
DRAFT Technical Support Document

ARIZONA
Area Designations for the
2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must initially designate areas as either "unclassifiable", "attainment", or "nonattainment" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to poor air quality in a nearby area that does not meet the NAAQS.

Table 1 below identifies the counties and portions of counties in Arizona that EPA intends to initially designate "nonattainment" based on monitored violations.

Table 1. Nonattainment Designations for Arizona

Area (listed alphabetically)	Arizona Recommendation of Areas/Counties	EPA's Intended Nonattainment Areas/Counties
Hayden		
Gila County (partial)	Nonattainment	Nonattainment
Pinal County (partial)	Nonattainment	Nonattainment
Miami		
Gila County (partial)	Nonattainment	Nonattainment

Background

On June 2, 2010, EPA revised the primary SO_2 NAAQS (75 FR 35520, June 22, 2010) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb), which is attained when the 3-year average of the 99th percentile of the daily maximum 1-hour average concentration at each monitor in an area does not exceed 75 ppb. EPA has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly, and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO_2. The Agency is revoking the two prior primary standards of 140 ppb evaluated over 24-hours and 30 ppb evaluated over an entire year because the standards will not add additional public health protection given a 1-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two prior primary standards. Similarly, the secondary standard for SO2 has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

EPA's SO_2 Designation Approach

Section 107(d) of the CAA 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. 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 Governor through a 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 will promulgate the designations that it deems appropriate. If a state or tribe disagrees with EPA's intended area designations, it has an opportunity to demonstrate why any proposed modification is inappropriate.

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

As defined at 18 U.S.C. 1151, "Indian country" refers to: "(a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same." EPA recognizes the sovereignty of tribal governments, and has attempted to take the desires of the tribes into account in establishing appropriate unclassifiable and nonattainment area boundaries, in accordance with EPA's December, 2011 *Policy for Establishing Separate Air Quality Designations for Areas of Indian Country*[1].

The March 24, 2011, memo recommended that area boundaries default to the county boundary unless additional provided information justifies a larger or smaller boundary than 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.

[1] http://www.epa.gov/ttn/caaa/t1/memoranda/20120117indiancountry.pdf

In this TSD, EPA discusses its review and technical analysis of the nonattainment area recommendations submitted by the state of Arizona for designations of the 1-hour SO_2 standard. Based on our review of information discussed below, EPA intends to agree with the state's recommendation to designate portions of Gila County and Pinal County nonattainment.

Definition of important terms used in this document:

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

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

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

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

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

Nonattainment Designations

Technical Analysis for Hayden, Arizona

Introduction

This technical analysis for Hayden, Arizona identifies the partial county with a monitor that violates the 2010 SO_2 NAAQS, and evaluates nearby counties for contributions to SO_2 concentrations in the area. EPA has evaluated this county and nearby counties based on the weight-of-evidence of the factors in EPA's Designation Guidance, issued on March 24, 2011.[2]

Figure 1 shows the areas in Arizona which EPA intends to designate nonattainment. Figure 2 is a map showing the locations of SO_2 monitors in Hayden, Arizona and surrounding counties. Violating monitors are shown with a red icon; monitors attaining the standard are shown with green icons. Design values for each monitor are listed in Figure 2, and in Table 2 below.

