
Technical Support Document (TSD)

**Michigan
Area Designations For the
2010 SO₂ Primary National Ambient Air Quality Standard**

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must designate areas as either “nonattainment,” “attainment,” or “unclassifiable” for the 2010 one-hour sulfur dioxide (SO₂) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to poor air quality in a nearby area that does not meet the NAAQS. Table 1 below identifies the counties or portions of counties (or tribal areas) in Michigan that EPA intends to designate “nonattainment” for the primary 2010 SO₂ NAAQS.

Michigan submitted designation recommendations on June 1, 2011. On February 6, 2013, EPA sent a letter with intended designations for Michigan. Michigan did not respond to EPA’s intended designation. Table 1 below lists Michigan’s recommendations and identifies the counties or portions of counties in Michigan for areas that EPA is initially designating “nonattainment” based on monitored violations. EPA is not yet prepared to designate other areas in Indiana, and will address such areas and their sources in a subsequent round of final designations.

Table 1. Nonattainment Area Designations for Michigan

Area	Michigan’s Recommended Designations of Areas/Counties	EPA's Designation of Areas/Counties
Detroit, MI Wayne County (partial) -An area bounded on the east by the Michigan- Ontario border, on the south by the Wayne County-Monroe County border, on the west by Interstate 75 north to Southfield Road, Southfield Road to Interstate 94, and Interstate 94 north to Michigan Avenue, and on the north by Michigan Avenue to Woodward Avenue and a line on Woodward Avenue extended to the Michigan-Ontario border	Nonattainment	Nonattainment

Background

On June 3, 2010, EPA revised the primary SO₂ NAAQS (75 FR 35520, June 22, 2010) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb), which is met at an ambient air quality monitoring site when the 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentration at each monitor in an area does not exceed 75 ppb, as determined in accordance with Appendix T of 40 CFR part 50. 40 CFR 50.17(a)-(b). EPA has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO₂. The Agency is revoking the two prior primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year because the standards will not add additional public health protection given a 1-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two prior primary standards. Similarly, the secondary standard for SO₂ has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

EPA's SO₂ Designation Approach

Section 107(d) of the CAA provides that not later than 1 year after promulgation of a new or revised NAAQS, state Governors may submit their recommendations for designations and boundaries to EPA. For the 2010 SO₂ NAAQS, this deadline was June 3, 2011. Section 107(d) also requires EPA to provide a notification to states of no less than 120-days prior to promulgating an initial area designation that is a modification of a state's recommendation. EPA has reviewed the State's recommendations and has notified the State Commissioner through letter signed by the Regional Administrator of any intended modifications. [While language in section 107 specifically addresses states, we intend to follow the same process for tribes, pursuant to section 301(d) of the CAA and Tribal Authority Rule (40 CFR Part 49). Therefore, we intend to designate tribal areas, in consultation with the tribes, on the same schedule as state designations.] If a State or Tribe did not submit designation recommendations, EPA is to promulgate the designations that it deems appropriate. If a state or tribal government disagrees with EPA's intended area designations, it had an opportunity to demonstrate why any proposed modification is inappropriate.

Designations guidance was issued by EPA through a March 24, 2011, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum identifies factors EPA intends to evaluate in determining boundaries for areas designated nonattainment. These 5 factors include: 1) Air quality data; 2) Emissions and emissions-related data (location of sources and potential contribution to ambient SO₂ concentrations); 3) Meteorology (weather/transport patterns); 4) Geography/topography (mountain ranges or other air basin boundaries); and 5) Jurisdictional boundaries (e.g., counties, air districts, pre-existing nonattainment areas, reservations, metropolitan planning organization), among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO₂ NAAQS.

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

In this TSD, EPA discusses its review and technical analysis of the recommendations submitted by Michigan for designations of the 1-hour SO₂ standard and any modifications from these recommendations.

Definition of important terms used in this document:

- 1) **Designated nonattainment area** – an area which EPA has determined, based on a state recommendation and/or on the technical analysis included in this document, has violated the 2010 SO₂ NAAQS, based on the most recent three years of air quality monitoring data from 2009-2011, or contributes to a violation in a nearby area.
- 2) **Recommended nonattainment area** – an area that a state or tribal government has recommended to EPA to be designated as nonattainment.
- 3) **Violating monitor** – an ambient air monitor meeting all methods, quality assurance and citing criteria and requirements whose valid design value exceeds 75 ppb, as described in Appendix T of 40 CFR part 50.
- 4) **2010 SO₂ NAAQS** - 75 ppb, national ambient air quality standard for SO₂ promulgated in 2010. Based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations
- 5) **Design Value** – a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.

