Final Technical Support Document

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), the U.S. Environmental Protection Agency (EPA, or the Agency) must designate areas as either "unclassifiable," "attainment," or "nonattainment" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS). Section 107(d) of the CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to a NAAQS violation in a nearby area, an attainment area as any area other than a nonattainment area that meets the NAAQS, and an unclassifiable area as any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

July 2, 2016, is the deadline established by the U.S. District Court for the Northern District of California for the EPA to designate certain areas. This deadline is the first of three deadlines established by the court for the EPA to complete area designations for the 2010 SO_2 NAAQS. This deadline applies to certain areas in Iowa because three emission sources meet the conditions of the court's order.

Iowa submitted updated recommendations on September 18, 2015. Table 1 below lists Iowa's recommendations and identifies the counties in Iowa that the EPA is designating in order to meet the July 2, 2016 court-ordered deadline. These final designations are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1 – Iowa's Recommended and the EPA's Final Designations

Area	Iowa's Recommended Area Definition	Iowa's Recommended Designation	EPA's Final Area Definition	EPA's Final Designation
Woodbury County, Iowa	Woodbury County	Attainment	Same as Iowa's Recommendation[1] (Woodbury County, IA)	Unclassifiable[2]
Wapello County, Iowa	Wapello County	Attainment	Same as Iowa's Recommendation[3]	Unclassifiable/

[1] EPA notified the State of Iowa on February 16, 2016, that our intended area definition consisted of the entirety of Woodbury County, Iowa. Our final area definition is the same as our intended area definition.
[2] EPA notified the State of Iowa on February 16, 2016, that our intended designation for the Woodbury County area was unclassifiable. Our final designation is the same as our intended designation.
[3] EPA notified the State of Iowa on February 16, 2016, that our intended area definition consisted of the entirety of Wapello County, Iowa. Our final area definition is the same as our intended area definition.

			(Wapello County, IA)	Attainment[4]
Des Moines County, Iowa	Des Moines County	Attainment	Same as Iowa's Recommendation[5] (Des Moines County, IA)	Unclassifiable/ Attainment[6]

Background

On June 3, 2010, the EPA revised the primary (health based) SO_2 NAAQS 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 99th percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. This NAAQS was published in the *Federal Register* on June 22, 2010 (75 FR 35520), and is codified at 40 CFR 50.17. The EPA determined this is the level necessary to protect 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 two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an entire year, codified at 40 CFR 50.4, remain applicable.[7] However, the EPA is not currently designating areas on the basis of either of these two primary standards. Similarly, the secondary standard for SO_2, set at 500 ppb evaluated over 3 hours, codified at 40 CFR 50.5, has not been revised, and the EPA is also not currently designating areas on the basis of the secondary standard.

General Approach and Schedule

Section 107(d) of the CAA requires that not later than 1 year after promulgation of a new or revised NAAQS, state governors must submit their recommendations for designations and boundaries to EPA. Section 107(d) also requires the EPA to provide notification to states no less than 120 days prior to promulgating an initial area designation that is a modification of a state's recommendation. If a state does not submit designation recommendations, the EPA may promulgate the designations that it deems appropriate without prior notification to the state, although it is our intention to provide such notification when possible. If a state or tribe disagrees

[4] EPA notified the State of Iowa on February 16, 2016, that our intended designation for the Wapello County area was unclassifiable. Our final designation is different than our intended designation but the same as Iowa's recommended designation.

[5] EPA notified the State of Iowa on February 16, 2016, that our intended area definition consisted of the entirety of Des Moines County, Iowa. Our final area definition is the same as our intended area definition.

[6] EPA notified the State of Iowa on February 16, 2016, that our intended designation for the Des Moines County area was unclassifiable. Our final designation is different than our intended designation but the same as Iowa's recommended designation.

[7] 40 CFR 50.4(e) provides that the two prior primary NAAQS will no longer apply to an area 1 year after its designation under the 2010 NAAQS, except that for areas designated nonattainment under the prior NAAQS as of August 22, 2010, and areas not meeting the requirements of a SIP Call under the prior NAAQS, the prior NAAQS will apply until that area submits and EPA approves a SIP providing for attainment of the 2010 NAAQS. No Iowa areas were designated nonattainment for the prior NAAQS as of August 22, 2010, nor is any area in the State not meeting the requirements of a SIP Call under the prior NAAQS.

with the EPA's intended designations, it is given an opportunity within the 120-day period to demonstrate why any proposed modification is inappropriate. The EPA is required to complete designations within 2 years after promulgation of a new or revised NAAQS, unless EPA determines that sufficient information is not available, in which case the deadline is extended to 3 years. The 3-year deadline for the revised SO_2 NAAQS was June 2, 2013.

On August 5, 2013, the EPA published a final rule establishing air quality designations for 29 areas in the United States for the 2010 SO_2 NAAQS, based on recorded air quality monitoring data from 2009 - 2011 showing violations of the NAAQS (78 FR 47191). In that rulemaking, the EPA committed to address, in separate future actions, the designations for all other areas for which the Agency was not yet prepared to issue designations. The EPA designated a portion of Muscatine County, Iowa as nonattainment in this initial set of designations.

Following the initial August 5, 2013, designations, three lawsuits were filed against the EPA in different U.S. District Courts, alleging the Agency had failed to perform a nondiscretionary duty under the CAA by not designating all portions of the country by the June 2, 2013 deadline. In an effort intended to resolve the litigation in one of those cases, plaintiffs Sierra Club and the Natural Resources Defense Council and the EPA filed a proposed consent decree with the U.S. District Court for the Northern District of California. On March 2, 2015, the court entered the consent decree and issued an enforceable order for the EPA to complete the area designations according to the court-ordered schedule.

According to the court-ordered schedule, the EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), the EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO_2 NAAQS and (2) areas that contain any stationary sources that had not been announced as of March 2, 2015, for retirement and that, according to the EPA's Air Markets Database, emitted in 2012 either (i) more than 16,000 tons of SO_2, or (ii) more than 2,600 tons of SO_2 with an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, a stationary source with a coal-fired unit that, as of January 1, 2010, had a capacity of over 5 megawatts and otherwise meets the emissions criteria, is excluded from the July 2, 2016, deadline if it had announced through a company public announcement, public utilities commission filing, consent decree, public legal settlement, final state or federal permit filing, or other similar means of communication, by March 2, 2015, that it will cease burning coal at that unit.

The last two deadlines for completing the remaining designations are December 31, 2017, and December 31, 2020. The EPA has separately promulgated requirements for state and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO_2 Data Requirements Rule (DRR), codified at 40 CFR part 51, subpart BB.

Updated designations guidance was issued by the EPA through a March 20, 2015, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air

Division Directors, U.S. EPA Regions 1-10. This memorandum supersedes earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and it identifies factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The guidance also contains the factors the EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional boundaries. This guidance was supplemented by two non-binding technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO_2. Notably, the EPA's documents, titled "SO_2 NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and "SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD), were available to states and other interested parties. Both of these TADs were most recently updated in February 2016.

Based on complete, quality assured and certified ambient air quality data collected between 2013 and 2015, no violations of the 2010 SO_2 NAAQS have been recorded at ambient air quality monitors in any undesignated part of Iowa. However, there are three sources in the State meeting the emissions criteria of the consent decree for which the EPA must complete designations by July 2, 2016. In this final technical support document, the EPA discusses its review and technical analysis of Iowa's updated recommendations for the areas that we must designate. The EPA also discusses any intended and final modifications from the state's recommendation based on all available data before us.

