed to: 1) adjust the original recorded values to account for the calibration error; 2) certify the adjusted values into the Air Quality System (AQS) database; and, 3) flag the adjusted data in the AQS database so it could not be used for regulatory purposes.

Due to the large amount of flagged data, the Musser Park monitor no longer met the minimum data completeness criteria for the 3-year period of time which we are using to evaluate compliance with the NAAQS, even though the monitor had been in place and operating for well over the minimum necessary 3 years. The completeness criteria specified in Appendix T of 40 CFR Part 50 require 3 years of complete data to establish a design value. A year is complete when all 4 quarters are complete. A quarter is complete when 75% of the days are complete. A day is complete when it has 75% of its hours. Although Appendix T of 40 CFR Part 50 includes data substitution provisions, due to the large amount of missing data from the Musser Park monitor, the data substitution provisions were not applicable. However, 40 CFR Part 50 Appendix T 3(d) allows the Administrator of EPA to consider other factors, such as consistency and levels of the valid concentration measurements that are available for the purpose of establishing a design value covering a monitor's 3 years of operation.

The Appendix T 3(d) provision was applied in the Musser Park situation because the valid data recorded from the monitor for the number of years preceding and following the malfunction included sufficient high hourly measurements to demonstrate that the ambient SO_2 concentration in Muscatine, Iowa was significantly above the 2010 SO_2 1-hr primary NAAQS. In fact, in evaluating whether to apply the

Appendix T 3(d) provision to the Musser Park data, EPA Region 7 took the most conservative approach possible and assumed that all the data that was flagged between the dates of August 30, 2008 to September 20, 2010 was zero (i.e., the monitor reported a zero daily concentration of SO_2 in the ambient air for the period of malfunction). This approach resulted in a design value 127 ppb (when calculated for the three year period of the monitor's operation beginning on January 1, 2009 and ending on December 31, 2011), which exceeds the NAAQS by 150%, and demonstrates that the monitor is for that 3-year period recording a violation of the 1-hr standard.

In response to our proposed designation, IDNR prepared comments to our proposal recommending that EPA finalize a revised boundary that did not include the entire county. In this analysis, the state reviewed the impact at the monitor of sources emitting SO_2 in and around all of Muscatine County, and found that establishing a nonattainment boundary for the entire county was not warranted. IDNR has instead recommended that the EPA finalize a boundary that is approximately 1/3 the size of our proposed boundary. In this TSD, EPA discusses its review and technical analysis of the recommendations submitted by the State of Iowa for designations of the 1-hour SO_2 standard and any modifications from these recommendations.

Detailed Assessment

Air Quality Data

We reviewed SO_2 air quality monitoring data from EPA's Air Trends website (see http://www.epa.gov/airtrends/values.html), including the design value calculated for the monitor in Muscatine County, Iowa for the years 2009 - 2011. This factor considers the SO_2 air quality monitoring data (found in EPA's Air Trends website at http://www.epa.gov/airtrends/values.html), including the design values (in ppb) calculated for all air quality monitors in Muscatine County and the surrounding area based on data for the 2009-2011 period.

EPA's final nonattainment boundary for Muscatine County, Iowa is based on data from (a) Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitor(s) located in the state.

The 2011 SO_2 NAAQS design values for all counties (containing a monitor) in the State of Iowa and surrounding area are shown in Table 2.

Table 2. Air Quality Data for All Monitors in the State of Iowa

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO_2 Design Value, 2009-2011 (ppb)
Muscatine	**No**	**Musser Park**	**191390020**	**Muscatine, IA**	**127***
Clinton	No	Chancy Park	190450019	Clinton	21
Linn	No	500 11TH	191130040	Cedar Rapids	28
Polk	No	Public Health Building	191530030	Des Moines	3
Scott	No	Jefferson School	191630015	Davenport	13
Van Buren	No	Lake Sugema	191770006	Keosuaqua	5

* The DV is based on an application of the 40 CFR Part 50 Appendix T 3(d) providing authority for the Administrator to approve the use of an incomplete data set to establish a valid DV.

The Musser Park monitor in Muscatine, Iowa shows a violation of the 2010 SO_2 NAAQS. Due to the violating monitor, EPA must determine an appropriate boundary for the area surrounding the monitor to be designated nonattainment, otherwise by default EPA identifies the entire county as the area of nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for inclusion in a nonattainment area as well. Each area has been evaluated based on the weight of evidence of the five factors and other relevant information.

Emissions and Emissions-Related Data

Evidence of SO_2 emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emissions data for SO_2 and any significant change in SO_2 emitting activities since the date represented by those emissions data.

Emissions

EPA relied on verified emissions data currently available in the 2008 National Emissions Inventory (NEI) emissions database (NEI2008V3.0). Generally, the point source inventory found in the database represents the bulk of the SO_2 emissions in Region 7.