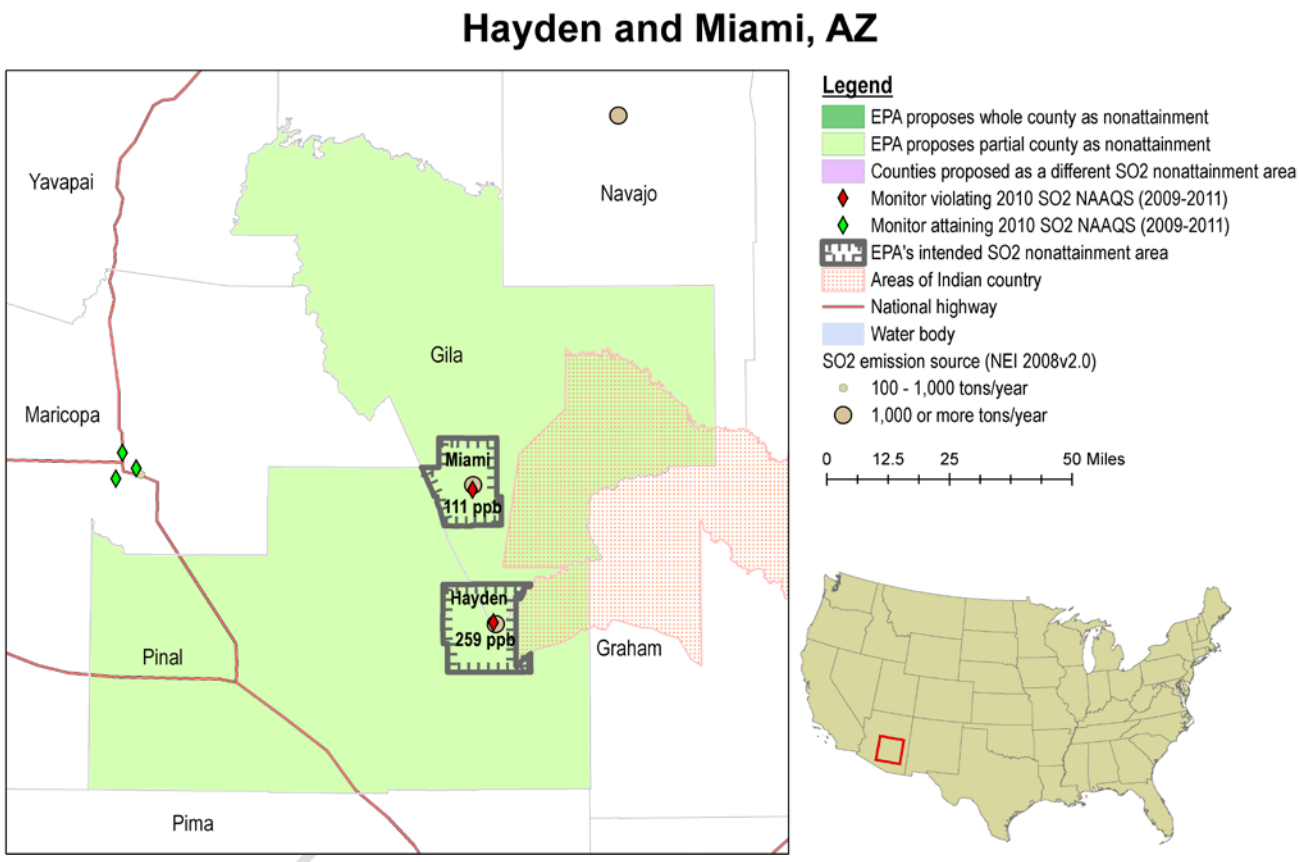


Figure 1

[2] http://www.epa.gov/air/sulfurdioxide/guidance.html

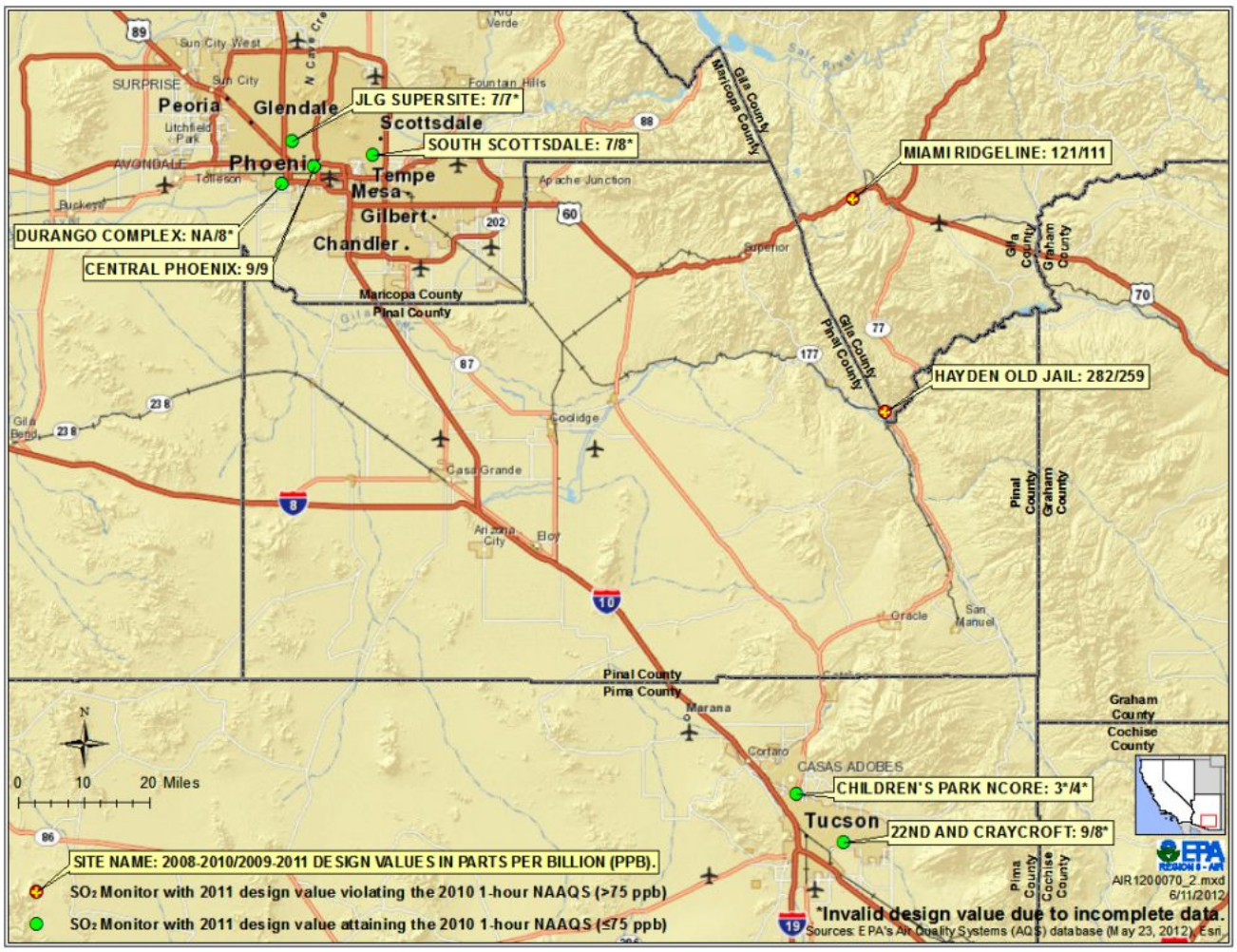


Figure 2

In May 2011, Governor Janice K. Brewer recommended that portions of Gila County and Pinal County be designated as "nonattainment" and the remaining counties and partial counties be designated "unclassifiable" for the 2010 SO_2 NAAQS based on monitored air quality data from 2007-2009 (letter to EPA Region 9 Administrator Jared Blumenfeld from Governor Janice K. Brewer, May 25, 2011). Consistent with the existing Hayden nonattainment area and Miami maintenance area for the 1971 SO_2 NAAQS, the state recommended that the same portions of Gila County and Pinal County (except those portions in Indian country) be designated as the Hayden and Miami nonattainment areas for the 2010 SO_2 NAAQS. The state recommendation was based primarily on monitoring data and consideration of emissions data from the 2005 National Emissions Inventory (NEI).

Based on EPA's technical analysis described below, EPA intends to concur with the state's recommendation to initially designate Gila County (partial) and Pinal County (partial) as nonattainment for the 2010 SO_2 NAAQS as part of the Hayden nonattainment area. These counties are listed above in Table 1.

Detailed Assessment

Air Quality Data

This factor considers the SO_2 air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in Gila County and Pinal County, in the intended Hayden nonattainment area and in the surrounding area based on data for the 2009-2011 period.

The Governor's recommendation was based on data from Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors located in the state letter to EPA Region 9 Administrator Jared Blumenfeld from Governor Janice K. Brewer, May 25, 2011.[3]

The 2011 SO_2 NAAQS design values for counties in the intended Hayden nonattainment area and surrounding area are shown in Table 2. Design values are calculated using the 3-year average of the 99th percentile of 1-hour daily maximum SO_2 concentrations, and compared to the NAAQS of 75 ppb, according to requirements of 40 CFR 50.17.

Table 2. Air Quality Data for Nonattainment Designations in Arizona

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO_2 Design Value, 2009-2011 (ppb)
Gila, Arizona	Yes (partial)	Miami Ridgeline	04-007-0009	4030 Linden Street	111
		Hayden Old Jail	**04-007-1001**	**Jail-Canyon Dr, Hayden**	**259**
Maricopa, Arizona	No	**Central Phoenix**	**04-013-3002**	**1645 E. Roosevelt St, Central Phoenix**	**9**
		South Scottsdale	04-013-3003	2857 N. Miller Road, South Scottsdale	8*
		Durango Complex	04-013-9812	2702 AC Ester Brook Blvd	8**
		JLG Supersite	04-013-9997	4530 N. 17th Ave	7*
Pima, Arizona	No	**22nd and Craycroft**	**04-019-1011**	**1237 S. Beverly, Tucson**	**8***
		Children's Park NCore	04-019-1028	400 W. River Road	4**

Monitors in **Bold** have the highest 2009-2011 design value in the respective county.
*Incomplete data, provided for informational purposes only, not relevant for comparison to the NAAQS. These stations stopped monitoring for comparison to the SO_2 NAAQS after December 2010. The South Scottsdale monitor was moved to the Durango Complex station; JLG Supersite started monitoring for trace levels of SO_2 instead of for comparison to the NAAQS; 22nd and Craycroft SO_2 monitoring was moved to the Children's Park NCore station.
**Incomplete data, provided for informational purposes only, not relevant for comparison to the NAAQS. These stations began monitoring for comparison to the SO_2 NAAQS in late 2010 or 2011.

[3] Note: Monitors that are eligible for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are sited in accordance with 40 CFR part 58, Appendix D (Section 4.4) and operating with a FRM or FEM monitor that meets the requirements of 40 CFR part 58, Appendix A. All data from a special purpose monitor (SPM) using an FRM or FEM which has operated for more than 24 months are eligible for comparison to the NAAQS unless the monitoring agency demonstrates that the data came from a particular period during which the requirements of Appendix A (quality assurance requirements) or Appendix E (probe and monitoring path siting criteria) were not met.

Gila County shows violations of the 2010 SO_2 NAAQS. No other SO_2 monitors in Arizona show violations of the 2010 SO_2 NAAQS. Therefore, some areas in Gila County and possibly additional areas in surrounding counties must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status. Each area has been evaluated based on the weight-of-evidence of the five factors and other relevant information.

Two SO_2 monitors are violating the standard in Arizona. Both violating monitors are located in Gila County. The Hayden Old Jail monitor (Air Quality System (AQS) ID 04-007-1001) is a source-oriented monitor located approximately 920 meters (0.57 miles) from the ASARCO, LLC – Hayden smelter stack (see Figure 2). Nestled in the southern, V-shaped tip of Gila County, the monitor is about 860 meters (0.54 miles) from the Pinal County border (see Figure 2). The Miami Ridgeline monitor (AQS ID 04-007-0009) is also a source-oriented monitor, located approximately 1,390 meters (0.86 miles) from the Freeport-McMoRan Miami Smelter. The Freeport-McMoRan Miami Smelter is roughly 45.5 kilometers (28 miles) northwest of the ASARCO, LLC – Hayden smelter.

Six additional SO_2 monitors have been operated in recent years in Maricopa and Pima counties. These monitors are not source-oriented and are located in the urban cores of the Phoenix and Tucson metropolitan areas, which are over 50 miles away from the violating monitors located in Gila County (see Figure 2, above). The low concentrations in these locations suggest that they are not impacted by the same sources that are impacting the violating monitors.

Figure 3

Emissions and Emissions-Related Data

Evidence of SO_2 emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county-level emission data for SO_2, as well as emissions from nearby point sources.

Emissions

For this analysis, EPA relied on information from the 2008 National Emissions Inventory (NEI) emissions database (NEI08V2). Arizona did not provide updated emissions information. Should EPA become aware of new or updated emissions inventories, EPA will take the new information into consideration for the final designations.

Table 3 shows total emissions of SO_2 in 2008 (given in tons) for all 15 counties in Arizona and single sources emitting greater than 100 tons per year of SO_2 according to the 2008 NEI. The counties that contain part of the intended Hayden nonattainment area for the 2010 SO_2 NAAQS are shown in **bold**.