The following are definitions of important terms used in this document:

1) 2010 SO_2 NAAQS – the primary NAAQS for SO_2 promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. See 40 CFR 50.17.
2) Attaining monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value is equal to or less than 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
3) Design Value – a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
4) Designated nonattainment area – an area which the EPA has determined has violated the 2010 SO_2 NAAQS or contributed to a violation in a nearby area. A nonattainment designation reflects considerations of the state's recommendations and all of the information discussed in this document. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
5) Designated unclassifiable area – an area for which the EPA cannot determine based on all available information whether or not it meets the 2010 SO_2 NAAQS.
6) Designated unclassifiable/attainment area – an area which the EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS.

The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.

7) Modeled violation – a violation based on air dispersion modeling.
8) Recommended attainment area – an area a state or tribe has recommended that the EPA designate as attainment.
9) Recommended nonattainment area – an area a state or tribe has recommended that the EPA designate as nonattainment.
10) Recommended unclassifiable area – an area a state or tribe has recommended that the EPA designate as unclassifiable.
11) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that the EPA designate as unclassifiable/attainment.
12) Violating monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

Technical Analysis for Woodbury County, Iowa

Introduction

The Woodbury County area contains a stationary source that, according to the EPA's Air Markets Database, emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, in 2012, the MidAmerican Energy Company's George Neal South electric generating facility emitted 14,272 tons of SO_2 and had an emissions rate of 0.64 lbs SO_2/mmBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Pursuant to the March 2, 2015, court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its November 4, 2015 submission, the Iowa Department of Natural Resources (IDNR) recommended that the area surrounding MidAmerican Energy Company's George Neal South facility, specifically the entirety of Woodbury County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, specifically using AERMOD, analyzing allowable emissions.

On February 16, 2016, the EPA notified Iowa that we intended to designate the Woodbury County area as unclassifiable, based on our view that available information was not sufficient to determine whether the area is meeting or not meeting the NAAQS. Additionally, we informed Iowa that our intended boundaries for the unclassifiable area consisted of the entirety of Woodbury County. Our intended designation and associated boundaries were based on, among other things, the fact that although IDNR provided modeling to the EPA that demonstrated attainment for the area, some emission rates used by IDNR in this modeling analysis, specifically the emission rates for MidAmerican Energy Company's George Neal North Unit 1 and 2, were not federally enforceable. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Iowa, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

In our February 16, 2016, notification to Iowa regarding our intended unclassifiable designation for the Woodbury County area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register*, inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

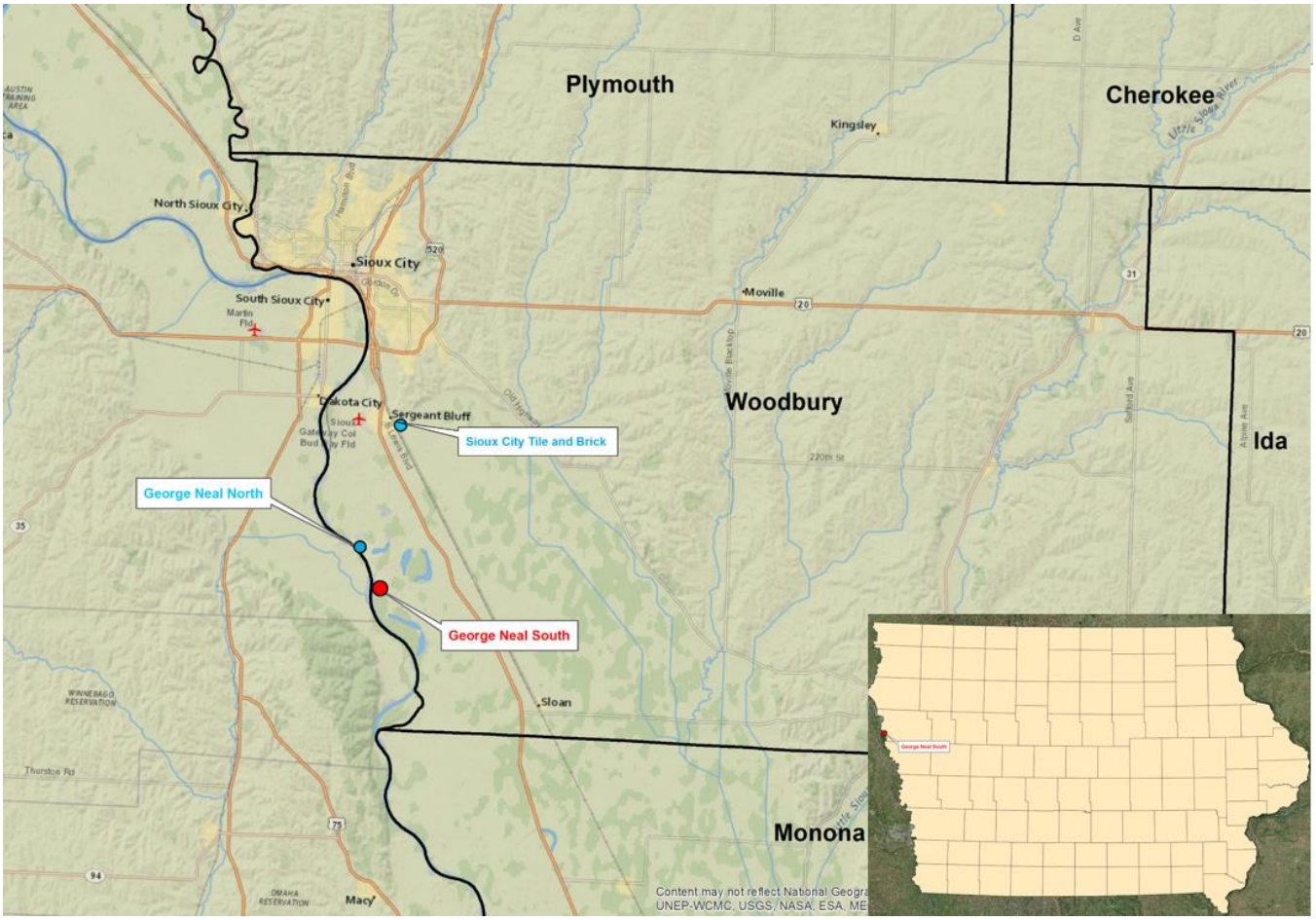
The EPA is explicitly incorporating and relying upon the analyses and information presented in the preliminary technical support document for the purposes of our final designation for this

area, except to the extent that any new information submitted to the EPA or conclusions presented in this final technical support document and our response to comments document (RTC), available in the docket, supersede those found in the preliminary document.

The EPA received comments from Iowa regarding our intended designation for this area. A comprehensive summary of the substantive comments we received regarding our intended unclassifiable designation for the Woodbury County area and our complete responses can be found in the RTC. Iowa provided an update on the status of the shutdown of George Neal Units 1 and 2 and submitted updated modeling. The only change Iowa made to its November 4, 2015, modeling was to extend the receptor grid from 5 km to 10 km.

After carefully considering all available data and information, the EPA is still unable to determine whether the Woodbury County area is meeting or not meeting the 2010 SO_2 NAAQS, and is designating the area as unclassifiable for the NAAQS. The boundaries for this unclassifiable area consist of the entirety of Woodbury County, and are shown in the figure below. Also included in the figure are nearby emitters of SO_2 and Iowa's recommended area.