Table 3 shows total emissions of SO_2 (given in tons per year) for violating and potentially contributing counties in and around Muscatine County, including sources emitting greater than 100 tons per year of SO_2 according to the 2008 NEI. The two Iowa counties adjacent to Muscatine County with sources within 50 kilometers and emitting greater than 100 tons per year are found in Louisa County, Iowa, and Scott County, IA. The source in Louisa County is an electric generating unit owned and operated by MidAmerican Energy (the Louisa Power Station). The other source of SO_2 (2,488 tons per year-not listed in the table 3 below) located outside of Muscatine County is Lafarge North America Cement Kiln in Buffalo, Iowa (Scott County), approximately 31.5 kilometers East-Northeast of the violating monitor. At the time of proposal, EPA was uncertain over the contribution or direct impact specific sources had on the violating monitor; however, windrose analysis (discussed in more detail later) provided by IDNR supports that emissions from Grain Processing Corporation (GPC), Muscatine Power and Water (MPW), and Monsanto Company are contributing to the violations recorded by the monitor.

Table 3. Annual SO_2 Emissions 2008

County	Facility >80 tpy (EIS or State Facility ID)	Facility Emissions (tpy)	Total County SO_2 Emissions (tons per year)
Muscatine	Grain Processing Corporation	14, 979	
	Central Iowa Power – Fair Station	7,068	
	Muscatine Power and Water	3160	
	Monsanto Company	520	
	SSAB Iowa Inc	374	
	Gerdau Ameristeel US	80	**26,479**
Louisa	MidAmerican – Louisa Station	2,453	**2,453**
Scott	La Farge North American	2,488	**2,488**
		Area Total	**31,420**

Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 3 represent emissions levels taking into account any control strategies implemented on stationary sources in Muscatine County and surrounding areas up to and including the year 2008. EPA has not received any additional information on emissions reductions resulting from federally enforceable controls put into place after 2008. Emission control information for the sources identified in Table 3 is summarized below.

Grain Processing Corporation (GPC)

GPC processes grain for the production of food and liquor grade ethanol, as well as a variety of grain based food products and animal feeds. GPC is located 1.2 kilometers South-Southeast of the violating monitor. As part of the grain conversion and production process GPC operates a variety of boilers for heating and power production. GPC's main source of SO_2 emissions is emission point #1 (EP-1) which includes boilers 1, 2, 3, 4, 6 and 7. The boilers range in heat input capacity from 105 – 230 MMBtu/hr. The boilers are capable of burning coal and natural gas. EP-1 is limited to 3915 lbs of SO_2/hr (averaged over a 24-hour period) and 6 lb/MMBtu. EP-1 is not equipped with any SO_2 control system. EP-1 is equipped with an SO_2 continuous emission monitor (CEM). GPC operates four germ dryers. The germ dryers have the following SO_2 emission limits: 13.73 lb/hr (EP-15), 9.20 lb/hr (EP-97), 0.53 lb/hr (EP-126) and 500 ppm (EP-178). The germ dryers are not equipped with any SO_2 control systems. EP-600 is capable of burning biogas and natural gas. EP-600 is limited to 4.86 lb SO_2/hr. EP-600 is equipped with a wet gas scrubber. GPC operates gluten flash dryer #4 (EP-173) which is capable of burning biogas. EP-173 has a heat input capacity of 29 MMBtu/hr. EP-173 is limited to no more than 4.5 lb SO_2/hr. The dryer is equipped with a wet scrubber that is expected to achieve a 91.2% control efficiency while burning biogas. GPC operates four natural gas-fired "Power House Boilers" (EP-103, 104, 142
and 153) with heat input capacities that range from 120 – 124 MMBtu/hr. These boilers burn natural gas only and have an emission limit of 500 ppm. These units are not equipped with any SO_2 control system. GPC operates an additional "Power House Boiler" (EP-177) with a heat input capacity of 360 MMBtu/hr. This unit is limited to 500 ppm and 0.23 lb SO_2/hr. This unit is also not equipped with any SO_2 control system. GPC operates several small natural-gas fired emission units including dryers. These units are limited to 500 ppm SO_2 and are not equipped with any SO_2 control system.

In response to EPA's 120-day letter and technical support document, IDNR notified EPA of the following

changes that have occurred at the GPC facility. The following sources were removed: EP-103.0, EP-104.0, EP-542.0, and EP-543.0. The stack height for EP195.0 was increased to 66.5 feet. Two new sources were added (EP-546.0 and EP-548.0). And, the emissions from EP-551.0 were changed from internally-venting to a point source.

Central Iowa Power Coop – Fair Station (CIPCO)

Central Iowa Power Coop (Fair Station) is an electric generating facility that is located 25.4 kilometers East-Northeast of the violating monitor. CIPCO's main SO_2 emission sources are EP-1 and EP-2. EP-1 is a 280 MMBtu/hr boiler that is capable of burning coal and natural gas. EP-1 is limited to 6 lb SO_2/MMBtu. EP-1 is not equipped with any SO_2 control system. EP-1 is not equipped with a SO_2 CEM. EP-2 is a 477 MMBtu/hr boiler that is capable of burning coal and natural gas. EP-2 is limited to 6 lb SO_2/MMBtu. EP-2 is not equipped with any SO_2 control system. EP-2 is equipped with a SO_2 CEM. CIPC also operates a small natural gas/diesel boiler and two small emergency generators.