Table 3. SO_2 Emissions in 2008

County	Facility Located in State Recommended Nonattainment Area?	Facility > 100 tons per year of SO_2 emissions	Facility Location	SO_2 Air Emissions (2008 NEIv2) (tons)	Total County 2008 SO_2 Emissions (tons)
Gila	Yes (Hayden)	ASARCO, LLC - Hayden Smelter	Hayden	21,742	
	Yes (Miami)	Freeport-McMoRan Miami Smelter	Miami	7,091	
	-	Other point, nonpoint, nonroad, onroad	-	107	28,940
Apache	No	Salt River Project (Coronado)	St. Johns	15,900	
	No	Tucson Electric Power Company	Springerville	6,562	
	-	Other point, nonpoint, nonroad, onroad	-	112	22,574
Navajo	No	Arizona Public Service (Cholla)	Joseph City	16,421	
	No	Catalyst Paper (Snowflake) Inc.	Snowflake	2,556	
	-	Other point, nonpoint, nonroad, onroad	-	224	19,201
Pima	No	Tucson Electric Power (Irvington)	Tucson	2,884	
	-	Other point, nonpoint, nonroad, onroad	-	1,897	4,781
Maricopa	No	Phoenix Sky Harbor International Airport	Phoenix	252	
	-	Other point, nonpoint, nonroad, onroad	-	2,886	3,138
Cochise	No	AZ Electric Power (Apache)	Cochise	1,903	
	No	Chemical Lime Company - Douglas	Douglas	1,013	
	-	Other sources (nonpoint, nonroad, onroad)	-	189	3,105
Yavapai	No	Nelson Lime Plant	Peach Springs	1,955	
	-	Other point, nonpoint, nonroad, onroad	-	368	2,323
Pinal	-	Other point, nonpoint, nonroad, onroad	-	464	464
Mohave	-	Other point, nonpoint, nonroad, onroad		408	408
Coconino	-	Other point, nonpoint, nonroad, onroad	-	350	350
Yuma	-	Other point, nonpoint, nonroad, onroad		248	248
La Paz	-	Other point, nonpoint, nonroad, onroad		75	75
Santa Cruz	-	Other point, nonpoint, nonroad, onroad		71	71
Greenlee	-	Other point, nonpoint, nonroad, onroad		54	54
Graham	-	Other point, nonpoint, nonroad, onroad	-	38	38

Total emissions of SO_2 are highest from Gila County. In 2008, the ASARCO, LLC – Hayden Smelter emitted over 20,000 tons of SO_2, three times more than the second largest source (Freeport-McMoRan Miami Smelter) of SO_2 in Gila County. Both smelters in Gila County are primary copper smelters. Apache and Navajo counties also contain coal-fired electric utility generating units that are large sources of SO_2: Coronado Generating Station (15,900 tons in 2008) and Springerville Generating Station (6,562 tons in 2008) in Apache County, and Cholla Power Plant (16,421 tons in 2008) in Navajo County. Total emissions of SO_2 from Pinal County are low (464 tons in 2008) compared to Gila, Apache, and Navajo counties. Gila, Apache, and Navajo counties together comprise 82% of total SO_2 emissions from the state of Arizona. These five largest stationary sources in the three counties comprised 79% of total SO_2 emissions from Arizona in 2008. See Figure 4 for the geographic distribution of these stationary sources.

The state-recommended Hayden nonattainment area for the 2010 SO_2 NAAQS includes the ASARCO, LLC – Hayden Smelter. As shown in Figure 4 and Table 3, besides the two largest sources in Gila County, both of which EPA intends to include in nonattainment areas, there are no other facilities emitting greater than 100 tons per year of SO_2 in Gila, Pinal, or Graham County. The San Carlos tribal lands to the east of the State's recommended Hayden nonattainment area, also do not have any facilities emitting greater than 100 tons per year of SO_2 according to the 2008 NEIV2.

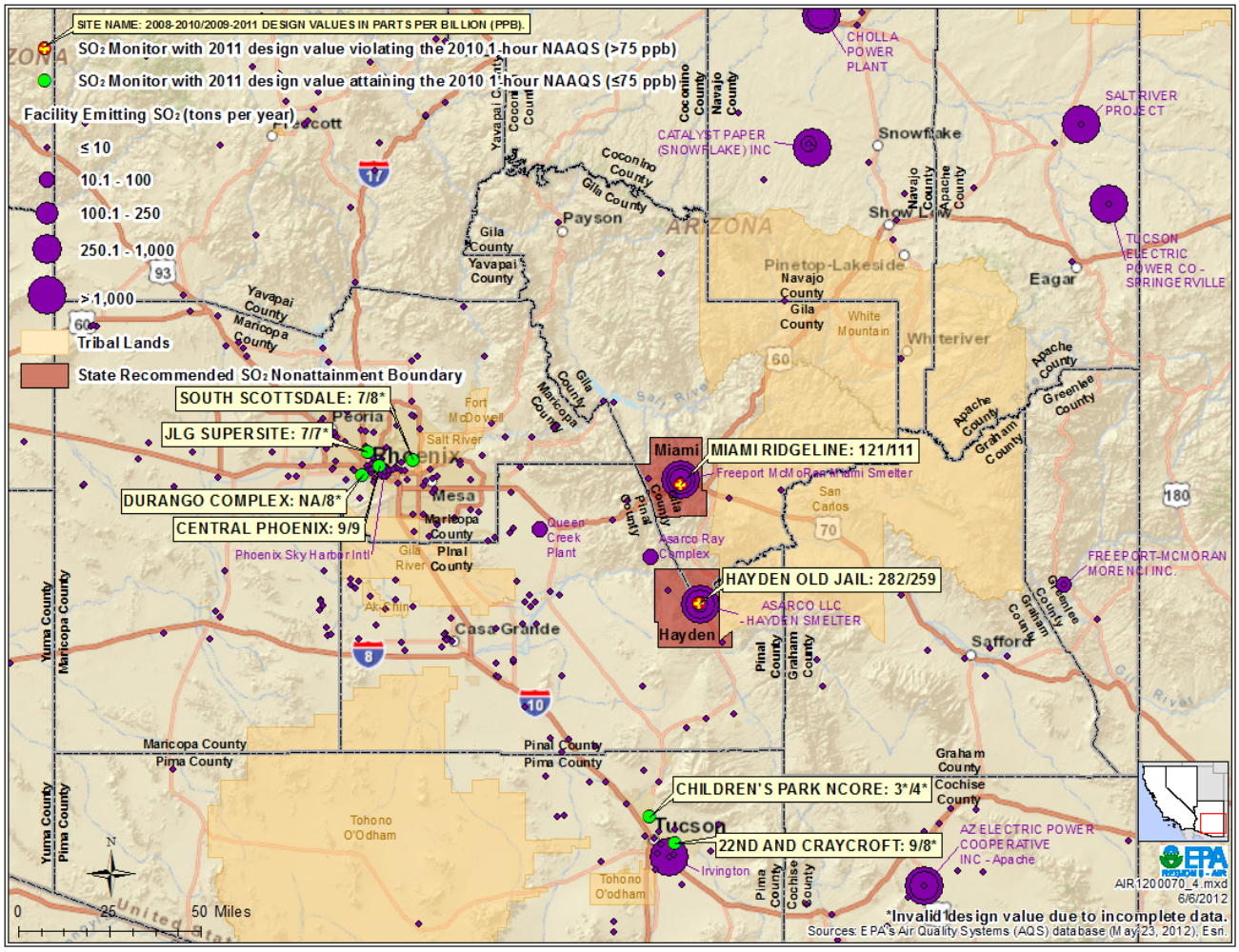


Figure 4

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 the Hayden, Arizona intended nonattainment area up to and including 2008. Since 2008, the ASARCO, LLC – Hayden Smelter has completed two projects, one in 2010 involving addition of a revert screen, and one in 2012 involving additional ventilation and a baghouse to service three existing anode furnaces.

Neither of these projects resulted in changes to permitted SO_2 emissions limits for the facility. See the source's Title V federal operating permit renewal and two ADEQ permit actions/revisions that occurred since 2008 (52397-MPR and 54251-MPR).[4]

Population

Gila County's population as of the 2010 census was 53,597. From 2000 to 2010 the county grew by 4.4% and had a population density of 11.3 persons per square mile. Pinal County's population as of the 2010 census was 375,770. From 2000 to 2010 the county grew by 109.1% and had a population density of 70.0 persons per square mile.

Meteorology (weather/transport patterns)

Evidence of source-receptor relationships between specific emissions sources and high SO_2 values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered meteorological data available for the area. Such data may provide evidence of the potential for SO_2 emissions sources located upwind of a violating monitor to contribute to ambient SO_2 levels at the violation location.

Temperature and precipitation data is available from the nearby Winkelman 6 S station, part of the National Weather Service Cooperative Observer Program. This station typically measures only 14 inches of rain each year, with nearly half of that occurring during the summer months of July through September, coinciding with the Arizona "monsoon" season. There is less than an inch of snow each year. Daily temperature highs range from 64 to 91 degrees Fahrenheit depending on season, and lows range from 31 to 69 degrees Fahrenheit. See Figure 5 for the location of the Winkleman meteorological station.

The varied elevations in the area cause complex wind flow locally. Within and adjacent to the Gila River and San Pedro River valleys, drainage winds tend to dominate at night under stable conditions. To the west of the smelter, drainage flows toward the west, while east of the smelter the drainage flows to the south. Given the smelter's elevated location and plume buoyancy, some emissions would be expected to rise above these surface flows. However, on sunny days the heated ground warms the air and enhances vertical mixing. Under such convective conditions, the plume could nevertheless be mixed down to the ground to varying degrees. This vertical mixing also causes the flow to be coupled with winds aloft, which generally flow toward the east.