Figure 1: The EPA's final unclassifiable area: Woodbury County, Iowa



Jurisdictional Boundaries:

Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable area, specifically with respect to clearly defined legal boundaries. The EPA did not receive any comments regarding the intended boundaries for this area. The EPA finds that our final unclassifiable area, consisting of the entirety of Woodbury County, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for geographically defining our final unclassifiable area.

Conclusion

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA is unable to determine whether the area around MidAmerican Energy Company's George Neal South facility is meeting or not meeting the 2010 SO_2 NAAQS, and is designating the area as unclassifiable for the NAAQS. Specifically, the area is comprised of the entirety of Woodbury County.

The unclassifiable designation is based on the fact that although IDNR provided modeling to the EPA that demonstrated attainment for the area, some emission limits used by IDNR in this modeling analysis are not currently federally enforceable. Consequently, based on available information EPA is not able to determine whether the Woodbury County meets or does not meet the NAAQS, and a final unclassifiable designation is appropriate.

At this time, our final designations for the state only apply to this area and the others contained in this final technical support document. Consistent with the court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Iowa by either December 31, 2017, or December 31, 2020.

Technical Analysis for Wapello County, Iowa

Introduction

The Wapello County area contains a stationary source that, according to the EPA's Air Markets Database, emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, in 2012, the IPL Ottumwa electric generating facility emitted 11,985 tons of SO_2 and had an emissions rate of 0.67 lbs SO_2/mmBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Pursuant to the March 2, 2015, court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its November 4, 2015 submission, IDNR recommended that the area surrounding IPL Ottumwa, specifically the entirety of Wapello County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, specifically using AERMOD, analyzing proposed allowable emissions.

On February 16, 2016, the EPA notified Iowa that we intended to designate the Wapello County area as unclassifiable. Additionally, we informed Iowa that our intended boundaries for the unclassifiable area consisted of the entirety of Wapello County. Our intended designation and associated boundaries were based on, among other things, the uncertain timing of proposed allowable emission limits on the IPL Ottumwa's main boiler, specifically the lack of indication that the emission limits will be federally enforceable by the July 2, 2016, court-ordered deadline to designate the area. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Iowa, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

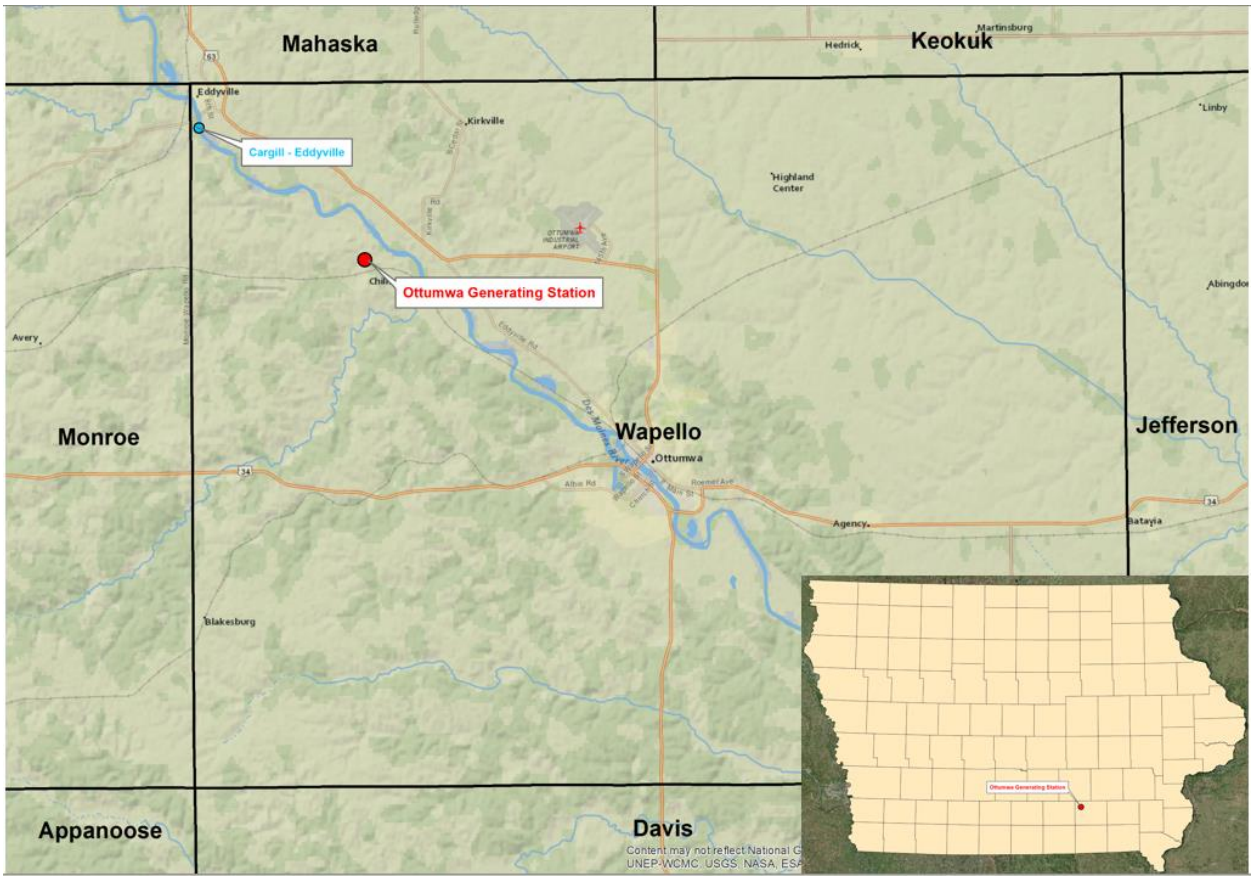
Assessment of New Information

In our February 16, 2016, notification to Iowa regarding our intended unclassifiable designation for the Wapello County area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register,* inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

The EPA is explicitly incorporating and relying upon the analyses and information presented in the preliminary technical support document for the purposes of our final designation for this area, except to the extent that any new information submitted to the EPA or conclusions presented in this final technical support document and our response to comments document (RTC), available in the docket, supersede those found in the preliminary document.

As detailed further below, after carefully considering all available data and information, the EPA is designating the Wapello County area as unclassifiable/attainment for the 2010 SO_2 NAAQS. The boundaries for this unclassifiable/attainment area consist of the entirety of Wapello County, and are shown in the figure below. Also included in the figure are nearby emitters of SO_2 and Iowa's recommended area.

Figure 2: The EPA's final unclassifiable/attainment area: Wapello County, Iowa



The EPA acknowledges that we received information from IDNR regarding our intended designation for this area prior to the February 16, 2016, notification to the state. IDNR submitted this information on December 23, 2015. However, due to the timing of this information relative to the scheduled timeline for announcing our intended designation, the EPA was not able to fully evaluate the information at that time. This final technical support document incorporates our analyses and conclusions regarding that information.

Additionally, the EPA received comments from IDNR and Alliant Energy Corporation regarding our intended unclassifiable designation for the Wapello County area during the public comment period. A comprehensive summary of these comments and our responses can be found in the RTC. Both IDNR and Alliant requested that the EPA consider the modeling that IDNR submitted on December 23, 2015, in making our final designation. The discussion and analysis of this new information that follow reference the Modeling TAD, Monitoring TAD, and the

factors for evaluation contained in the EPA's March 20, 2015 guidance, as appropriate and applicable.

Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. The AERMOD modeling system contains the following components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRIME: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

IDNR used AERMOD version 15181 and a discussion of the individual components will be referenced in the corresponding discussion that follows as appropriate.