In response to EPA's 120-day letter and technical support document, IDNR notified EPA that CIPCO is currently scheduled to cease operation in September of 2013. However, because EPA is not aware of an enforceable agreement that requires CIPCO to cease operation, CIPCO must be included in any analysis regarding its impact on the area exceeding the SO_2 NAAQS.

Muscatine Power & Water (MPW)

MPW is a nonprofit public utility offering electric, water, and communications services to the greater Muscatine municipal area located 1.9 km South-Southeast of the violating monitor. MPW's main SO_2 emission sources are electric generating units designated EP-70, EP-80 and EP-90. EP-70 is a 289 MMBtu/hr boiler that is capable of burning coal and natural gas. EP-70 is limited to 6 lb SO_2/MMBtu. EP-70 and EP-80 are also limited to a combined 2,772 lb SO_2/hr (averaged over a 24-hour calendar day) and 12,141 tons SO_2/yr. EP-70 is not equipped with any SO_2 control system. EP-70 is equipped with a SO_2 CEM. EP-80 is a 890 MMBtu/hr boiler that is capable of burning coal, natural gas, waste solvent (limited), diesel oil (limited) and waste oil (limited). EP-80 is limited to 6 lb SO_2/MMBtu. EP-70 and EP-80 are also limited to a combined 2,772 lb SO_2/hr (averaged over a 24-hour calendar day) and 12,141 tons SO_2/yr. EP-80 is not equipped with any SO_2 control system. EP-80 is equipped with a SO_2 CEM. EP-90 is a 1,556 MMBtu/hr boiler that is capable of burning coal and natural gas. EP-90 is limited to 0.56 lb SO_2/MMBtu (averaged over a 24-hr calendar day) and 0.45 lb SO_2/MMBtu (averaged over a 30-day period). EP-90 is also subject to a 92% reduction in SO_2 from the flue gas desulfurization system (scrubbers CE-93 and CE-94). EP-90 is also subject to NSPS subpart Da emission limits. As mentioned, EP-90 is equipped with two scrubbers (CE-93 and CE-94) that control SO_2 emissions. EP-90 is equipped with a SO_2 CEM. MPW also operates several small diesel and gasoline-powered emission units.

La Farge – North American

Lafarge's cement manufacturing plant located in Buffalo, Iowa main source of SO_2 emissions is the preheater/precalciner/kiln/raw mill system (EP-0466-0) located approximately 31 kilometers East-Northeast of the violating monitor in Muscatine, Iowa The cement processing plant has a capacity of 145.3 tons clinker per hour. EP-0466-0 is limited to 4,850 tons SO_2/yr and 2,900 lb SO_2/hr. EP-0466-0 is equipped with a dry

absorbent addition system. EP-0466-0 is also equipped with an SO_2 continuous emission monitor. Lafarge can burn a range of approved materials in the kiln.

Lafarge also has a couple of small fossil-fired emission units including a diesel-fired emergency generator and a diesel-fired water pump that are limited to 2.5 lb SO_2/MMBtu limit and are not equipped

with any SO_2 controls.

Due to EPA not including any portion of Fort Scott County, Iowa in the nonattainment area we proposed in our 120-day letter, the Lafarge facility was not included in the analysis submitted by IDNR in response to EPA's proposal. We note that the Lafarge facility is east of the violating monitor, and that IDNR's windrose analysis does not indicate that sources east of the monitor are contributing violation at the Musser Park monitor. Based on this, we are not yet prepared to conclude that the emissions from the Lafarge facility contribute to the monitored violation or to other possible violations. In a subsequent round of designations we will make final designations decisions for areas (and their sources), like Fort Scott County, that are not currently included in the nonattainment area designation addressed in this TSD.

MidAmerican Energy Company – Louisa Generating Station (MidAmerican or LGS)

MidAmerican Energy Company is a for-profit power production company that operates an electric generating facility in Louisa County, Iowa 13.9 kilometers South-Southwest of the violating monitor located in Muscatine County, Iowa. The Louisa Generating Station is just south of the Muscatine county line with a portion of its property lying across the county line. MidAmerican's main SO_2 emission source is EP-1 (Utility Boiler). MidAmerican also operates two auxiliary boilers (EP-2 and EP-3) and two emergency generators (EP-4 and EP-5).