Over the years, wind data has been collected at multiple locations in and around Hayden. Sites include the Hayden Maintenance Yard ("Hayden"), Hayden-Winkelman High School ("Winkelman"), and Globe Highway (data prepared for "Draft Report, Remedial Investigation Report for the ASARCO, LLC Hayden Plant Site, Hayden, Gila County, Arizona", Prepared for U.S. Environmental Protection Agency Region IX, San Francisco, CA., CH2M Hill, August 2008). These stations are shown in Figure 5. Wind roses from these stations are shown in Figure 6. The Winkelman site is nearest the junction of the Gila and San Pedro River valleys, and the Globe Highway site is in the northeastern portion of the Gila River valley before it joins the San Pedro. All of the dominant wind directions are consistent with

[4] Further information about Arizona federal Title V air permits can be found on EPA's website at: http://www.epa.gov/region9/air/permit/title-v-permits.html

the orientation of the valleys. However, when morning and evening wind frequencies are plotted separately, not all of the directions are consistent with slope flow, e.g., afternoon flow at Hayden is toward the east, but downslope flow in the Gila River valley would be toward the northwest. There is a similar evening component toward the east at Winkelman on some days, but more of a downslope flow on other days. At Globe Highway, flow directions are consistent with slope flows. The differences between sites located relatively close together show the complexity of the flow in the area. Transport of pollutants would be expected to occur mainly along the Gila-San Pedro River valleys (northwest-southeast orientation), somewhat circumscribed by the orientations of the valleys and the surrounding mountains.

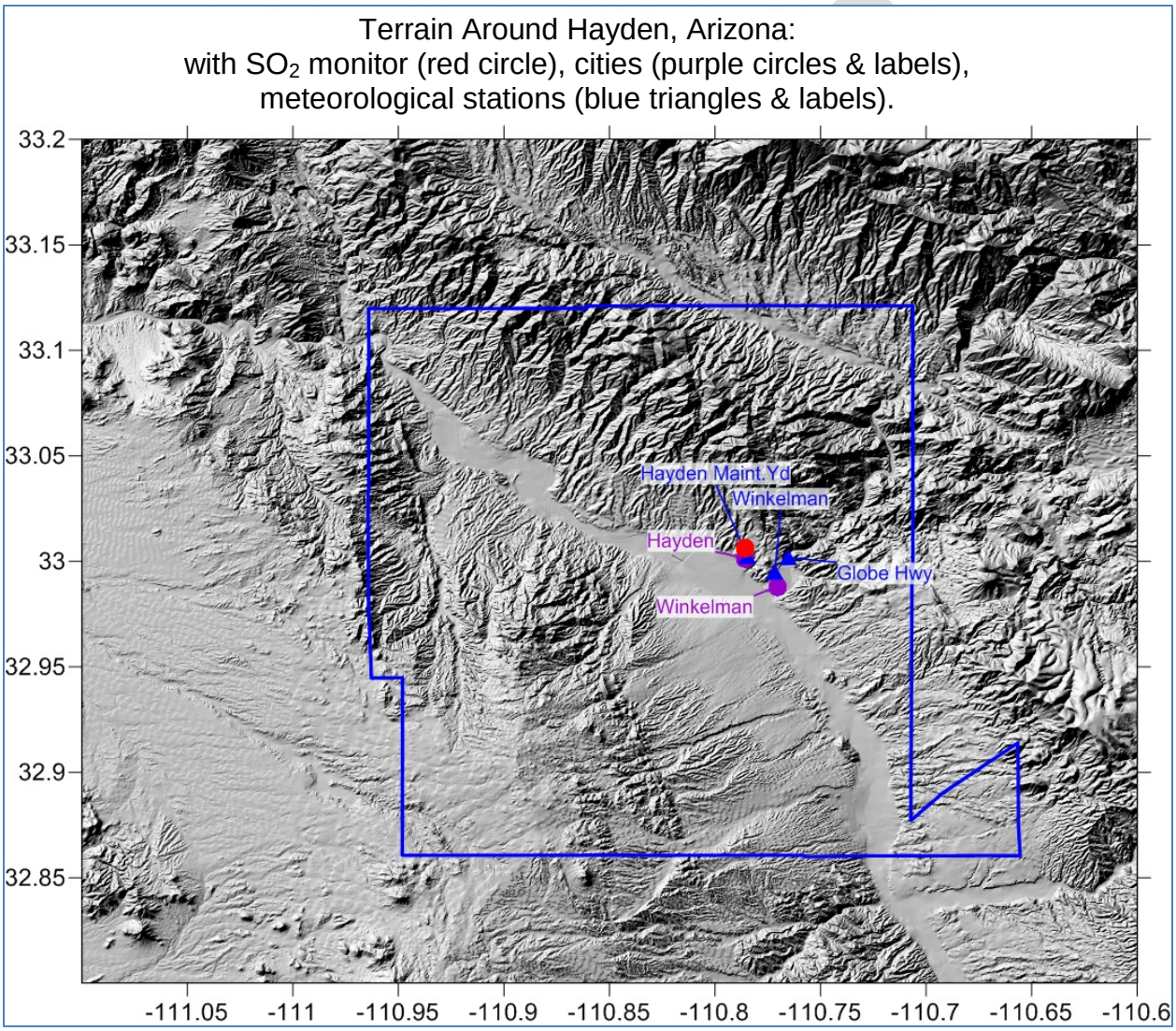
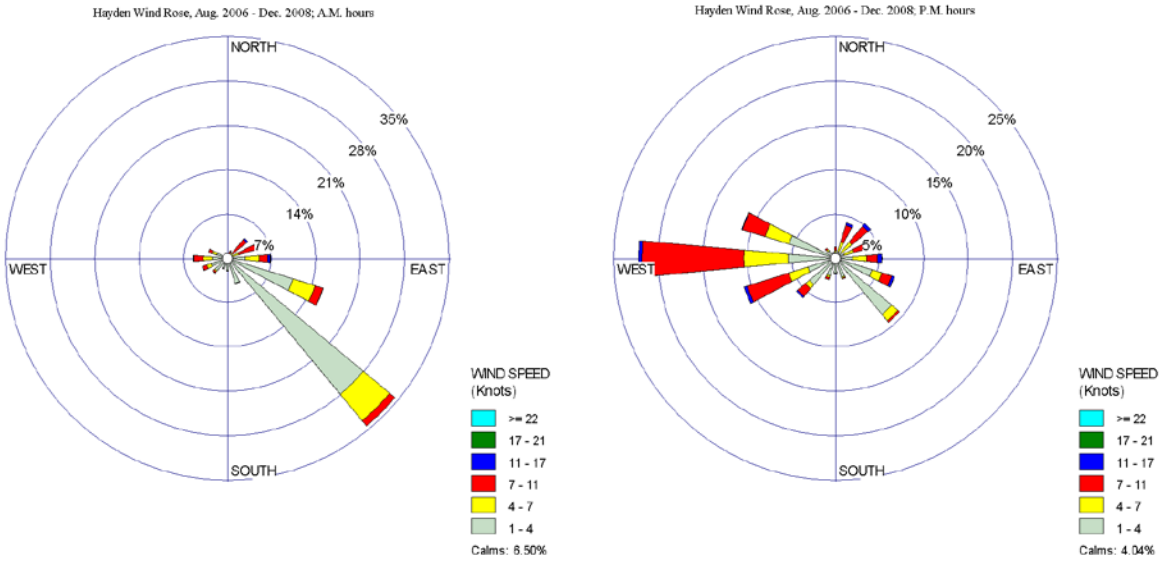