Modeling Parameter: Rural or Urban Dispersion

The EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 3 km of the facility. According to the EPA's modeling guidelines contained in documents such as the Modeling TAD, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50% of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50% of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area of analysis, IDNR determined that it was most appropriate to run the model in rural mode. The facility is located along the Des Moines River and the rural determination was made based on IDNR's analysis that more than 50% of the area within a 3 km radius of the IPL Ottumwa facility is classified as rural.

Modeling Parameter: Area of Analysis (Receptor Grid)

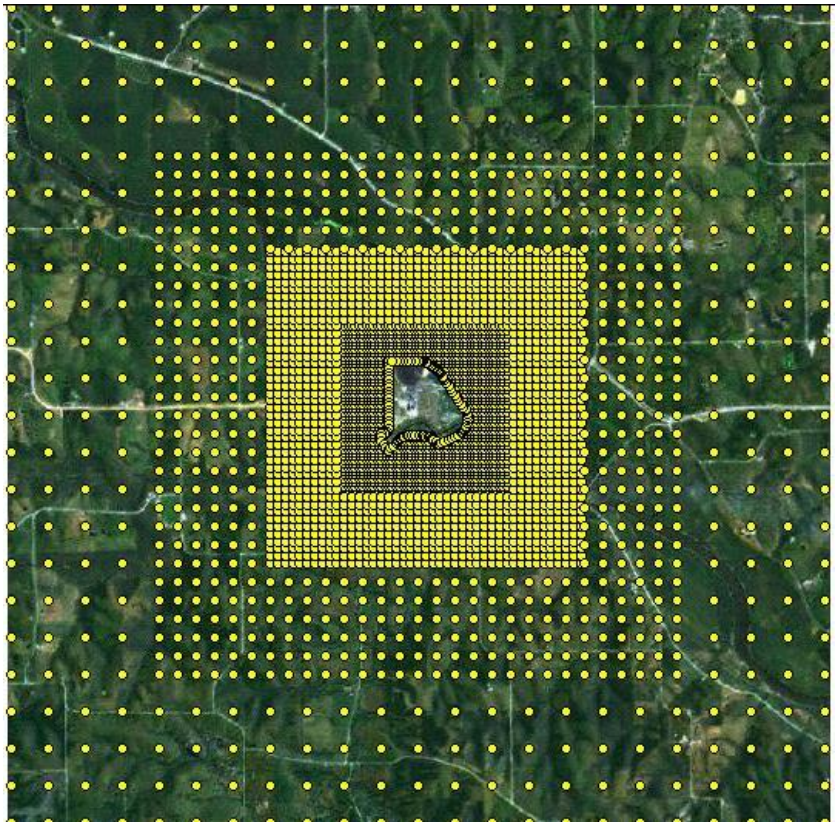
The EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the IPL Ottumwa facility is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The grid receptor spacing for the area of analysis chosen by IDNR is as follows:

- 50 meters along the IPL Ottumwa facility fenceline
- 50 meters from the fenceline to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3.0 km
- 500 meters extending from 3.0 km to 5.0 km

The receptor network contained 3,955 receptors and covered the western portion of Wapello County, Iowa. Figure 3, which was included in IDNR's submission prior to the start of the comment period, shows the chosen area of analysis surrounding the IPL Ottumwa facility, as well as the receptor grid for the area of analysis. Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. The impacts of the area's geography and topography will be discussed later within this document.

Figure 3: Receptor Grid for the IPL Ottumwa Facility Area of Analysis



For the area around IPL Ottumwa, IDNR included one other emitter of SO_2 within 20 km of the facility in any direction. The state deemed this 20 km distance appropriate because the state believes that the area of analysis described above adequately includes the sources which might contribute to those concentrations.

The one facility identified by IDNR is Cargill – Eddyville, which is approximately 15 km to the northwest of IPL Ottumwa. Cargill – Eddyville had SO_2 emissions greater than 1,500 tons each

year from 2012-2014. IDNR states that the Cargill – Eddyville facility replaced its coal-fired boilers with natural gas boilers in 2015, thus reducing SO_2 emissions from this facility by over 99%. Given the significant reduction in SO_2 emissions, IDNR included Cargill – Eddyville in the background value.

Modeling Parameter: Source Characterization

IDNR characterized the sources within the area of analysis in accordance with practices outlined as acceptable in the Modeling TAD. Specifically, IDNR used actual stack heights in conjunction with actual emissions. IDNR also adequately characterized IPL Ottumwa's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that, for the purposes of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also provides for the flexibility of using allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information when it is available and that these data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA believes that detailed throughput, operating schedules, and emissions information from the impacted source should be used.

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, IDNR included the IPL Ottumwa facility and one other emitter of SO_2 (Cargill – Eddyville) within 20 km in the area of analysis. This distance and these facilities were selected because IDNR found that this area of analysis adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might

contribute to those concentrations. IDNR indicated Cargill added two new natural gas-fired boilers to replace the three existing coal-fired boilers that accounted for approximately 94% of the SO_2 emissions from the facility. IDNR further indicated that this change from three coal-fired boilers to the two natural gas-fired boilers resulted in an approximate 99% reduction in SO_2 emissions from the boiler. IDNR therefore assumed that the SO_2 emissions from Cargill – Eddyville were accounted for in the background. No other sources beyond 20 km were determined by IDNR to have the potential to cause significant concentration gradient impacts within the area of analysis. The annual actual SO_2 emissions from the IPL Ottumwa facility from 2012 to 2014 are summarized below.

Table 2: Actual SO_2 Emissions from 2012 – 2014 from IPL Ottumwa

Facility Name	SO_2 Emissions (tons per year)		
	2012	2013	2014
IPL Ottumwa	11,985	13,126	9,227

For the IPL Ottumwa facility in the area of analysis, IDNR used actual emissions from the 3-year data set 2012 - 2014. These emissions data were obtained from a CEMS.

Modeling Parameter: Meteorology and Surface Characteristics

The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, the Federal Aviation Administration (FAA), and military stations.

For the IPL Ottumwa facility area of analysis, surface meteorology from the NWS station in Ottumwa, Iowa, approximately 8 km to the southeast, and coincident upper air observations from the NWS station in Davenport, Iowa, approximately 120 km to the northeast were selected as best representative of meteorological conditions within the area of analysis (Figure 4).

IDNR used AERSURFACE version 13016 using data from the NWS station in Ottumwa, Iowa, located at 41.11N, 92.45W to estimate the surface characteristics of the area of analysis. The state estimated values for 12 spatial sectors at a monthly temporal resolution. AERSURFACE was processed three times, once each for dry, average, and wet surface moisture conditions. The output for the individual months from the three AERSURFACE runs were then manually combined into one output file. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo"). In the figure below, generated by the EPA, the location of the Ottumwa, Iowa, NWS

station and Davenport, Iowa, upper air station is shown relative to the IPL Ottumwa area of analysis.

Figure 4: IPL Ottumwa Facility Area of Analysis and the Ottumwa, Iowa and Davenport, Iowa NWS Station

Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. IDNR followed the methodology and settings presented in EPA's Modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1 minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-

ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, IDNR set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area of analysis is best described as relatively flat as the IPL Ottumwa facility lies along the Des Moines River in southeast Iowa. However, there are rolling hills to the northwest of the facility. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model was the USGS National Elevation Database.

Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99^{th} percentile monitored concentrations by hour of day and season or month.