EP-1 is a 8,624 MMBtu/hr boiler that is capable of burning coal, #2 fuel oil and natural gas. EP-1 is limited to 0.96 lb SO_2/MMBtu (BACT) (averaged over a 30-day period), 1.20 lb SO_2/MMBtu (NSPS D) while burning solid fossil fuel, and 0.80 lb SO_2/MMBtu (NSPS D) while burning liquid fossil fuel. EP-1 is also limited to 3,450 lb SO_2/hr (averaged over a 30-day period). The sulfur content of any coal is limited to 2.0 lb/MMBtu or less. EP-1 is equipped with a lime spray dryer flue gas desulfurization system (scrubber). EP-1 is equipped with a SO_2 CEM. EP-2 and EP-3 are 98 MMBtu/hr boilers that are capable of burning natural gas and #2 fuel oil. EP-2 and EP-3 are limited to 98.3 lb SO_2/hr each. The sulfur content of the fuel oil is limited to 0.5% by weight. EP-2 and EP-3 are not equipped with any SO_2 control system. EP-2 and EP-3 are not equipped with an SO_2 CEM. EP-4 and EP-5 are 16 MMBtu/hr emergency generators that are capable of #2 fuel oil only. EP-4 and EP-5 are limited to 8.4 lb SO_2/hr each. The sulfur content of the fuel oil is limited to 0.5% by weight. EP-4 and EP-5 are not equipped with any SO_2 control system. EP-4 and EP-5 are not equipped with an SO_2 CEM.

EPA's proposed default nonattainment boundary did not include the LGS facility in neighboring Louisa County, however IDNR's analysis included an evaluation of the LGS facility for its contribution at the violating monitor. The LGS facility is located south of the violating monitor, which is the general direction of the sources implicated by IDNR's windrose analysis as causing or contributing to the violations detected at the Musser Park monitor. However, as our 120-day letter to Iowa did not address this source, we are not yet prepared to conclude that the emissions from the LGS facility contribute to the monitored violation or to other possible violations, and we will make final designations decisions for areas and sources outside Muscatine County in a subsequent round of designations.

Monsanto Company (Monsanto)

Monsanto is an agricultural services company that produces on-site power and heat at its product development facility approximately 9.0 kilometers South-Southwest of the violating monitor, Monsanto's main SO_2 emission sources are Boiler #6, #7 and #8. EP-33 (Boiler #6) is a 73 MMBtu/hr boiler that is capable of burning fuel oil and natural gas. EP-33 is limited to 36.6 lb SO_2/hr. The amount of fuel oil EP-33 can combust is dependent on whether EP-45 is burning fuel oil. The sulfur content of

the fuel oil is limited to 0.5% by weight. EP-33 is not equipped with any SO_2 control system. EP-33 is not equipped with an SO_2 CEM. EP-45 (Boiler #7) is a 124 MMBtu/hr boiler that is capable of burning fuel oil and natural gas. EP-45 is limited to 61.4 lb SO_2/hr. The amount of fuel oil EP-45 can combust is dependent on whether EP-33 is burning fuel oil. The sulfur content of the fuel oil is limited to 0.5% by weight. EP-45 is not equipped with any SO_2 control system. EP-45 is not equipped with an SO_2 CEM. EP-195 (Boiler #8) is a 150 MMBtu/hr boiler that is capable of burning coal, sludge (limited) and seed corn (limited). EP-195 is limited to 292.5 lb SO_2/hr and 1.95 lb SO_2/MMBtu (averaged over a 3-hr period). EP-195 is not equipped with any SO_2 control system. EP-195 is equipped with an SO_2 CEM. EP-21 (Boiler #5) is a 73 MMBtu/hr boiler that is capable of natural gas only. EP-21 is limited to 500 ppm SO_2. Monsanto also operates several small natural gas-fired emission units and a small diesel emergency generator.

SSAB Iowa, Inc. (SSAB)

SSAB Inc. is a steel manufacturer that is located 21.6 kilometers East-Northeast of the violating monitor, SSAB's main SO_2 emission source is EP-1 (EAF/LMF). EP-1 is an electric arc furnace and a ladle metallurgy furnace. The electric arc furnace has a capacity of 200 tons of liquid steel/hr. EP-1 is limited to 0.70 lb SO_2/ton of steel produced and 613.2 tons SO_2/yr. EP-1 is not equipped with any SO_2 control system. EP-1 is not equipped with an SO_2 CEM. SSAB also operates a 371 MMBtu/hr furnace (EP-13) that burns natural gas only. EP-13 is limited to 0.52 lb SO_2/hr and 2 tons of SO_2/yr. SSAB also operates several small natural gas and diesel-fired emission units.

Based on its location and distance to the east of the violating monitor at Musser Park, IDNR's windrose analysis does not indicate that the SSAB facility is causing or contributing to the violating Musser Park monitor. Based on this, we are not yet prepared to conclude that the emissions from the SSAB facility contribute to the monitored violation or to other possible violations. In a subsequent round of designations we will make final designations decisions for areas and sources not currently included in the nonattainment area designation addressed in this TSD.