Figure 5

Hayden a.m. and p.m. wind roses



Winkelman a.m. and p.m. wind roses

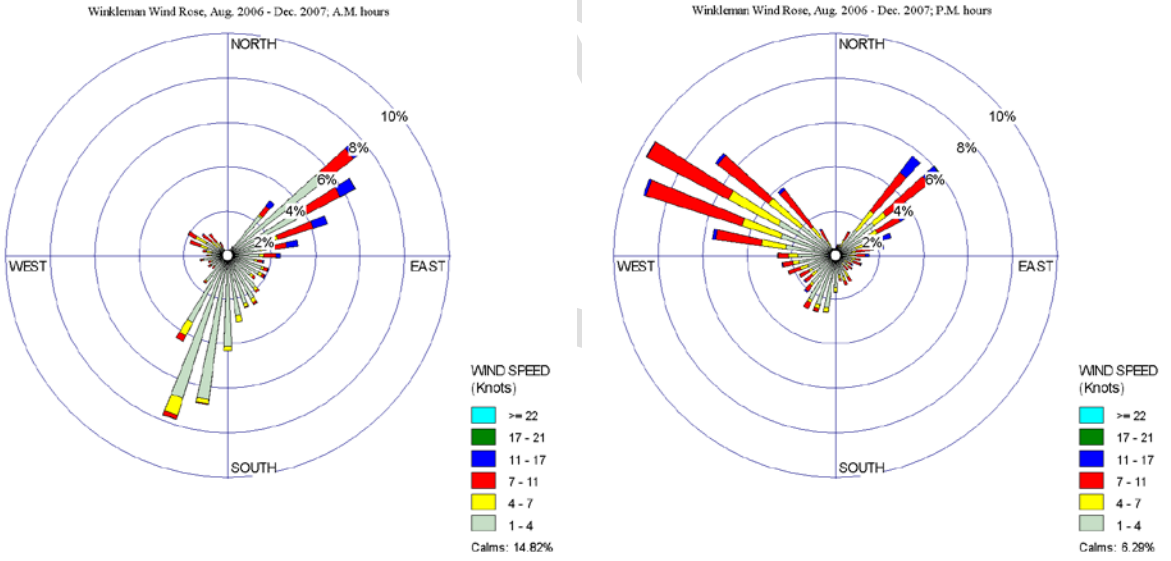


Figure 6

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

As shown in Figure 5 (above) and Figure 7 (below), Hayden and the ASARCO, LLC - Hayden smelter are located in very complex terrain, with the Gila River making a winding semi-circle around the east and south of the facility, and intersected by the San Pedro River valley from the south. The facility itself is elevated relative to the valleys; there is a 200-foot hill just south of the facility. In all directions there is a mountain side. Hayden is at roughly 2,000 feet elevation; the Dripping Springs Mountains to the north rise to 4,000 feet; the Tortilla Mountains on the northwest, west, and south rise 3,300 to 4,000 feet. Terrain rises more gently within the Gila-San Pedro River valleys from the northwest toward the southeast. The intended nonattainment area encompasses the Gila River valley from where it narrows in the northwest corner of the area, to where it joins with the San Pedro River valley in roughly the center of the area, and to a bend in the San Pedro River in the southeast corner. The surrounding mountains likely limit the extent of the area exceeding the SO_2 standard to a relatively small area around the smelter, the main source of SO_2 emissions. For the same reason, locations outside the particular valleys intersecting at Hayden are not expected to contribute to SO_2 NAAQS exceedances there.

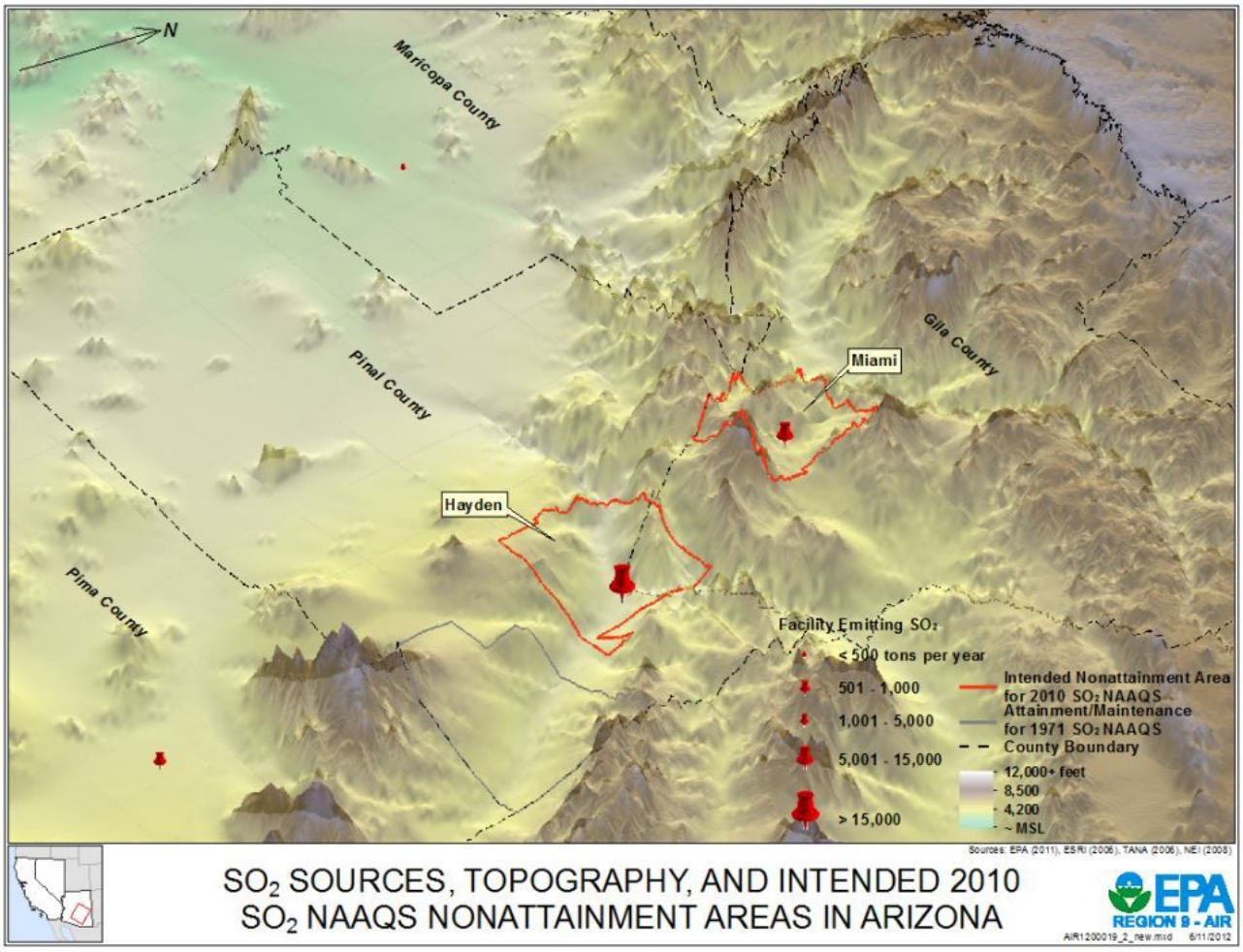


Figure 7

Jurisdictional boundaries

The Office of Management and Budget (OMB) defines metropolitan (metro) and micropolitan (micro) statistical areas based on census information. A metro statistical area contains a core urban area of 50,000 or more in population, and a micro statistical area contains an urban core of at least 10,000 but less than 50,000 in population. A Core Based Statistical Area (CBSA) is a collective term for both metro and micro areas. OMB may further define a combined statistical area (CSA) as an aggregate of adjacent metro or micro statistical areas that are linked by commuting ties.

The state of Arizona is divided into 15 counties (listed in Table 3). Within the state, OMB has defined 11 CBSAs comprising six metro statistical areas and five micro statistical areas. OMB has not aggregated any metro or micro statistical areas in Arizona into a CSA. Two counties in Arizona, Apache and La Paz, are not defined by OMB as a metro or micro statistical area. The Payson Micropolitan Statistical Area comprises Gila County, and the Phoenix-Mesa-Glendale Metropolitan Statistical Area comprises Maricopa and Pinal counties. The Payson metro area comprises the entirety of Gila County, and is named for the most populated city of the county, Payson City. Payson City is outside the state's recommended nonattainment area and there are no other large population centers in the area, apart from the town of Hayden itself, which has several hundred residents.

To manage air quality, the state of Arizona has one state agency, the Arizona Department of Environmental Quality (ADEQ), and three local agencies: Maricopa County Air Quality Department, Pima County Department of Environmental Quality, and Pinal County Air Pollution/Quality Control District. Air quality planning for the existing Hayden nonattainment area under the 1971 SO_2 NAAQS, composed of the same portions of Gila and Pinal counties as the state's recommended nonattainment area for the 2010 SO2 NAAQS, is under the jurisdiction of ADEQ. Originally, for the 1971 NAAQS, the Hayden area was split between two county-wide SO_2 nonattainment areas for Gila and Pinal counties (see 43 FR 8968, March 3, 1978). At the request of the state of Arizona, the boundary for the Hayden area was reduced to nine townships in and around the town of Hayden (44 FR 21261, April 10, 1979). See also, 40 CFR Section 81.303. In addition, six adjacent townships were designated as ''cannot be classified.'' Section 107(d)(1)(C) of the 1990 Clean Air Act Amendments (CAAA) brought forward, by operation of law, the nonattainment designations for areas, such as the Hayden SO_2 area, that continued to be designated as nonattainment at the time of enactment of the CAAA, i.e., areas that had not been redesignated to ''attainment'' prior to the CAAA's November 15, 1990 enactment date. The then-existing nonattainment area for Hayden under the 1971 SO_2 NAAQS included a portion of Indian country along the eastern boundary. The intended Hayden nonattainment area for the 2010 SO_2 NAAQS is the same area as the existing 1971 SO_2 NAAQS brought forward by operation of law following the 1990 CAAA, without the portion of Indian country. The existing Hayden nonattainment area attained the 1971 SO_2 NAAQS such that ADEQ submitted a maintenance plan to EPA in 2002. EPA has not acted on the redesignation request and maintenance plan.

As defined at 18 U.S.C. 1151, "Indian country" refers to: "(a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running

through the same." EPA recognizes the sovereignty of tribal governments, and has attempted to take the desires of the tribes into account in establishing appropriate unclassifiable and nonattainment area boundaries. No areas of Indian country are included in the intended Hayden, Arizona nonattainment area.

