



State Of Ohio 2010 Revised Sulfur Dioxide
National Ambient Air Quality Standard
Recommended Source Area Designation:
W. H. Zimmer Generating Station

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August, 2015

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Recommended Designation: W. H. Zimmer Generating Station

CHAPTER ONE:

General Discussion

History

The United States Environmental Protection Agency (U.S. EPA) promulgated the revised National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO₂) on June 2, 2010. U.S. EPA replaced the 24-hour and annual standards with a new short-term one-hour standard of 75 parts per billion (ppb). The new one-hour SO₂ standard was published on June 22, 2010 (75 FR 35520) and became effective on August 23, 2010. The standard is based on the three-year average of the annual 99th percentile of one-hour daily maximum concentrations.

On August 15, 2013, U.S. EPA published (78 FR 47191) the initial SO₂ nonattainment area designations for the one-hour SO₂ standard across the country (effective October 4, 2013). On March 2, 2015, the U.S. District Court for the Northern District of California accepted as an enforceable order an agreement between the U.S. EPA and Sierra Club and the Natural Resources Defense Council to resolve litigation concerning the deadline for completing designations. The court's order directs U.S. EPA to complete designations in three steps: the first by July 2, 2016; the second by December 31, 2017 and the third by December 31, 2020. As part of the first round of designations, U.S. EPA has identified areas with newly monitored violations of the standard, or areas that contain stationary sources that emitted more than 16,000 tons of SO₂ in 2012 or emitted more than 2,600 tons of SO₂ and had an emission rate of at least 0.45 lbs SO₂/MMBtu in 2012. The U.S. EPA has identified two facilities in Ohio as meeting one or more of the emissions thresholds: the General James M. Gavin Plant and the W.H. Zimmer Generating Station. Ohio EPA must submit designation recommendations to U.S. EPA by September 18, 2015.

Requirements

Pursuant to section 107(d) of the Clean Air Act (CAA), U.S. EPA must initially designate areas as either "unclassifiable", "attainment", or "nonattainment" for the 2010 one-hour SO₂ standard. Since the original 2011 state submittals of designation recommendations and pursuant to the March 2, 2015 court order,

new information may be relevant for future designations. CAA Section 107(d) does not require states to submit updated recommendations. However, U.S. EPA will consider such information. For the round of designations to be completed by July 2, 2016, U.S. EPA requests that states submit updated recommendations and supporting information for consideration by September 18, 2015. If U.S. EPA intends to modify any state's designation recommendation, original or updated, the state will be notified no later than 120 days prior to promulgating the final designations. For the designations due to be promulgated on or before July 2, 2016, this notification will occur no later than March 2, 2016. Although not required by statute, U.S. EPA will provide a 30-day public comment period immediately following issuance of the 120-day letters.

Section 107(d)(1) of the CAA defines an area as "nonattainment" if it is violating the NAAQS or if it is contributing to a violation in a nearby area. The first step in making designation decisions is to identify areas for which monitoring or appropriate modeling information indicate a violation of the NAAQS. U.S. EPA may designate an area as attainment if it is clear that that it meets the SO₂ NAAQS and does not contribute to a violation in a nearby area.

As stated in the U.S. EPA's *Data Requirements Rule for the 1-Hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS); Proposed Rule (79 FR 27445)*, herein referred to as the proposed Data Requirements Rule, the purpose of the designations modeling is to assess actual, current air quality and that recommendations could include modeling the source area as attaining the standard. U.S. EPA intends to designate areas that are modeled with actual emissions as "unclassifiable" whereas areas that are modeled with allowable emissions may be designated as "attainment." Areas designated as unclassifiable may be subject to additional and continued analysis to assess attainment over time.

Ohio EPA's Approach

This submittal is Ohio's recommendation for the designation of the area surrounding the William H. Zimmer Generating Station located in Clermont County, Ohio. This facility was identified by U.S. EPA as meeting the criteria established in the March 2, 2015 court order. In accordance with U.S. EPA's final rule, SO₂ Designation Guidance, and a March 20, 2015 memorandum *Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard*, the starting point for the area designations would be the county boundary associated with a violation or around the SO₂ source(s) in question, unless additional information is provided to U.S. EPA demonstrating a different boundary is appropriate. U.S. EPA's SO₂ Designation Guidance states that U.S. EPA generally believes that in the

absence of other relevant information it is appropriate to use county boundaries to define nonattainment areas, but they recognize that the five-factor analysis and other information may support designating only a portion of a county as nonattainment. U.S. EPA states that modeling could be used to address several of these factors simultaneously. Ohio used the five-factor analysis approach and conducted additional modeling analysis as a part of this submittal. While using this approach, the SO₂ Designation Guidance states this analysis should show that: 1) violations are not occurring in nearby portions that are excluded from the designation area; and 2) the excluded portions do not contain emission sources that contribute to the monitored or modeled violations, if observed.