For the IPL Ottumwa facility area of analysis, IDNR chose the "first tier" approach but derived a statewide default background concentration using an average of the concentrations of four monitors using 2009-2011 data. The derived average background concentration was based on monitors from the following four cities in Iowa: Cedar Rapids, Davenport, Des Moines, and Keosauqua. While the averaging of multiple monitors is not outlined in the Modeling TAD, EPA has determined that this methodology provides a conservative background concentration for the IPL Ottumwa facility area, which is located in rural south central Iowa, because the four monitors used to derive the average background concentration are located near higher populated areas and other sources of SO_2 emissions, which would result in higher background concentrations than the rural area surrounding the Ottumwa facility given the higher number of nonpoint source emissions captured by the background monitors near more heavily populated urban areas.

In summary, the background concentration for this area of analysis was determined by the state using the described "first tier" multiple monitor averaging technique to be 32 micrograms per

cubic meter ($\mu g/m^3$), or 12.2 ppb,[8] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from IDNR prior to the start of the comment period for the IPL Ottumwa facility area of analysis are summarized below in Table 3.

Table 3: AERMOD Modeling Parameters for the IPL Ottumwa Facility Area of Analysis

IPL Ottumwa Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	2
Modeled Structures	N/A
Modeled Fencelines	1
Total receptors	3,955
Emissions Type	Actuals
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Ottumwa, Iowa
Upper Air Meteorology Station	Davenport, Iowa
Methodology for Calculating Background SO_2 Concentration	Statewide default from monitors
Calculated Background SO_2 Concentration	32 $\mu g/m^3$

The results presented below in Table 4 show the magnitude and geographic location of the highest predicted modeled concentration based on actual emissions.

Table 4: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the IPL Ottumwa Facility Area of Analysis Based on Actual Emissions

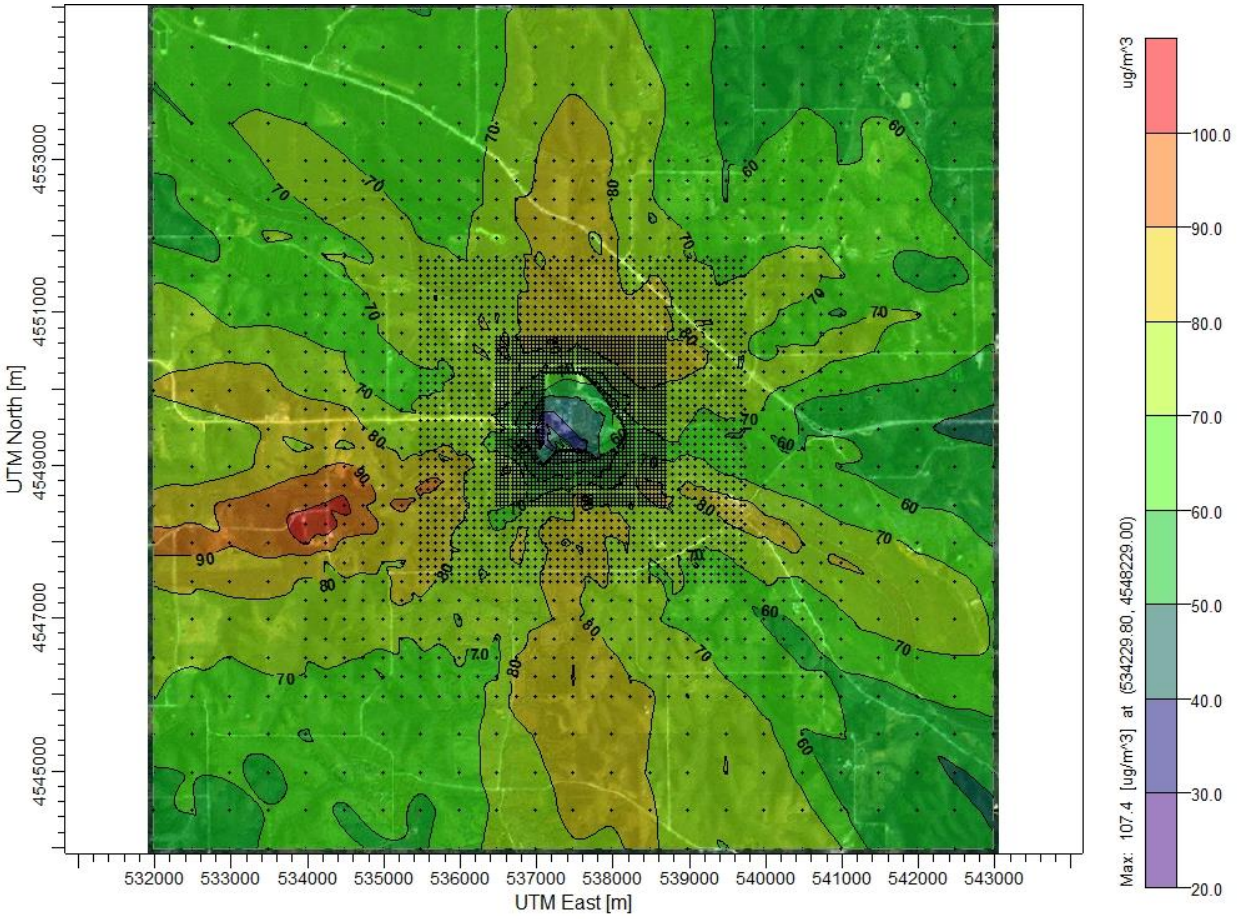
		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99^{th} Percentile 1-Hour Average	2012-2014	537343.2	4549206.1	139.4	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

[8] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62 $\mu g/m^3$.

The state's modeling indicates that the highest predicted 3-year average 99th percentile 1-hour average concentration within the chosen modeling domain is 139.4 µg/m^3, or 53.2 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figure 5 below indicates that the predicted value occurred to the west of IPL Ottumwa. IDNR's chosen receptor grid is also shown in the figure.

Figure 5: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the IPL Ottumwa Facility Area of Analysis Based on Actual Emissions



Jurisdictional Boundaries:

Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. The EPA did not receive any comments regarding the intended boundaries for this area.

The EPA believes that our final unclassifiable/attainment area, consisting of the entirety of Wapello County, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for geographically defining our final unclassifiable/attainment area.

Conclusion

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA is determining that the area around IPL Ottumwa is meeting the 2010 SO_2 NAAQS, and is designating the area as unclassifiable/attainment for the NAAQS. Specifically, the area is comprised of the entirety of Wapello County.

The unclassifiable/attainment designation is based on the modeling analysis that the IDNR provided to EPA on December 23, 2015. The modeling analysis submitted by IDNR, using actual emissions from 2012-2014, shows attainment and this modeling followed the recommended EPA modeling TAD for designation purposes.

At this time, our final designations for the state only apply to this area and the others contained in this final technical support document. Consistent with the court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Iowa by either December 31, 2017, or December 31, 2020.

Technical Analysis for Des Moines County, Iowa

Introduction

The Des Moines County area contains a stationary source that, according to the EPA's Air Markets Database, emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, in 2012, the IPL Burlington electric generating facility emitted 4,697 tons of SO_2 and had an emissions rate of 0.67 lbs SO_2/mmBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Pursuant to the March 2, 2015, court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its November 4, 2015 submission, IDNR recommended that the area surrounding the IPL Burlington electric generating facility, specifically the entirety of Des Moines County, be designated as unclassifiable/attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, specifically using AERMOD, analyzing allowable emissions.