Other Relevant Information

In its May 25, 2011 letter, ADEQ provided additional information to support its assertion that presumptive use of full county boundaries as the nonattainment area boundary is inappropriate for geographically large counties. The state argued that the use of full county boundaries as the presumptive nonattainment area boundary for a violating monitor results in disparities in the size of nonattainment areas. For example, the state compared the area of Gila County (4,796 square miles) with the area of the entire state of Connecticut (4,845 square miles). A violating monitor in Middlesex County, Connecticut, would result in a presumptive nonattainment area boundary encompassing 369 square miles. Applying this presumption in Arizona would result in a nonattainment area (Gila County) that is 13 times larger than a full Middlesex County nonattainment area in Connecticut. The state further highlighted that the violating monitor in their recommended Hayden nonattainment area is less than 0.5 miles from the southwest border of Gila and Pinal counties, and more than 100 miles from the northern border of Gila and Coconino counties. Therefore, the state concluded that its consideration of partial counties for the Hayden and Miami nonattainment areas was appropriate.

Conclusion

After considering the factors described above, EPA intends to concur with the state's recommendation to initially include Pinal County (partial) and Gila County (partial) as the Hayden, Arizona nonattainment area for the 2010 SO_2 NAAQS, based on the violating monitor.

The air quality monitor in Hayden, Arizona shows a violation of the 2010 SO_2 NAAQS based on 2009-2011 air quality data. EPA preliminarily concludes that the state's recommended boundary contains the area violating the standard as well as areas causing or contributing to the violation. The monitor is source-oriented, and is located in the southernmost tip of Gila County. Due to constraints imposed by the complex terrain in the Hayden area (see Geography/Topography discussion above), it is expected that the extent of the area exceeding the SO_2 standard is confined to a relatively small area around the main source of SO_2 emissions, the ASARCO, LLC - Hayden smelter. For the same reason, locations outside the particular valleys intersecting at Hayden are not expected to contribute to NAAQS exceedances at the Hayden monitor. The meteorology factor is not significant in determining a boundary for the nonattainment area, but available data confirms the importance of the topography in limiting the intended nonattainment area to the nearby river valleys and their surroundings. The state's recommended boundary for the intended Hayden nonattainment area is also consistent with the existing Hayden nonattainment boundary for the 1971 SO_2 NAAQS, without areas of Indian country. The existing (for the 1971 SO_2 NAAQS) Hayden SO_2 nonattainment area attained the standard prior to 2002, at which time ADEQ submitted a maintenance plan and request for EPA to redesignate the area to attainment for the 1971 NAAQS. All non-Indian country lands are under the jurisdiction of ADEQ.

Based on the consideration of all the relevant and available information, as described above, EPA's preliminary conclusion is that the boundaries described herein encompass an area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the 2010 SO_2 NAAQS, based on the violating monitor information.

Technical Analysis for Miami, Arizona

Introduction

This technical analysis for Miami, Arizona identifies the partial county with a monitor that violates the 2010 SO_2 NAAQS and evaluates nearby counties for contributions to SO_2 concentrations in the area. EPA has evaluated this county and nearby counties based on the weight-of-evidence of the factors in EPA's Designation Guidance, issued on March 24, 2011.[5]

Figure 8 shows the areas in Arizona which EPA intends to designate nonattainment. Figure 9 is a map of SO_2 monitors in the area and the surrounding counties. Violating monitors are shown with a red icon; monitors attaining the standard are shown with green icons. Design values for each monitor are listed in Figure 9 and in Table 4, below.