Gerdau Ameristeel US, Inc. (Gerdau)

Gerdau Ameristeel is a steel manufacturer that is located 20.5 kilometers North of the violating monitor. Gerdau's main SO_2 source is EP-01 (which includes the electric arc furnace). The electric arc furnace has a capacity of 90 tons of liquid steel/hr. EP-01 is limited to 70.2 lb SO_2/hr and 190 tons SO_2/yr. There are permit conditions that limit the amount of liquid steel processed, the carbon sources for the electric arc furnace and the amount of natural gas combusted. EP-01 is not equipped with any SO_2 control system. EP-01 is not equipped with an SO_2 CEM. Gerdau also operates a 150 MMBtu/hr Billet Reheat Furnace (EP-04). This furnace burns natural gas only. The SO_2 emissions are limited to 500 ppm. Gerdau also operates several small natural gas and diesel-fired emission units.

Based on its location and distance to the north of the violating monitor at Musser Park, IDNR's windrose analysis does not indicate that the Gerdau facility is causing or contributing to the violating Musser Mark monitor. Based on this, we are not yet prepared to conclude that the emissions from the Gerdau facility contribute to the monitored violation or to other possible violations. In a subsequent round of designations we will make final designations decisions for areas and sources not currently included in the nonattainment area designation addressed in this TSD.

Meteorology (weather/transport patterns)

We evaluated meteorological data to help determine how weather conditions, including wind speed and direction, affect the plume of sources contributing to ambient SO_2 concentrations. The National Weather Service maintains surface and upper air monitoring sites across the United States. Automated Surface Observing System (ASOS) (http://www.weather.gov/asos) sites collect hourly averaged wind measurements including wind direction and wind speed.

Evidence of source-receptor relationships between specific emissions sources and high SO_2 values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered the additional information submitted by IDNR that contained windrose analysis on exceedance days.

IDNR provided a windrose analysis on exceedance days for three SO_2 monitors in the Muscatine area. This analysis is found in Figure 3. Because the Musser Park monitor represents the design value monitor, the EPA focused on the windrose associated with this monitor, and notes that the majority of the exceedances are from sources located south of the monitor. This windrose analysis provides supporting information to not include in this initial round of designations several SO_2 sources found in the northern and eastern portion of Muscatine County, including SSAB, Gerdau Ameristeel, and CIPCO, as the wind does not come from the direction of these sources during monitored exceedances at the Musser Park monitor. In addition to the daily windrose analysis, IDNR submitted hourly monitoring and wind direction information, Figure 4, demonstrating that the predominant SO_2 source(s) impacting the Musser monitor were located to the south.

EPA finds that the IDNR windrose and meteorological analysis supports a smaller initial boundary that includes the Muscatine County sources that EPA has sufficient information to conclude are contributing to the violations at the Musser Park monitor. EPA is not yet reaching a conclusion concerning areas and sources not included in the initial nonattainment boundary, and will address these areas and their sources in a future final designations action.

Figure 3. IDNR Windroses on observed exceedance days (2010-2012).