The following summarizes the major factors included in Ohio's analysis for the designation recommendation for the area surrounding the William H. Zimmer Generating Station. Specifically, Ohio has used the five factor analysis approach, including refined dispersion modeling, as recommended in the SO₂ Designation Guidance, to support the boundary recommendation. Ohio EPA understands, based on the both the December 2013 Draft SO₂ NAAQS Designations Modeling Technical Assistance Document and the March 20, 2015 memorandum, that dispersion modeling accounts simultaneously for multiple elements of the five-factor analysis. As such, Ohio believes that the modeling analysis presented in Appendix A and summarized in this document should carry significant weight in the designation process. Where appropriate, Ohio is providing additional supporting information with respect to the five-factor designation approach.

Factor 1: Dispersion Modeling

Ohio conducted a refined dispersion modeling analysis following the guidance issued by U.S. EPA in the December 2013 Draft SO₂ NAAQS Designations Modeling Technical Assistance Document, the March 20 memorandum, and the proposed Data Requirements Rule. The modeling analysis was based on 2012 to 2014 actual emissions from the William H. Zimmer Generating Station and representative meteorological data from the same period. The methodology and results of this analysis are provided in Appendix A.

Factor 2: Emissions Data

Emissions of SO₂ for 2014 are derived from Ohio EPA's Fee Emission Reports (FERs) which are the basis for Ohio's 2014 NEI submittal. Tables identified in this analysis show stationary sources with reported SO₂ emissions in tons per year (TPY) at the facility level within each county relevant to the area around the William H. Zimmer facility. U.S. EPA's Designations Modeling Technical Assistance Documents suggests sources greater than the thresholds established under the proposed Data Requirements Rule located within 50

kilometers of the William H. Zimmer facility should be considered in the analysis of emissions data. Further, U.S. EPA Region 5 indicated to the Region 5 states that sources retired prior to the promulgation of a designation for a particular area do not need to be modeled. (Appendix E) This is consistent with the language of the proposed Data Requirements Rule. Therefore, Ohio will consider the reduction in SO₂ emissions due to retirements as part of its recommended designation. In addition to the emissions from sources meeting the above criteria, the impact of the William H. Zimmer facility are directly modeled as a part of Ohio's designation recommendation analysis. Emissions data for the William H. Zimmer facility were provided to Ohio EPA by the owner/operator of the facility, Dynegy Zimmer, LLC.

Factor 3: Meteorology

The meteorology review looks at wind data gathered at stations in and near Ohio by the National Weather Service (NWS). Information presented under this factor is indicative of annual average winds. These data may also suggest that emissions originating from some directions may be more prone to contribute than emissions in other directions.

Ohio is located in what is meteorologically termed the Mid-Latitudes. For pollutant dispersion, the most important meteorological parameter is wind speed and wind direction. In this region, surface weather systems predominantly travel from west to east, guided by either the sub-tropical or polar jet streams. The resulting surface transport winds associated with these systems will generally have a western component with additional southern components in the summer and northern components in the winter, although, on any given day, winds can blow from any direction. Discussions regarding this factor will show representative wind roses for the source area and SO₂ sources surrounding the William H. Zimmer facility.

The major geographic feature affecting winds in the area surrounding the William H. Zimmer facility is the hilly terrain and the Ohio River valley. This area has significant forested areas which modify the surface roughness lengths and can impact wind speed and wind direction. The Covington airport wind roses best illustrate the range of wind directions and wind speeds associated with this area.

A significant portion of this factor is accounted for by the dispersion modeling analysis conducted for this area. The AERSURFACE preprocessor component of the AERMOD model accounts for land use and its impact on surface roughness lengths, albedo, and Bowen ratio. The meteorological inputs to AERMOD itself are taken from measurements at the Covington airport.