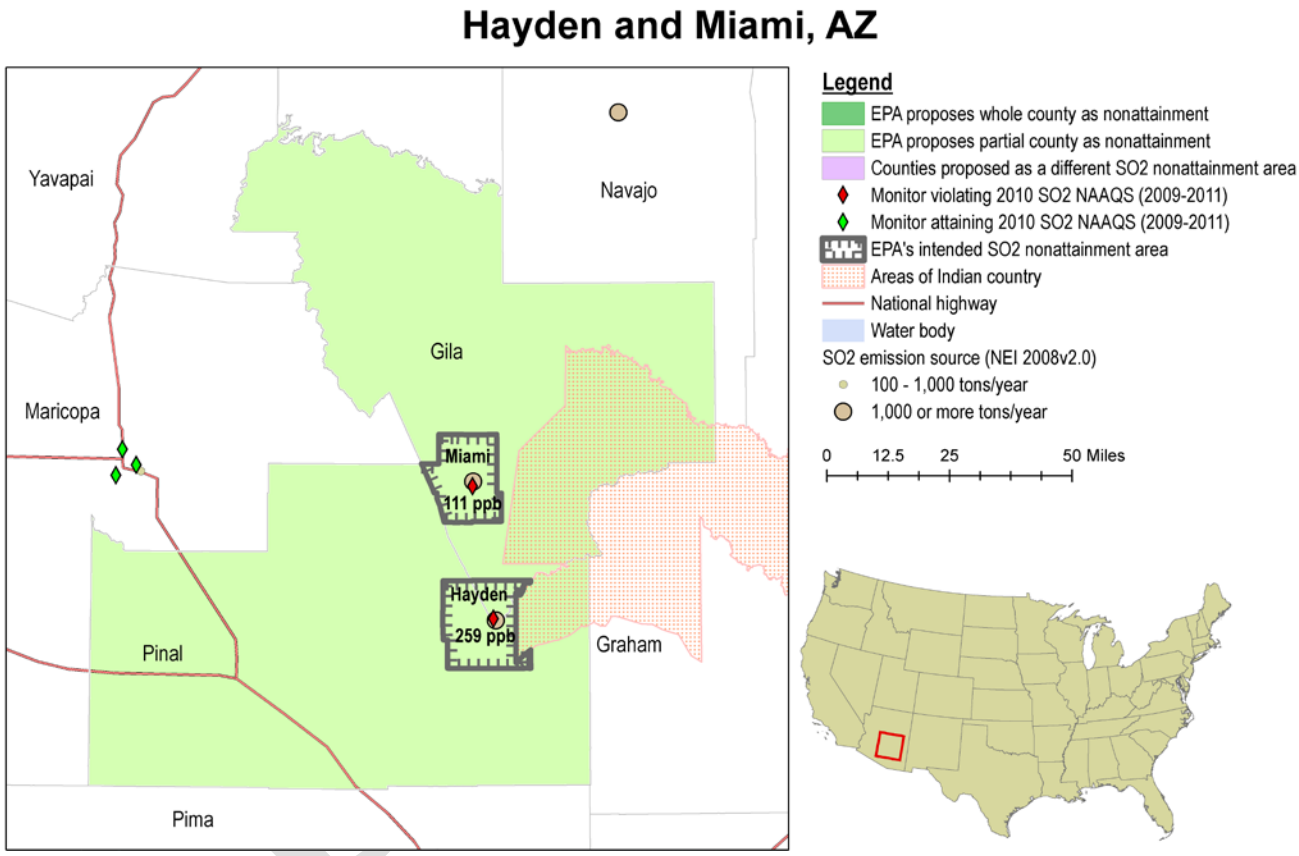


Figure 8

[5] http://www.epa.gov/air/sulfurdioxide/guidance.html

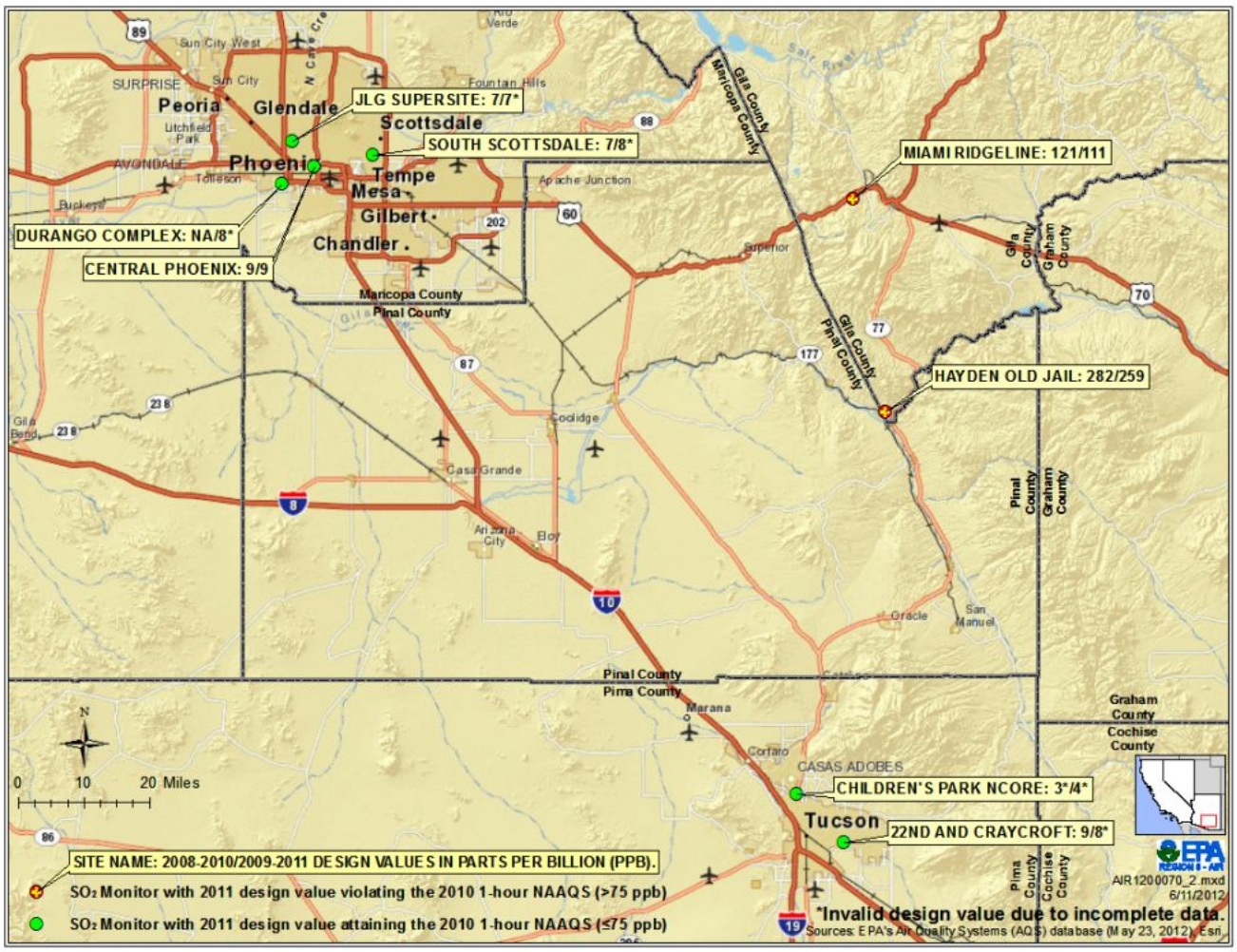


Figure 9

In May 2011, Governor Janice K. Brewer recommended that portions of Gila County and Pinal County be designated as "nonattainment", and the remaining counties and partial counties be designated "unclassifiable" for the 2010 SO_2 NAAQS based on monitored air quality data from 2007-2009 (letter to EPA Region 9 Administrator Jared Blumenfeld from Governor Janice K. Brewer, May 25, 2011). Consistent with the existing Hayden nonattainment area and Miami maintenance area for the 1971 SO_2 NAAQS, the state recommended that the same portions of Gila County and Pinal County be designated as the Hayden and Miami nonattainment areas for the 2010 SO_2 NAAQS. The state recommendation was based primarily on monitoring data and consideration of emissions data from the 2005 National Emissions Inventory (NEI).

Based on EPA's technical analysis described below, EPA intends to concur with the state's recommendation and initially designate Gila County (partial) as nonattainment for the 2010 SO_2 NAAQS as the Miami nonattainment area. The county is listed above in Table 1.

Detailed Assessment

Air Quality Data

This factor considers the SO_2 air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in Gila County, in the intended Miami nonattainment area and the surrounding area based on data for the 2009-2011 period.

The Governor's recommendation was based on data from Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors located in the state (letter to EPA Region 9 Administrator Jared Blumenfeld from Governor Janice K. Brewer, May 25, 2011).[6]

The 2010 SO_2 NAAQS design values for counties in the intended Miami nonattainment area and surrounding area are shown in Table 4. Design values are calculated using the 3-year average of the 99th percentile of 1-hour daily maximum SO_2 concentrations, and compared to the NAAQS of 75 ppb, according to requirements of 40 CFR 50.17.

Table 4. Air Quality Data for Nonattainment Designations in Arizona

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO2 Design Value, 2009-2011 (ppb)
Gila, Arizona	Yes (partial)	Miami Ridgeline	04-007-0009	4030 Linden Street	111
		Hayden Old Jail	**04-007-1001**	**Jail-Canyon Dr, Hayden**	**259**
Maricopa, Arizona	No	**Central Phoenix**	**04-013-3002**	**1645 E. Roosevelt St, Central Phoenix**	**9**
		South Scottsdale	04-013-3003	2857 N. Miller Road, South Scottsdale	8*
		Durango Complex	04-013-9812	2702 AC Ester Brook Blvd	8**
		JLG Supersite	04-013-9997	4530 N. 17th Ave	7*
Pima, Arizona	No	**22nd and Craycroft**	**04-019-1011**	**1237 S. Beverly, Tucson**	**8***
		Children's Park NCore	04-019-1028	400 W. River Road	4**

Monitors in **Bold** have the highest 2009-2011 design value in the respective county.
*Incomplete data, provided for informational purposes only, not relevant for comparison to the NAAQS. These stations stopped monitoring for comparison to the SO_2 NAAQS after December 2010. The South Scottsdale monitor was moved to the Durango Complex station; JLG Supersite started monitoring for trace levels of SO_2 instead of for comparison to the NAAQS; 22nd and Craycroft SO_2 monitoring was moved to the Children's Park NCore station.
**Incomplete data, provided for informational purposes only, not relevant for comparison to the NAAQS. These stations began monitoring for comparison to the SO_2 NAAQS in late 2010 or 2011.

[6] Note: Monitors that are eligible for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are sited in accordance with 40 CFR Part 58, Appendix D (Section 4.4) and operating with a FRM or FEM monitor that meets the requirements of 40 CFR Part 58, Appendix A. All data from a special purpose monitor (SPM) using an FRM or FEM which has operated for more than 24 months are eligible for comparison to the NAAQS unless the monitoring agency demonstrates that the data came from a particular period during which the requirements of Appendix A (quality assurance requirements) or Appendix E (probe and monitoring path siting criteria) were not met.

Gila County shows violations of the 2010 SO_2 NAAQS. No other SO_2 monitors in Arizona show violations of the 2010 SO_2 NAAQS. Therefore, some areas in Gila County and possibly additional areas in surrounding counties must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status. Each area has been evaluated based on the weight-of-evidence of the five factors and other relevant information.

Two SO_2 monitors are violating the standard in Arizona. Both violating monitors are located in Gila County (see Figure 9). The Miami Ridgeline monitor (AQS ID 04-007-0009) is a source-oriented monitor, located approximately 1,390 meters (0.86 miles) from the Freeport-McMoRan Miami Inc. (FMMI) copper smelter (see Figure 10). The FMMI smelter is roughly 45.5 kilometers (28 miles) northwest of the other violating monitor, Hayden Old Jail, a source-oriented monitor located near the ASARCO, LLC – Hayden smelter.

Figure 10

Six additional SO_2 monitors have been operated in Maricopa and Pima counties in recent years. These monitors are not source-oriented and are located in the urban cores of the Phoenix and Tucson metropolitan areas, which are over 50 miles away from the violating monitors located in Gila County (see Figure 9, above). The low concentrations in these locations suggest that they are not impacted by the same sources that are impacting the violating monitors.

Emissions and Emissions-Related Data

Evidence of SO_2 emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emission data for SO_2, as well as emissions from nearby point sources.

Emissions

For this analysis, EPA relied on information from the 2008 National Emissions Inventory (NEI) emissions database (NEI08V2). Arizona did not provide updated emissions information. Should EPA become aware of new or updated emissions inventories, EPA will take the new information into consideration for the final designations.

Table 5 shows total emissions of SO_2 (given in tons per year) for all 15 counties in Arizona and sources emitting greater than 100 tons per year of SO_2 according to the 2008 NEI. The county that contains all of the Miami nonattainment area for the 2010 SO_2 NAAQS is shown in **bold**.