On or about February 16, 2016, the EPA notified Iowa that we intended to designate the Des Moines County, Iowa, area as unclassifiable, based on our view that available information did not support a determination of whether the area was meeting or not meeting the NAAQS. Additionally, we informed Iowa that our intended boundaries for the unclassifiable area consisted of the entirety of Des Moines County. Our intended designation and associated boundaries were based on, among other things, the uncertain timing of proposed allowable emission limits on the IPL Burlington Generating Facility's main boiler, specifically the lack of indication that the limits will be federally enforceable by the July 2, 2016, court-ordered deadline to designate the area. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Iowa, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

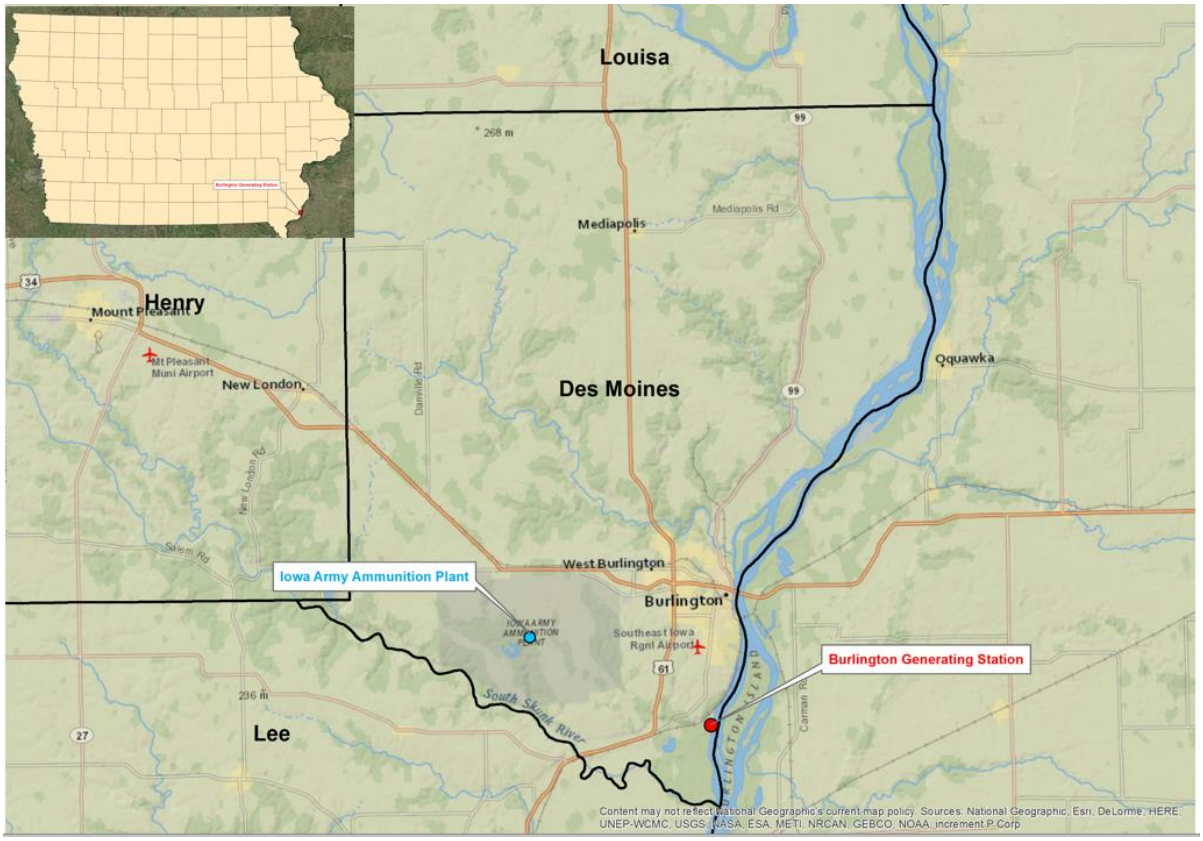
In our February 16, 2016, notification to Iowa regarding our intended unclassifiable designation for the Des Moines County area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register,* inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

The EPA is explicitly incorporating and relying upon the analyses and information presented in the preliminary technical support document for the purposes of our final designation for this area, except to the extent that any new information submitted to the EPA or conclusions

presented in this final technical support document and our response to comments document (RTC), available in the docket, supersede those found in the preliminary document.

As further detailed below, after carefully considering all available data and information, the EPA is determining that the Des Moines County area is meeting the 2010 SO_2 NAAQS, and is designating the area as unclassifiable/attainment for the NAAQS. The boundaries for this unclassifiable/attainment area consist of the entirety of Des Moines County, and are shown in the figure below. Also included in the figure are nearby emitters of SO_2 and Iowa's recommended area.

Figure 6: The EPA's final unclassifiable/attainment area: Des Moines County, Iowa



The EPA acknowledges that we received information from IDNR regarding our intended designation for this area prior to the February 16, 2016, notification to the state. IDNR submitted this information on December 23, 2015. However, due to the timing of this information relative to the scheduled timeline for announcing our intended designation, the EPA was not able to fully evaluate the information at that time. This final technical support document incorporates our analyses and conclusions regarding that information.

Additionally, the EPA received comments from IDNR and Alliant Energy Corporation regarding our intended unclassifiable designation for the Des Moines County area during the public comment period. A comprehensive summary of these comments and our responses can be found

in the RTC. Both IDNR and Alliant requested that EPA consider the modeling that IDNR submitted on December 23, 2015, in making our final designation. The discussion and analysis of this new information that follow reference the Modeling TAD, Monitoring TAD, and the factors for evaluation contained in the EPA's March 20, 2015m guidance, as appropriate and applicable.

Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. The AERMOD modeling system contains the following components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRIME: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The state used AERMOD version 15181, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

The EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 3 km of the facility. According to the EPA's modeling guidelines contained in documents such as the Modeling TAD, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50% of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50% of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area of analysis, IDNR determined that it was most appropriate to run the model in rural mode. The facility is located in the Mississippi River valley along the Iowa-Illinois border and the rural determination was made based on IDNR's analysis that more than 50% of the area within a 3 km radius of the IPL Burlington facility is classified as rural..

Modeling Parameter: Area of Analysis (Receptor Grid)

The EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the IPL Burlington facility is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of

significant concentration gradients of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

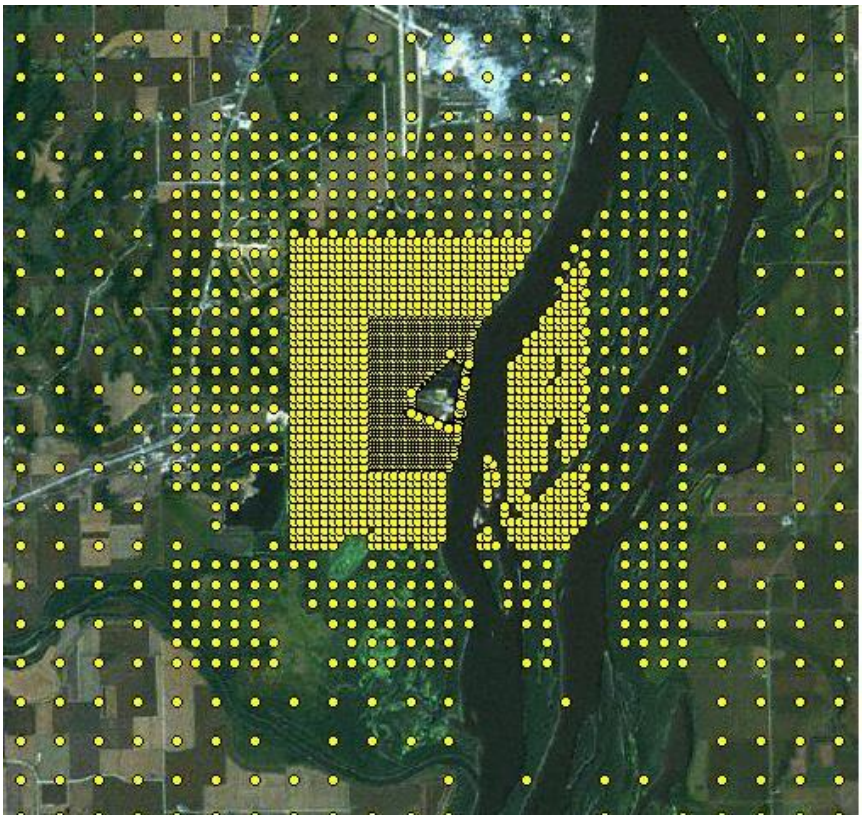
The grid receptor spacing for the area of analysis chosen by IDNR is as follows:

- 50 meters along the IPL Burlington facility fenceline
- 50 meters from the fenceline to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3.0 km
- 500 meters extending from 3.0 km to 5.0 km

The receptor network contained 2,486 receptors and covered the eastern portion of Des Moines County, Iowa and the western portion of Henderson County, Illinois.

Figure 7, which was included in IDNR's submission prior to the start of the comment period, shows the chosen area of analysis surrounding the IPL Burlington facility, as well as the receptor grid for the area of analysis. Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. The impacts of the area's geography and topography will be discussed later within this document.

Figure 7: Receptor Grid for the IPL Burlington Facility Area of Analysis



The state performed an analysis to locate any additional major sources of SO_2 within 20 km of IPL Burlington. For the area of analysis, the state did identify the Iowa Army Ammunition Plant (IAAP), with a maximum SO_2 emissions rate of 753.26 tpy during the 2012-2014 period, as a possible significant SO_2 contributor within 20 km of the IPL Burlington facility. The IAAP is located approximately 15 km to the northwest of the Burlington Facility. It has two coal-fired boilers that vent through a common stack. IDNR performed a single point source modeling analysis for this facility to determine the plant's impact within the IPL Burlington modeling analysis area. Although excluding IAAP as an interactive source for the IPL Burlington analysis and modeling the source separately does not follow the Modeling TAD and is not recommended, EPA believes the results likely give a conservative estimation for this analysis since the highest modeled impact from IAAP was added to the highest modeled impact from IPL Burlington. INDR modeling indicated that the highest 4th highest predicted concentration (corresponding to the 99th percentile) averaged over three years attributed to the emissions from the IAAP was 21.3 μg/m3. IDNR stated that this modeled concentration for the IAAP, along with the inclusion of the modeled IPL Burlington results and background value, is below the 1-hr SO_2 NAAQS.

Modeling Parameter: Source Characterization

IDNR characterized the source within the area of analysis in accordance with practices outlined as acceptable in the Modeling TAD. Specifically, IDNR used actual stack heights in conjunction with actual emissions. IDNR also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purposes of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also provides for the flexibility of using allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information when it is available and that these data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA believes that detailed throughput, operating schedules, and emissions information from the impacted source(s) should be used.

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These

new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, IDNR included IPL Burlington and one other emitter of SO_2 within 20 km in the area of analysis. This other emitter of SO_2 (IAAP) was evaluated individually in the state's modeling analysis. The state determined that the emissions from this source would not lead to exceedences of the 1-hr SO_2 NAAQS when added to the IPL Burlington modeled impacts and the background value. The 20 km distance was selected because IDNR believes that this distance adequately includes the sources which might contribute to those concentrations in the area of analysis. IPL Burlington's annual actual SO_2 emissions from 2012 to 2014 are summarized below.

Table 5: Actual SO_2 Emissions from 2012 – 2014 from IPL Burlington

Facility Name	SO_2 Emissions (tons per year)		
	2012	2013	2014
IPL Burlington	4,697	3,941	3,657

For IPL Burlington, IDNR used actual emissions from the 3-year data set 2012 – 2014. These emissions data were obtained from CEMs.

Modeling Parameter: Meteorology and Surface Characteristics

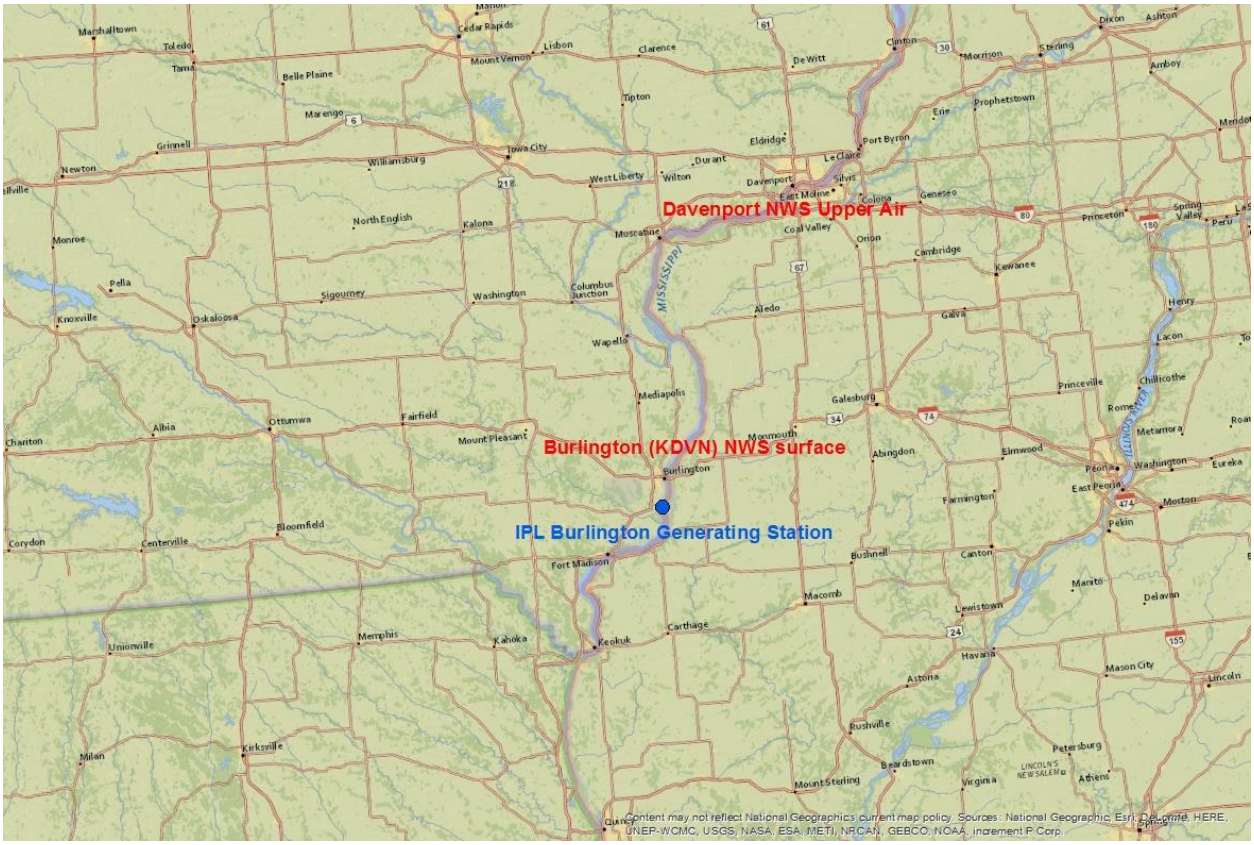
The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, the Federal Aviation Administration (FAA), and military stations.