Factor 4: Topography and Land Use/Land Cover

The topography and land use/land cover analysis looks at physical features and land use or land cover that might have an effect on the airshed and, therefore, the distribution of pollutants over an area. The William H. Zimmer facility is located in the Ohio River valley, and therefore some portions of the area may experience inversions. However, the geographical and topographical features of the area are not likely to limit or impact the transport of SO₂ in a significant manner. Furthermore, the topography of the region is accounted for in the dispersion modeling analysis via the AERMAP preprocessor, and the impact of land use is accounted for via the AERSURFACE preprocessor. As such, Ohio EPA does not consider topography and land use to be a significant factor for this analysis beyond what is analyzed directly via the refined dispersion modeling analysis.

Factor 5: Jurisdictional Boundaries

The analysis of jurisdictional boundaries looks at the planning and organizational structure of an area to determine if the implementation of controls in a potential nonattainment area can be carried out in a cohesive manner. Core Based Statistical Areas (CBSAs), comprised of Metropolitan Statistical Areas (MSAs) and Combined Statistical Areas (CSAs), boundaries were considered for these recommendations.

CHAPTER TWO:

Analysis

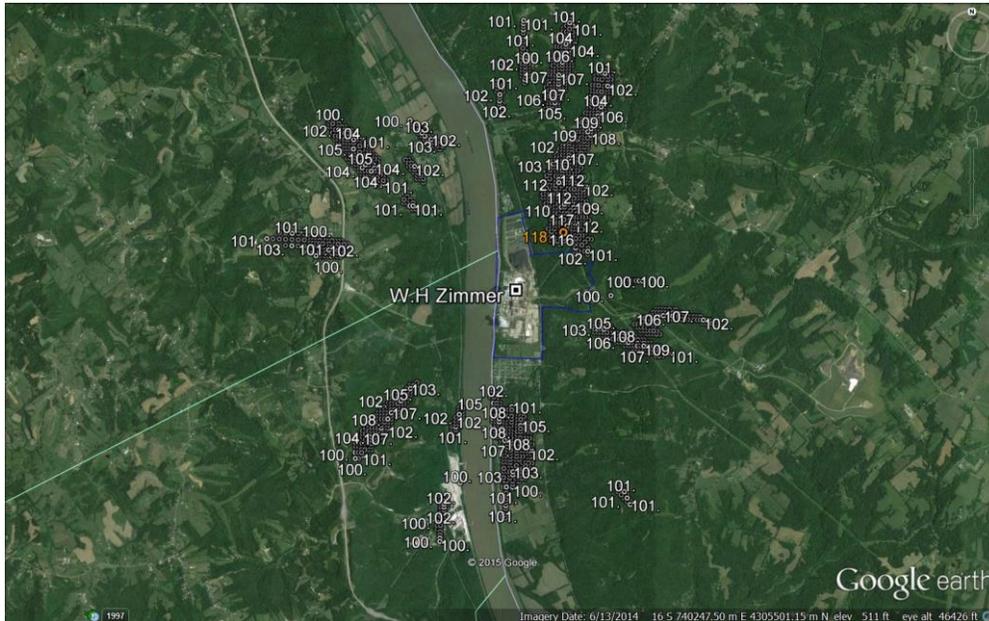
Discussion:

Based on the five factor analysis below, Ohio EPA is recommending the portion of Clermont County, excluding Pierce Township, be designated as attainment for the 2010 one-hour SO₂ standard. This recommendation encompasses the following townships in Clermont County: Batavia, Franklin, Goshen, Jackson, Miami, Monroe, Ohio, Stonelick, Tate, Union, Washington, Wayne, and Williamsburg. The following discussion and information is relevant to those townships in Clermont County listed above, excluding Pierce Township.

As detailed under Factor 1, Ohio EPA modeled actual SO₂ emissions from the William H. Zimmer Generating Station, years 2012-2014. No exceedances of the standard were modeled inclusive of a conservative 11 ppb background concentration. Derivation of the background concentration is detailed in Appendix B of this submittal.

Factor 1: Dispersion Modeling

Ohio EPA modeled actual emissions from the William H. Zimmer Generating Station for years 2012-2014, inclusive of an 11 ppb background. The full details of the modeling analysis are presented in Appendix A of this submittal. Appendix C includes the modeling protocol. For this analysis, the maximum modeled 3-year design value, years 2012-2014, was 118.2265 µg/m³ (147.0025 µg/m³, with background). An area meets the standard of 75 ppb if a concentration of 196.2 µg/m³ or lower is modeled. Thus, no exceedance of the standard was modeled. The results of this analysis are shown in Figure 1. Note that for clarity, only design values of 100 µg/m³ or greater are displayed.