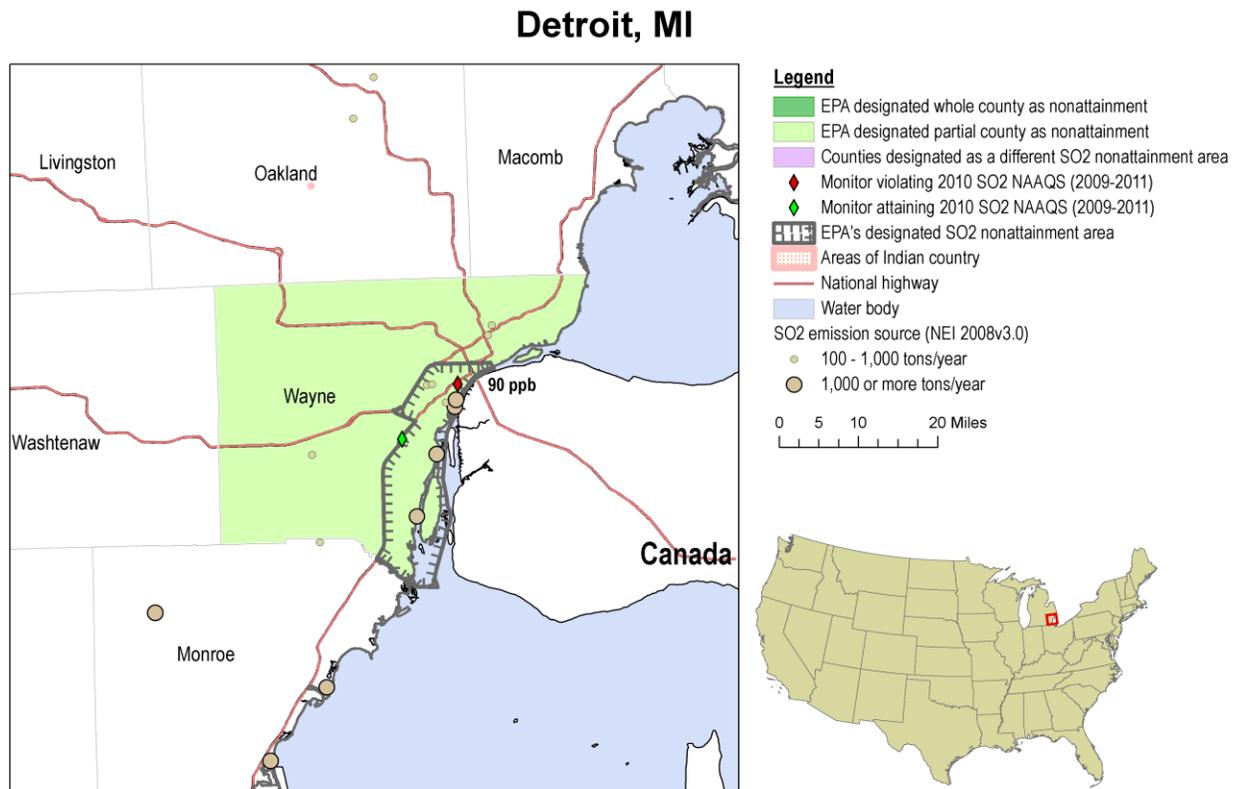
Technical analysis for the Detroit, MI Area

Introduction

This technical analysis for the Detroit, MI area identifies Wayne County with a monitor that violates the 2010 SO₂ NAAQS, and evaluates nearby counties for contributions to SO₂ concentrations in the area. EPA has evaluated this county and nearby counties based on the evidence for the factors recommended in the March 24, 2011 EPA guidance.

Figure 1 is a map of the area showing the locations and design values of air quality monitors in the area, and the counties surrounding any violating air quality monitors. Notably, a monitor at Southwest High School in Detroit recorded a 2009 to 2011 design value of 90 ppb. One other monitor operates in the area, at Allen Park, also in Wayne County, about 12 kilometers to the southwest. The Allen Park monitor recorded a 2009 to 2011 design value of 49 ppb.

Figure 1. Map of sources and monitors in the Detroit, MI area and the Detroit nonattainment area



Michigan analyzed the sources that might be contributing to the violation at Southwest High School. This assessment identified a series of major sources located south of downtown Detroit and within a few kilometers of the Detroit River. Based on this assessment, Michigan's June 1, 2011, submittal recommended designating a nonattainment area bordered by the Michigan-Ontario border (in the Detroit River) on the east, the Wayne-Monroe county border on the south, Interstate 75, Southfield Road and Interstate 94 on the west, and Michigan Avenue on the north. Since Michigan Avenue does not extend fully to the Michigan-Ontario border, Michigan subsequently clarified that its recommended nonattainment area should be considered to be bounded by Michigan Avenue from Interstate 94 to Woodward Avenue and by Woodward Avenue and an extending line as if Woodward Avenue extended to the Michigan-Ontario border. Michigan's recommended nonattainment area averages approximately 6 kilometers east-west and about 40 kilometers north-south.