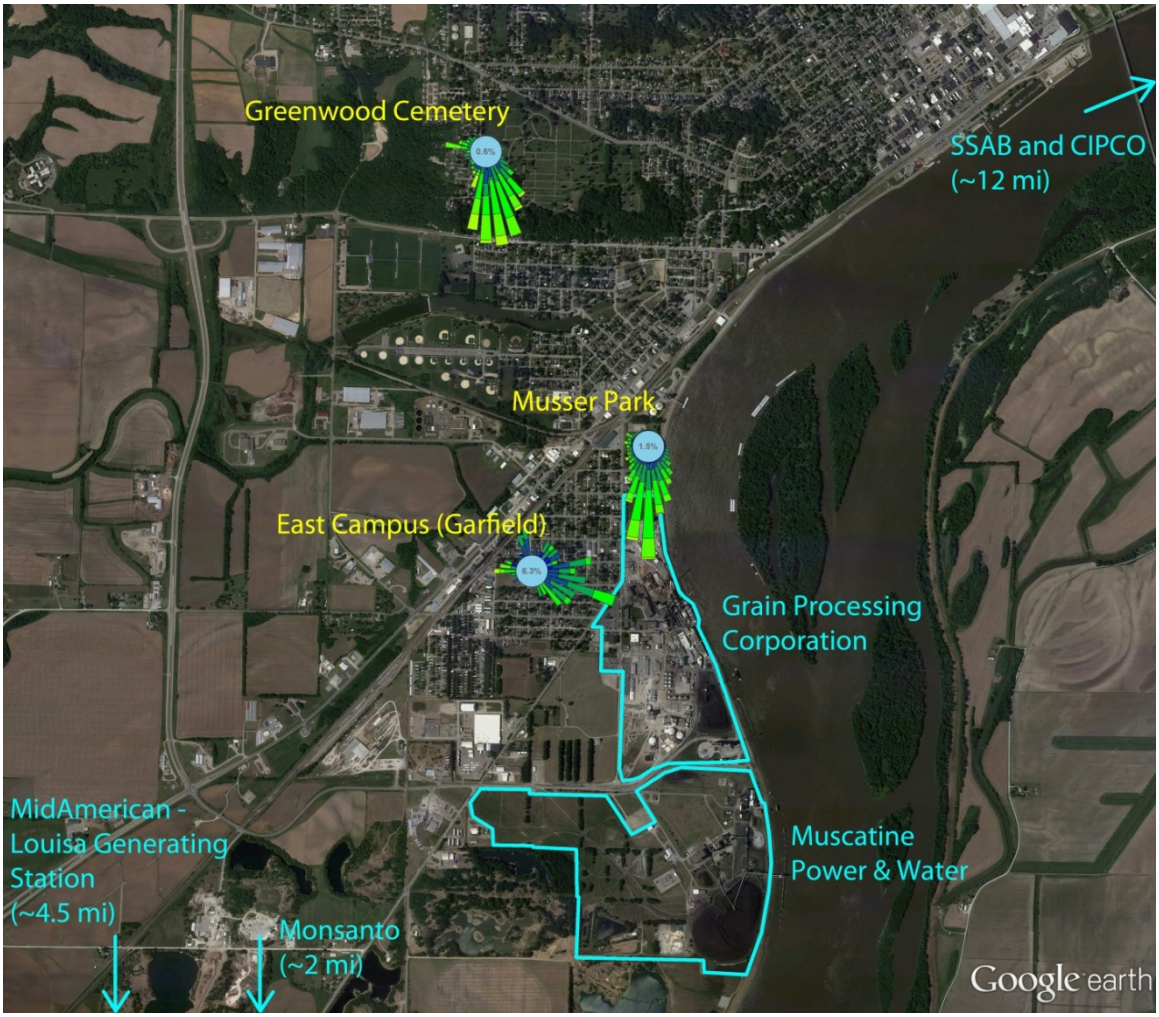
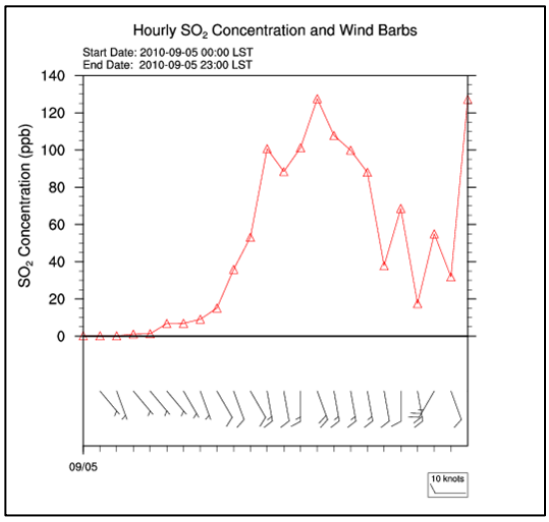
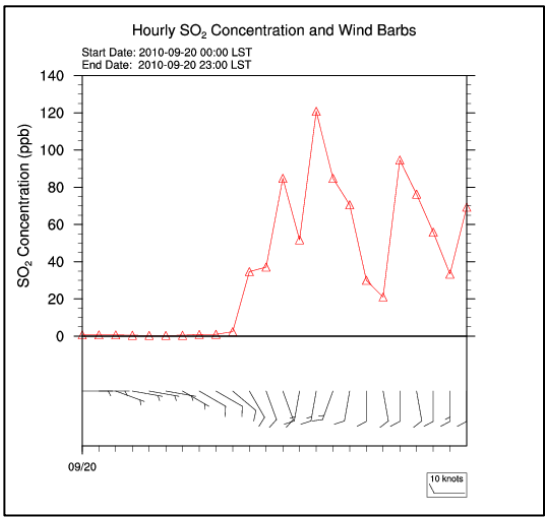


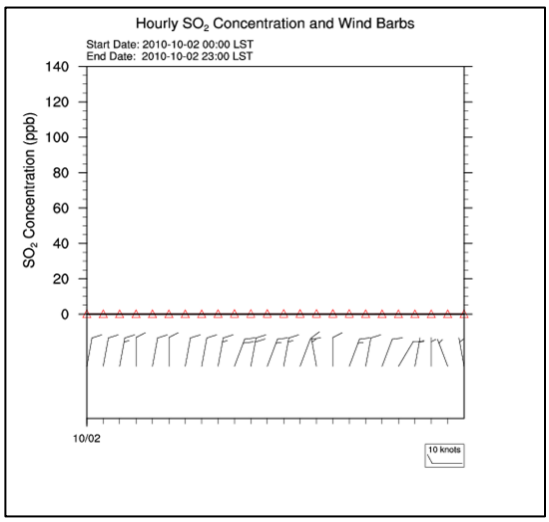
Figure 4. IDNR analysis of hourly winds paired with hourly SO_2 concentrations at Musser Park.