**Figure 1: Maximum SO₂ impacts, William H. Zimmer facility, 2012-2014.
Concentrations are shown in µg/m³.**

The maximum 3-year design value was modeled approximately 350 meters from the facility fenceline and approximately 1,200 meters from the largest SO₂ source. The spatial distribution of modeled concentrations greater than or equal to 100 µg/m³ were located in a 4 to 5 km radius of the primary emissions source at the William H. Zimmer facility, as detailed in Appendix A. It should be noted that Ohio’s modeling analysis was conducted over a 50 x 50 kilometer modeling domain with additional receptors placed to encompass the entirety of Clermont County.

Factor 2: Emissions

In 2014, there were 83,038 TPY of actual SO₂ emissions from Ohio and Kentucky sources within 50 kilometers of the border of Clermont County from facilities that might potentially need to be modeled under the requirements of the proposed Data Requirements Rule. 46,101 TPY of actual 2014 SO₂ emissions are within Clermont County itself. These sources are shown in Table 1.

State	County	Facility ID	Facility Name	2014 SO2 Emissions (TPY)	Distance from W. H. Zimmer (km)
OH	Clermont	1413090154	W. H. Zimmer Power Station	13,498	--
OH	Clermont	1413100008	Duke Energy Ohio, W.C. Beckjord Station	32,603	14.7
Clermont Total				46,101	
OH	Hamilton	1431350093	Miami Fort Power Station	28,479	57.1
OH	Hamilton	1431394148	DTE St. Bernard, LLC	1,666	41.6
Hamilton Total				30,145	
KY	Boone		Duke Energy Kentucky, East Bend Station	2,103	54.53
Boone Total				2,103	
KY	Mason		Spurlock Station	4,689	40.9
Mason Total				4,689	
Grand Total				83,038	

Table 1: 2014 annual SO₂ emissions, William H. Zimmer and nearby sources.

A significant aspect of Ohio's recommended designation is the cessation of operations at the Walter C. Beckjord Station as of June 1, 2015. (Appendix F, Appendix G) This represents an emission reduction of approximately 34% from the area surrounding the William H. Zimmer facility, and an approximately 71% reduction in Clermont County. Additionally, Unit 6 at the Miami Fort Power Station ceased operation as of June 1, 2015. (Appendix H) This unit emitted 18,865 tons of SO₂ in 2014. These shutdowns account for a reduction of 51,468 tons from 2014, or 62% from the area surrounding the William H. Zimmer facility. The distance between the remaining facilities and the area impacted by emissions from the William H. Zimmer facility, as well as the meteorology of the area (Factor 3), would indicate that emissions from these remaining facilities are unlikely to impact ambient SO₂ concentrations in Clermont County beyond what is accounted for in the background concentration.

Factor 3: Meteorology

Please refer to the Factor 3 general discussion at the beginning of this document for general meteorological information applicable to Clermont County and the William H. Zimmer facility. Per U.S. EPA guidance, dispersion modeling accounts for the majority of topographical and land use features that influence the meteorology of Clermont County. Of particular importance in Ohio's designation recommendation for this area is the annual trends and distribution of wind directions in this area, which are best represented by data from the National Weather Service station located at the Cincinnati Northern Kentucky Airport (Covington). Wind roses from this station, years 2012 to 2014, are shown in Figure 2, below.