For the IPL Burlington area of analysis, surface meteorology from the NWS station in Burlington, Iowa, approximately 5 km to the north, and coincident upper air observations from the NWS station in Davenport, Iowa, approximately 120 km to the northeast were selected as best representative of meteorological conditions within the area of analysis (Figure 4).

IDNR used AERSURFACE version 13016 using data from the NWS station in Burlington, Iowa, located at 40.77N, 91.13W to estimate the surface characteristics of the area of analysis. The state estimated values for 12 spatial sectors at a monthly temporal resolution. AERSURFACE was processed three times, once each for dry, average, and wet surface moisture conditions. The

output for the individual months from the three AERSURFACE runs were then manually combined into one output file. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo"). In the figure below generated by the EPA, the locations of the Burlington, Iowa, NWS station and Davenport, Iowa, upper air station are shown relative to the IPL Burlington area of analysis.

Figure 8: IPL Burlington Area of Analysis and the Burlington, Iowa and Davenport, Iowa NWS Stations



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. IDNR followed the methodology and settings presented in EPA's Modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In

order to better represent actual wind conditions at the meteorological tower, wind data of 1 minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, IDNR set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area of analysis is best described as relatively flat as the IPL Burlington facility lies along the Mississippi River Valley. There are, however, rolling hills to the northwest of the facility. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database.

Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99^{th} percentile monitored concentrations by hour of day and season or month.

For the IPL Burlington area of analysis, IDNR chose the "first tier" approach but derived a statewide default background concentration using an average of the concentrations of four monitors using 2009-2011 data. The derived average background concentration was based on monitors from the following four cities in Iowa: Cedar Rapids, Davenport, Des Moines, and Keosauqua. While the averaging of multiple monitors is not outlined in the Modeling TAD, EPA has determined that this methodology provides a conservative background concentration for the IPL Burlington area, which is located in rural southeast Iowa. In contrast, the four monitors used to derive the average background concentration are located near higher populated areas and other sources of SO_2 emissions, which would result in higher background concentrations than the rural area surrounding the Burlington facility given the higher number of nonpoint source emissions captured by the background monitors near more heavily populated urban areas. In summary, the background concentration for this area of analysis was determined by the state using the

described "first tier" multiple monitor averaging technique to be 32 micrograms per cubic meter ($\mu g/m^3$), or 12.2 ppb,[9] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from IDNR prior to the start of the comment period for the IPL Burlington area of analysis are summarized below in Table 6.

Table 6: AERMOD Modeling Parameters for the IPL Burlington Area of Analysis

[Facility, State] Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	2
Modeled Stacks	1
Modeled Structures	N/A
Modeled Fencelines	1
Total receptors	2,486
Emissions Type	Actuals
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Burlington, Iowa
Upper Air Meteorology Station	Davenport, Iowa
Methodology for Calculating Background SO_2 Concentration	Statewide default from monitors
Calculated Background SO_2 Concentration	32 $\mu g/m^3$

The results presented below in Table 7 show the magnitude and geographic location of the highest predicted modeled concentration based on actual emissions.

Table 7: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the IPL Burlington Area of Analysis Based on Actual Emissions

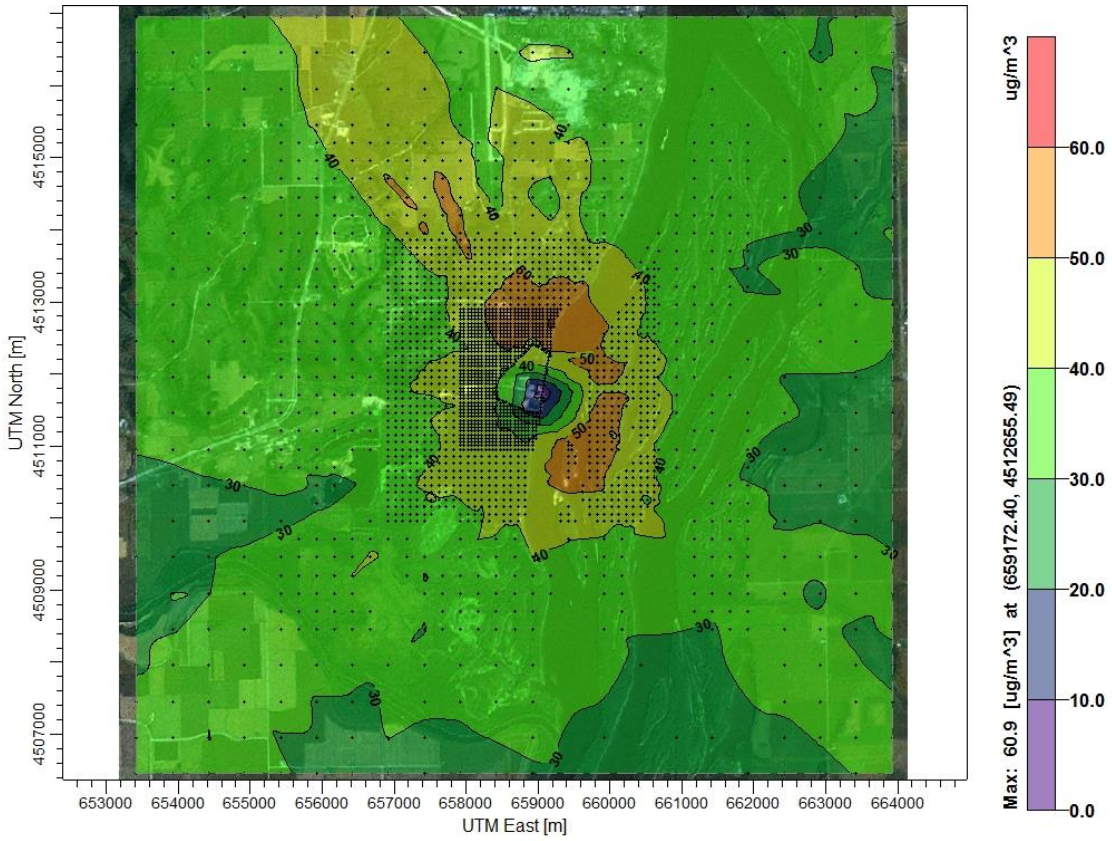
		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	657672.4	4514455.5	92.9	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

[9] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62 $\mu g/m^3$.

The state's modeling indicates that the highest predicted 3-year average 99th percentile 1-hour average concentration within the chosen modeling domain is 92.9 µg/m^3, or 35.5 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figure 9 below indicates that the predicted value occurred to the north of the IPL Burlington facility. IDNR's chosen receptor grid is also shown in the figure.

Figure 9: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the IPL Burlington Area of Analysis Based on Actual Emissions



Jurisdictional Boundaries:

Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. The EPA did not receive any comments regarding the intended boundaries for this area.

The EPA believes that our final unclassifiable/attainment area, consisting of the entirety of Des Moines County, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for geographically defining our final unclassifiable/attainment area.

<u>Conclusion</u>

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA is designating the area around IPL Burlington as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the area is comprised of the entirety of Des Moines County.

The unclassifiable/attainment designation is based on the modeling analysis that the State of Iowa provided to EPA December 23, 2015. The modeling analysis submitted by the state, using actual emissions from 2012-2014, shows attainment and this modeling followed the recommended EPA modeling TAD for designation purposes.

At this time, our final designations for the state only apply to this area and the others contained in this final technical support document. Consistent with the court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Iowa by either December 31, 2017, or December 31, 2020.