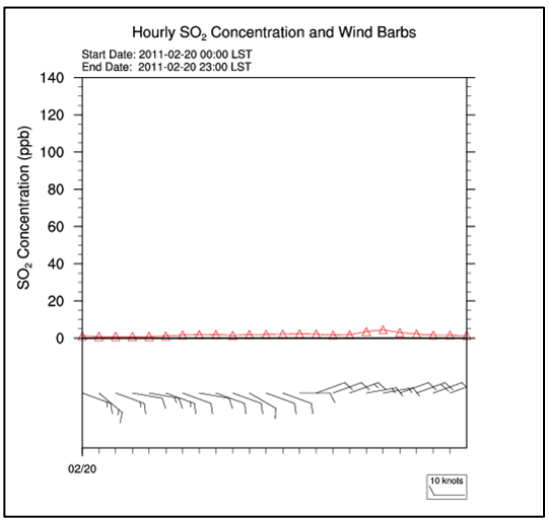
Increased Southerly Wind Speeds



Winds Shifted from East to South



Wind Direction: North



Wind Direction: East

Geography/Topography (mountain ranges or other air basin boundaries)

We examined the physical features of the land that might affect the distribution of SO_2 over an area. River valleys, escarpments, or other physical features may affect the distribution of emissions, and may help define boundaries. Satellite images depicting river valleys and point sources were constructed and evaluated to determine the effects of the topography on point source emissions.

Muscatine County, Iowa does not have any significant geographical or topographical barriers significantly limiting air-pollution transport within its air shed; however, Muscatine County rests on the western
shore of the upper Mississippi River. This factor did not play a significant role in determining the nonattainment boundary. The river valley created by the Mississippi River can impact local winds by channeling them along the valley north and south, and can serve to limit the impact of a particular source on a monitor sited in proximity to the river valley. In the case of Muscatine, as the Mississippi River flows south it makes a strong bend to the west across the eastern edge of the county, then abruptly turns south again at the City of Muscatine. Iowa. The existence of the river channel through and across the eastern edge of the county is not expected to impact the emissions observed at the violating monitor located in Muscatine, Iowa.

Jurisdictional Boundaries

Once the geographic area associated with the area violating the SO_2 standard and the nearby areas contributing to violations is determined, we consider existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the nonattainment area. If an existing jurisdictional boundary is used to help define the nonattainment area, it encompasses all of the area that has been identified as meeting the nonattainment definition. These existing boundaries may include an existing nonattainment or maintenance area boundary, a county or township boundary, a metropolitan area boundary, an air management district, or an urban planning boundary established for coordinating business development or transportation activities. Where existing jurisdictional boundaries are not adequate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates are used.

EPA reviewed jurisdiction boundary information, including townships, city limits, and a previous SO_2 nonattainment boundary. The revised boundary recommended by IDNR encompasses the area that includes the sources within Muscatine County that we are now prepared to conclude are contributing to exceedances observed at the monitor, as well as the area IDNR's analysis shows is exceeding the NAAQS. IDNR's recommendation is also consistent with jurisdictional (township) boundaries of the area. Areas and sources that we are not yet prepared to conclude are contributing to the monitored violation are not included in this initial nonattainment area. The legal description is as follows in Table 4.

Table 4. Legal Description of Iowa DNR Proposed Nonattainment Area.