Based on EPA's technical analysis described below, EPA is initially designating a Detroit, MI nonattainment area for the 2010 SO₂ NAAQS with the boundaries recommended by Michigan. Areas and sources that we are not yet prepared to conclude are contributing to the monitored

violations or to possible other violations are not included in this initial nonattainment area, and will be addressed in a subsequent round of designations.

Detailed Assessment

Air Quality Data

This factor considers the SO₂ air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in the Detroit area based on data for the 2009-2011 period.

The 2010 SO₂ NAAQS design values for the Detroit, MI area in Michigan are shown in Table 2.

Table 2. Air Quality Data in the Detroit Area

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009-2011 (ppb)
Wayne	Yes	26-163-0015	42.3028, -83.1065	90
	Included in area	26-163-0001	42.2286, -83.2082	49

Monitor in Bold has the highest 2009-2011 design value in the county.

The Southwest High School monitor (Monitor Air Quality System ID 26-163-0015) in Wayne County shows a violation of the 75 ppb 2010 SO₂ NAAQS.

Emissions and Emissions-Related Data

Evidence of SO₂ emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emission data for SO₂ and any growth in SO₂ emitting activities since the date represented by those emissions data.

Emissions

The most recent year for which national emissions information was compiled was 2008. Michigan provided emissions data for 2009 generally showing emissions similar to 2008 emissions. Therefore, EPA primarily relied on the 2008 National Emissions Inventory (NEI) emissions data (NEI08V3).

Table 3 shows total emissions of SO₂ (given in tons per year) for major sources in Wayne County and for sources emitting over 1000 tons per year in adjoining Monroe and St. Clair Counties. Table 3 also shows pertinent information for sources in these counties emitting greater than 100 tons per year of SO₂ according to the 2008 NEI.

Table 3. SO₂ Emissions in the Detroit Area (NEI08V3)

County	Facility in State Recommended N.A. Area?	Facility	Emissions NEI08V3 (tons per year)	Facility Location	Distance to SWHS monitor (km)	Total County SO ₂ Emissions (tons per year)
Wayne	Yes	DTE Trenton Channel	27,622	42.1237, -83.1812	21	55,660
	Yes	DTE River Rouge	14,491	42.2727, -83.1124	3	
	Yes	USS Great Lakes	6,755	42.2817, -83.1102	2	
	Yes	Wyandotte Muni	1,793	42.2082, -83.1456	11	
	No	GM Hamtramck	566	42.3820, -83.0449	10	
	Yes	Severstal	558	42.3032, -83.1655	5	
	Yes	Dearborn Industrial Generation	401	42.3026, -83.154	4	
	Yes	Carmeuse Lime/River Rough	395	42.2774, -83.128	3	
	No	Detroit WTP	225	42.2217, -83.3622	23	
	No	Detroit Resource Recovery	200	42.3686, -83.0517	7	
Monroe	No	DTE Monroe	118,382	41.8917, -83.3461	54	135,789
	No	J.R. Whiting	9,260	41.7917, -83.4486	63	
	No	Holcim Cement	7265	41.9933, -83.6596	57	
St. Clair	No	Belle River power plant	62,114	42.7748, -82.4945	73	64,392
	No	E.B. Eddy Paper	1,019	42.9865, -82.4415	93	

All of the largest sources in Wayne County are located within the recommended nonattainment area. Three sources in Wayne County emitting over 100 tons per year are located outside the recommended nonattainment area. Based on the emissions from these relatively smaller sources and their distance from the violating monitor, EPA is not yet prepared to conclude that the emissions from these three sources contribute to the monitored violation or to other possible violations. These sources will be addressed in a subsequent round of designations.

Monroe County has a power plant with by far the most emissions of any facility in the area based on the NEI08V3. This facility is also located at a substantial distance from the violating monitor. Using emissions divided by distance as a rough indicator of impacts, this facility is likely to have less impact than DTE's River Rouge plant and USS' Great Lakes Works but more impact on the violating monitor's design value than other sources in the area. Thus, full consideration of the impact of this plant requires consideration of recent emission controls at this plant. The other plant in Monroe County and the plant in St. Clair County are at even greater distances and are less likely to be contributing to the violating monitor's design value.

Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 3 represent emissions levels taking into account any control strategies implemented on stationary sources in this area up to and including 2008. Michigan did not provide any additional information on

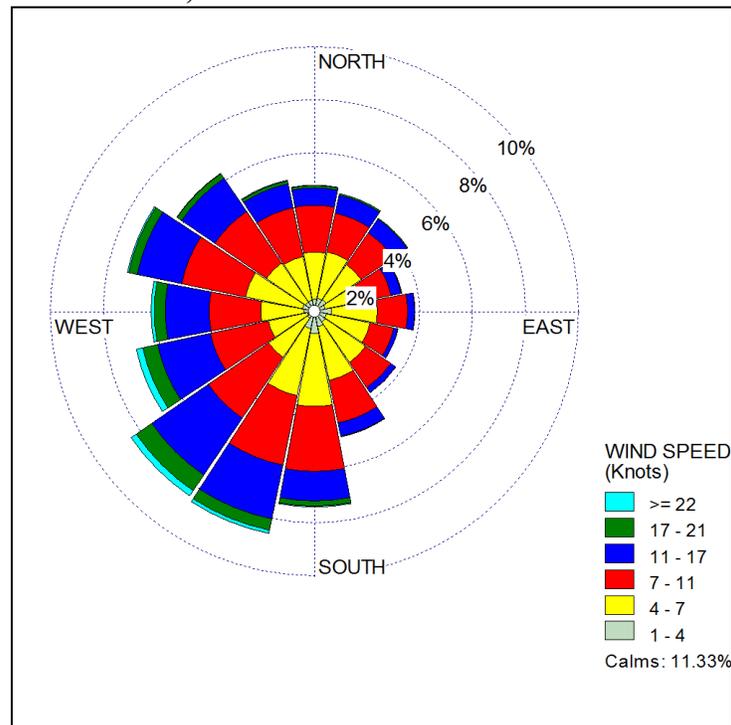
emissions reductions resulting from controls put into place after 2008. However, EPA examined emissions data submitted into EPA’s Clean Air Markets database for the Monroe power plant. These data show that this facility installed wet limestone scrubbing systems on two of its four units in 2009, reducing SO₂ emissions from the 2008 level of 118,382 tons to a 2010 level of 47,608 tons. Emissions in 2011 from this facility were similar to its emissions in 2010. Given this decline in emissions, and the distance of the facility from the monitor, the Monroe plant is likely to have significantly less impact on the monitor’s design value than sources in Wayne County that are much closer to the violating monitor.

Based on information above for the sources in Monroe County and St. Clair County, we are not yet prepared to conclude that the emissions from these sources contribute to the monitored violation or that the sources may be considered nearby. We will further address these sources in a subsequent round of designations.

Meteorology (weather/transport patterns)

Evidence of source-receptor relationships between specific emissions sources and high SO₂ values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area. Figure 2 shows the prevalent wind direction for the Detroit area.

Figure 2: Wind Rose for Detroit, MI



The wind rose above shows that winds are most likely to come from the southwest but also frequently come from all the western directions, and occasionally from the other directions. This shows that a source from any direction could contribute to the violation at the monitor. All of the largest emitters in the area, including DTE Trenton Channel, DTE River Rouge, and USS

Great Lakes, are located to the south and southwest of the monitor, which are the most frequent wind directions.

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

The Detroit area does not have any geographical or topographical barriers significantly limiting air pollution transport within its airshed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional boundaries

Once the geographic area associated with the area violating the SO₂ standard and the nearby areas contributing to the monitored violations are determined, we considered existing jurisdictional boundaries for the purpose of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Michigan does not have any pre-existing SO₂ nonattainment area boundaries under the prior NAAQS. Nonattainment areas in Michigan for other pollutants have often been defined on the basis of roadways, and roadways in Michigan have well established locations and are a suitable basis for defining nonattainment areas. Therefore, EPA used roadways in defining the nonattainment boundary for the Detroit area. The boundary for the Detroit nonattainment area is provided in Table 1 above.

Other Relevant Information

EPA did not receive additional information relevant to establishing a nonattainment area boundary for this area.

Conclusion

The air quality monitor located at Southwest High School shows a violation of the 2010 SO₂ NAAQS, based on 2009-2011 air quality data. The nonattainment area recommended by Michigan includes the violating monitor and sources that are likely to be contributing to the violating monitor's design value. While a large source is located in Monroe County south of the recommended nonattainment area, this source has recently installed significant emission controls, and the source is sufficiently distant from the violating monitor to warrant not including it in the initial nonattainment area based on the monitored violation, as we are not yet prepared to conclude that it is a nearby source contributing to that violation. This source will be further addressed in a subsequent round of designations.

Other sources outside Michigan's recommended nonattainment area are also less likely to be having a significant impact on the violating monitor's design value, and we are similarly not yet prepared to conclude that these sources are contributing to the monitored violation. We will also further address these sources in a subsequent round of designations. Therefore, EPA is initially designating a Detroit, MI nonattainment area using the boundaries recommended by Michigan. In a subsequent round of designations, we will make final designation decisions for areas in Michigan not included in the nonattainment area designation addressed in this TSD.