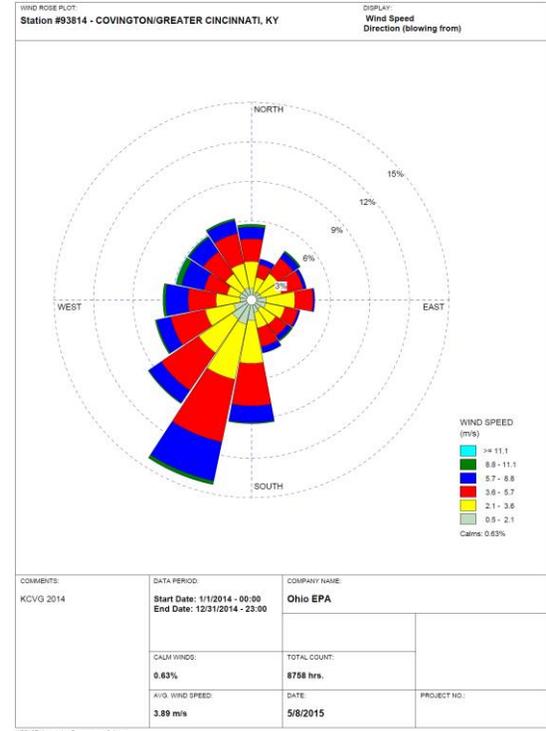
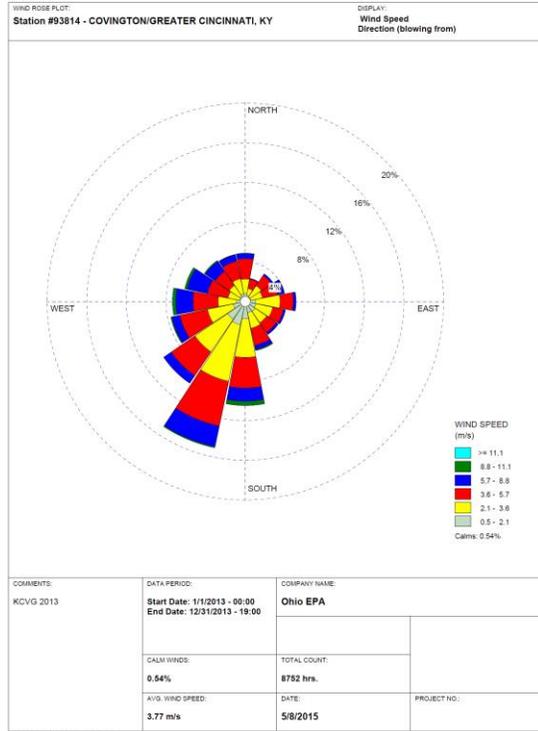
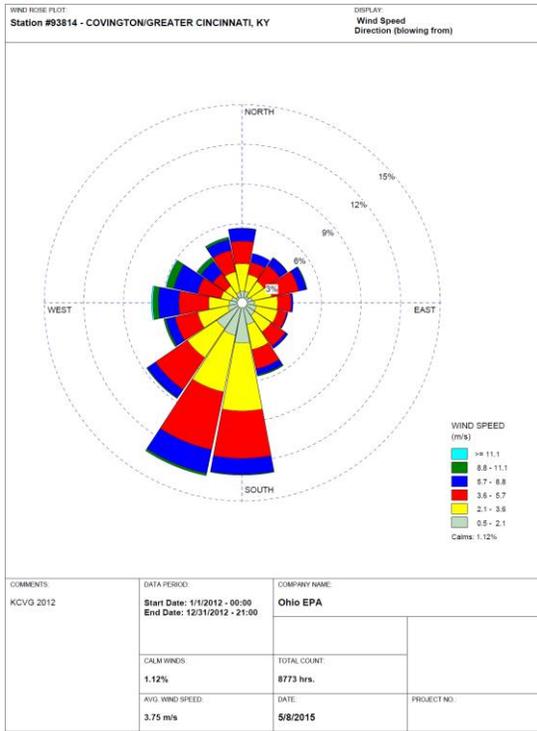


Figure 2: Covington wind roses, 2012-2014

The predominant wind directions were used, in part, to inform which facilities in Table 1, in addition to William H. Zimmer, may potentially impact ambient SO₂ concentrations in Clermont County not accounted for by background and therefore necessitate inclusion in the dispersion modeling analysis. As shown in Figure 2, the predominant winds in the source area originate from the south and south-west and to a lesser degree from the west. Figure 3 shows the location of all facilities in Table 1, as well as a composite wind rose, years 2012-2014, from the Covington meteorological station.