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

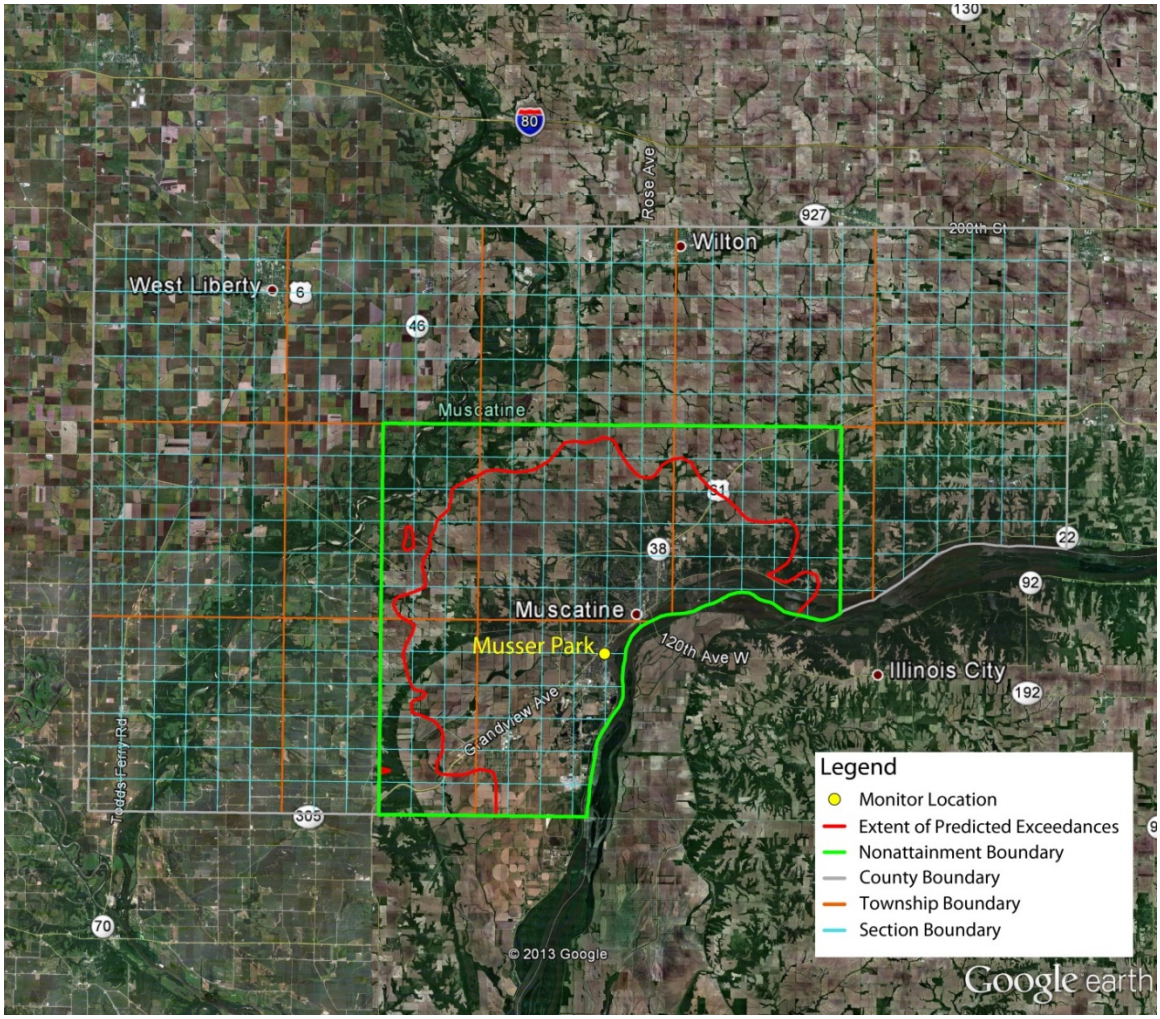
Other Relevant Information

To support its revised boundary proposal, IDNR also conducted refined dispersion modeling. We are not relying upon the specific results of this modeling to support our final initial designation, but provide the following discussion for informational purposes. IDNR performed two types of modeling – a culpability test to assess which sources contributed to the exceedances observed at the Musser Park monitor, and a full grid analysis to evaluate the extent of the predicted exceedances surrounding the Musser Park monitor.

The full grid analysis modeling performed by IDNR was centered on the Musser Park monitor and extended out to cover EPA's presumptive county-wide nonattainment boundary. The modeling analysis performed by IDNR utilized actual emission rates from 2009 through 2010 for the following sources: Grain Processing Corporation (GPC); Muscatine Power and Water (MPW); Monsanto; MidAmerican Energy (Louisa Generating Station); and Central Iowa Power Corporation (CIPCO). IDNR used a default background concentration typically used for modeling conducted in the new source review program permit applications. The results of the modeling analysis predict that exceedances of the 1-hr 2010 SO_2 NAAQS extend over an area substantially smaller than the presumptive county-wide boundary proposed by EPA. This revised area includes 3 of the 6 SO2 emissions sources that were included in EPA's original county-wide presumptive boundary, and is consistent with IDNR's contribution conclusions from its windrose analysis for those sources. Figure 5 contains the results of the IDNR modeling showing the extent of the predicted exceedances and its proposed nonattainment boundary within Muscatine County.

EPA is not prepared to conclude on the basis of IDNR's refined dispersion modeling, that sources or areas excluded based upon IDNR's modeling are or are not contributing to violations of the SO2 NAAQS. EPA is not yet reaching a conclusion concerning areas excluded from the initial nonattainment boundary and will address these areas in a future final designations action.

Figure 5. IDNR Proposed Nonattainment Boundary (highlighted in green)



Conclusion

The air quality monitor in Muscatine County shows a violation of the 2010 SO_2 NAAQS, based on 2009-2011 air quality data. As a result, Muscatine County or some portion of Muscatine County must be designated as nonattainment. Based upon the consideration of all the relevant and available information, as described above, EPA believes that the technical analysis prepared and submitted by IDNR to respond to EPA's preliminary nonattainment area proposal presents a reasonable and technically supported alternative initial nonattainment boundary. IDNR's technical analysis examined several factors, including monitoring data, meteorological data, and proximity and magnitude of emissions. Additionally, IDNR demonstrated through windrose analysis which sources are known to be impacting the violating monitor and should be included in the nonattainment area. The windrose analysis also provided supporting information to exclude from the initial nonattainment area several SO_2 sources,

which will be further analyzed in subsequent designations actions, in the northern and eastern portion of Muscatine County, including Gerdau Steel, SSAB and CIPCO.

EPA finds the windrose analysis performed by IDNR supports a smaller initial boundary, excluding those sources within Muscatine County that we are not yet prepared to conclude are contributing to the violating monitor on days exceeding the standard. Based upon the consideration of all relevant and available information, as described above, EPA is finalizing the initial SO_2 nonattainment area boundary proposed by IDNR that is described in Table 4 above.