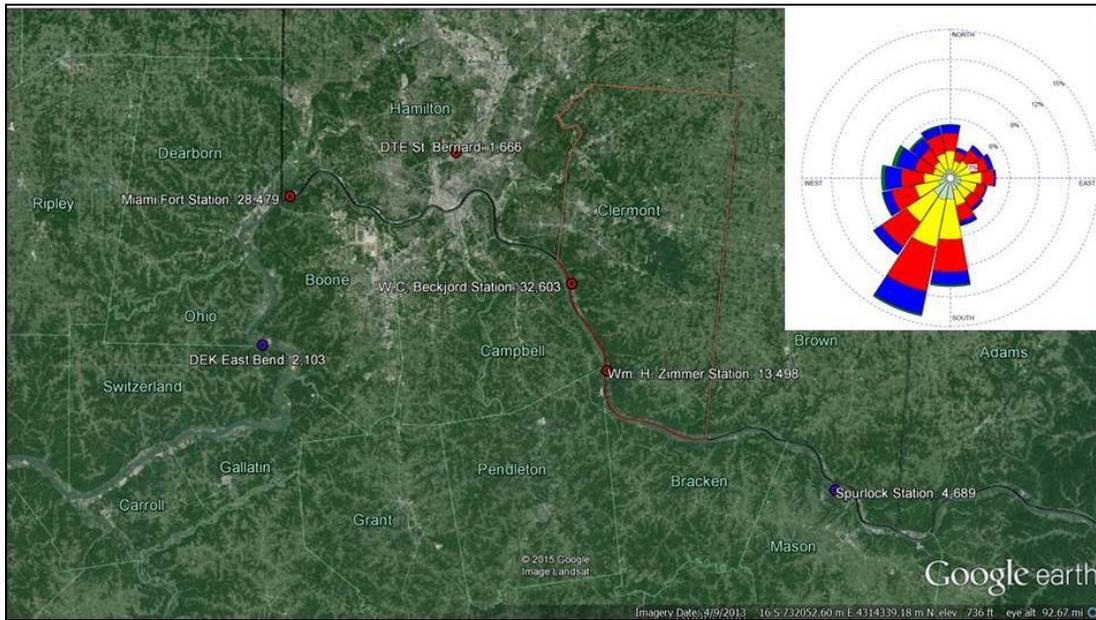


Figure 3: SO₂ sources within 50 km of Clermont County, Ohio.

Considering the predominant wind directions, Ohio does not conclude that emissions from Spurlock Station, located to the south-east of the source area, impact ambient SO₂ concentrations in Clermont County. The largest SO₂ source based on 2014 data, Walter C. Beckjord, is no longer operational as of June 1, 2015. Wind direction data suggests that emissions from Miami Fort Station and East Bend, located to the west of Clermont County, could potentially impact ambient SO₂ concentrations; these sources are more than 40 kilometers distant from the nearest part of Clermont County and as such, Ohio does not conclude that emissions from these sources impact ambient SO₂ concentrations beyond the background level accounted for in the refined dispersion modeling analysis. Lastly, wind direction data suggests that emissions from DTE St. Bernard may impact ambient SO₂ concentrations in Clermont County under some meteorological conditions. Please refer to Factor 2, which shows that this facility has relatively low annual emissions. Further, the largest emission unit at DTE St. Bernard has a stack height of 65 meters. It is therefore likely that the

maximum impacts of this facility would occur within approximately 650 meters of the facility. Screen modeling analyses indicate that the maximum impact decreases by approximately 95% over the 17 kilometers distance to the border of Clermont County. Ohio does not conclude that impacts from DTE St. Bernard impact ambient SO₂ concentrations in Clermont County beyond what is accounted for in background. Ohio concludes that, following the closure of the Walter C. Beckjord facility, the primary source of SO₂ in Clermont County is the William H. Zimmer facility, and that the impact of those facilities in Table 1 not explicitly modeled are represented adequately and conservatively by the background concentration included in the Factor 1 analysis.

Factor 4: Topography and Land Use/Land Cover

Please refer to the general discussion of Factor 4 at the beginning of this document. Ohio, consistent with U.S. EPA guidance, understands that the topography and land use characteristics influencing meteorology and the dispersion of SO₂ emissions from the William H. Zimmer facility are adequately accounted for via the dispersion modeling analysis. Please refer to the Factor 1 section of this Chapter.

Factor 5: Jurisdictional Boundaries

The Cincinnati, OH-KY-IN MSA includes Clermont, Brown, Butler, Hamilton, and Warren Counties in Ohio, as well as Boone, Bracken, Campbell, Gallatin, Kenton, Mason, Pendleton Counties in Kentucky and Dearborn, Ohio, and Union Counties in Indiana. The Ohio EPA Central Office and the Southwest Ohio Air Quality Agency are responsible for air quality planning within all areas of Clermont County. Clermont County, with the exception of Pierce Township, is not currently nonattainment for the 2010 one-hour SO₂ standard. The dispersion modeling analysis conducted by Ohio was inclusive of the entirety of Clermont County. Ohio, in a separate submission, is requesting that Pierce Township be redesignated maintenance for the 2010 one-hour SO₂ standard. In this submission, Ohio is recommending, based on a five-factor analysis, that the remainder of Clermont County: Batavia, Franklin, Goshen, Jackson, Miami, Monroe, Ohio, Stonelick, Tate, Union, Washington, Wayne, and Williamsburg Townships, be designated unclassifiable/attainment for the 2010 one-hour SO₂ standard. Townships in Ohio have well-established boundaries, and Ohio believes they are a suitable administrative basis for this recommendation.

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