Table 5. SO_2 Emissions in 2008

County	Facility Located in State Recommended Nonattainment Area?	Facility > 100 tons per year of SO_2 emissions	Facility Location	SO_2 Air Emissions (2008 NEI v2) (tons)	Total County 2008 SO_2 Emissions (tons)
Gila	Yes (Hayden)	ASARCO, LLC - Hayden Smelter	Hayden	21,742	
	Yes (Miami)	Freeport-McMoRan Miami Smelter	Miami	7,091	
	-	Other point, nonpoint, nonroad, onroad	-	107	28,940
Apache	No	Salt River Project (Coronado)	St. Johns	15,900	
	No	Tucson Electric Power Company	Springerville	6,562	
	-	Other point, nonpoint, nonroad, onroad	-	112	22,574
Navajo	No	Arizona Public Service (Cholla)	Joseph City	16,421	
	No	Catalyst Paper (Snowflake) Inc.	Snowflake	2,556	
	-	Other point, nonpoint, nonroad, onroad	-	224	19,201
Pima	No	Tucson Electric Power (Irvington)	Tucson	2,884	
	-	Other point, nonpoint, nonroad, onroad	-	1,897	4,781
Maricopa	No	Phoenix Sky Harbor International Airport	Phoenix	252	
	-	Other point, nonpoint, nonroad, onroad	-	2,886	3,138
Cochise	No	AZ Electric Power (Apache)	Cochise	1,903	
	No	Chemical Lime Company - Douglas	Douglas	1,013	
	-	Other sources (nonpoint, nonroad, onroad)	-	189	3,105
Yavapai	No	Nelson Lime Plant	Peach Springs	1,955	
	-	Other point, nonpoint, nonroad, onroad	-	368	2,323
Pinal	-	Other point, nonpoint, nonroad, onroad	-	464	464
Mohave	-	Other point, nonpoint, nonroad, onroad		408	408
Coconino	-	Other point, nonpoint, nonroad, onroad	-	350	350
Yuma	-	Other point, nonpoint, nonroad, onroad		248	248
La Paz	-	Other point, nonpoint, nonroad, onroad		75	75
Santa Cruz	-	Other point, nonpoint, nonroad, onroad		71	71
Greenlee	-	Other point, nonpoint, nonroad, onroad		54	54
Graham	-	Other point, nonpoint, nonroad, onroad	-	38	38

Total emissions of SO_2 are highest from Gila County. In 2008, the FMMI copper smelter was the second largest source of SO_2 in Gila County, and the fourth largest source in Arizona. Both smelters (FMMI and ASARCO, LLC) in Gila County are primary copper smelters. Apache and Navajo counties also contain coal-fired electric utility generating units that are large sources of SO_2: Coronado Generating Station (15,900 tons in 2008) and Springerville Generating Station (6,562 tons in 2008) in Apache County, and Cholla Power Plant (16,421 tons in 2008) in Navajo County. Total emissions of SO_2 from Pinal County are low (464 tons in 2008) compared to Gila, Apache, and Navajo counties. Gila, Apache, and Navajo counties together comprise 83% of total SO_2 emissions from the state of Arizona. The five largest stationary sources in those three counties comprised 79% of total SO_2 emissions from Arizona in 2008. The existing Miami maintenance area for the 1971 SO_2 NAAQS is

identical to the state's recommended Miami nonattainment area for the 2010 SO2 NAAQS and includes the FMMI smelter. See Figure 11.

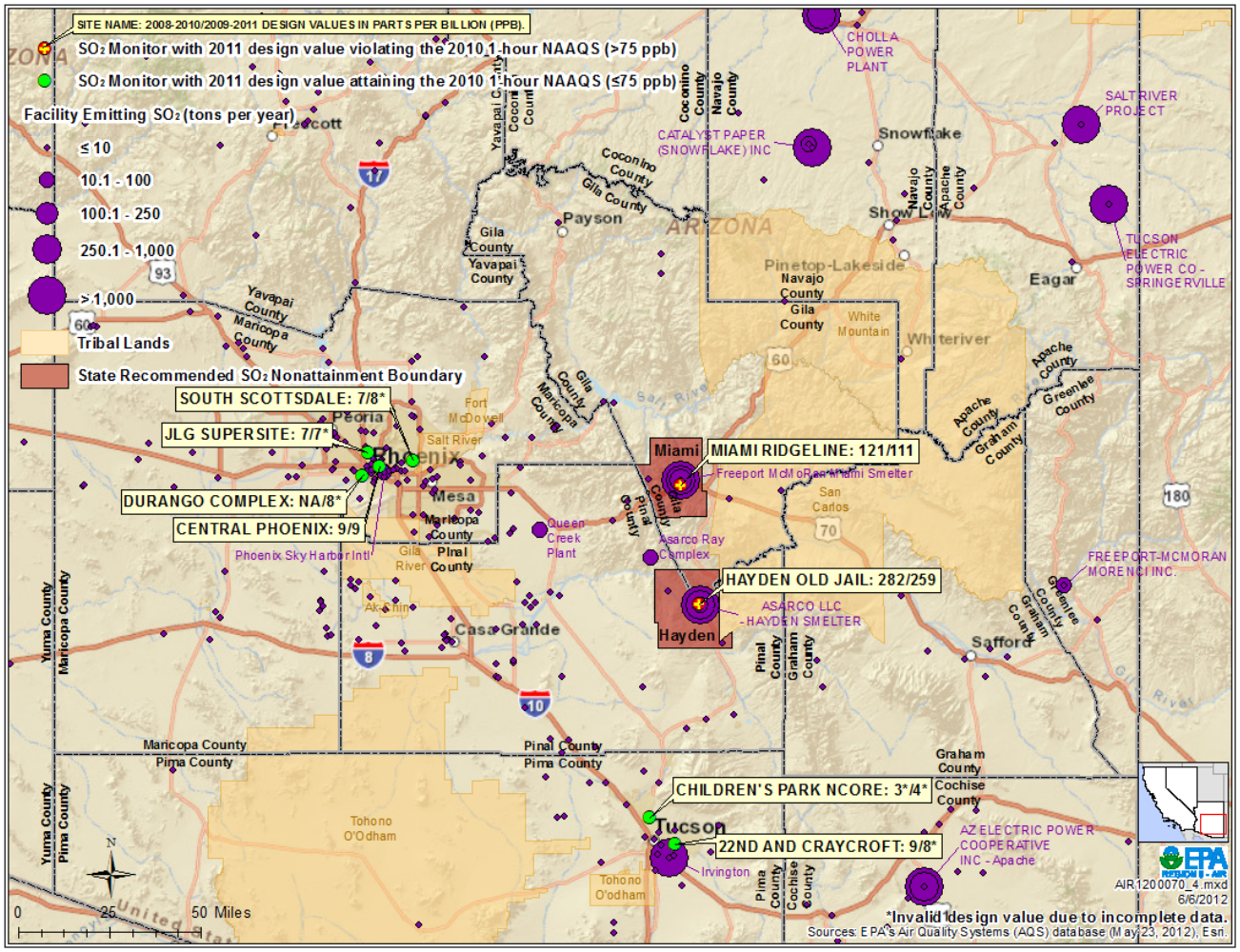


Figure 11

Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 5 represent emissions levels taking into account any control strategies implemented on stationary sources in the Miami, Arizona intended nonattainment area up to and including 2008. Since 2008, FMMI has had several permit revisions, including: installation of a coal injection system with a dust collector system, clarification and/or correction to existing permit conditions, revision to allow additional use of an existing screening machine, update of the sulfur balance methodology to include a gravimetric method, and addition of small internal combustion engines. None of the permit revisions resulted in changes to permitted SO_2 emission limits. See seven ADEQ permit actions/revisions from 2008 to the present: 43398-SPR, 45593-MPR, 48448-MPR, 49986-MPR, 54218-MPR, 55226-MPR, and 55691-MPR. These seven permit actions/revisions were included in the Title V Renewal Operating Permit 53592 issued November 26, 2012.[7]

[7] Further information about Arizona federal Title V air permits can be found on EPA's website at:

Population

Gila County's population as of the 2010 census was 53,597. From 2000 to 2010 the county grew by 4.4% and had a population density of 11.3 persons per square mile.

Meteorology (weather/transport patterns)

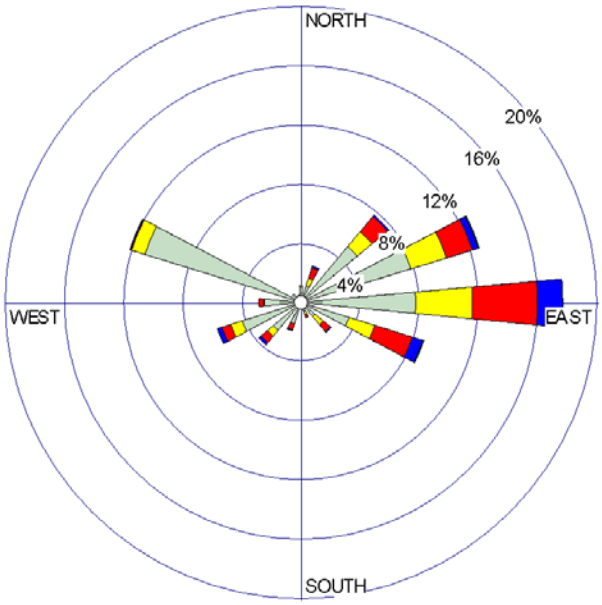
Evidence of source-receptor relationships between specific emissions sources and high SO_2 values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered meteorological data available for the area. The data may provide evidence of the potential for SO_2 emissions sources located upwind of a violating monitor to contribute to ambient SO_2 levels at the violation location.

Temperature and precipitation data are available from the Miami station, part of the National Weather Service Cooperative Observer Program. Around 20 inches of rain fall each year at the Miami station, roughly evenly distributed between the months, except in April, May, and June, when less than a half inch of rain falls per month. Normal daily temperature highs range from 96 degrees Fahrenheit (°F) in summer to 62 °F in winter, while normal lows are 65 °F in summer to 34 °F in winter.

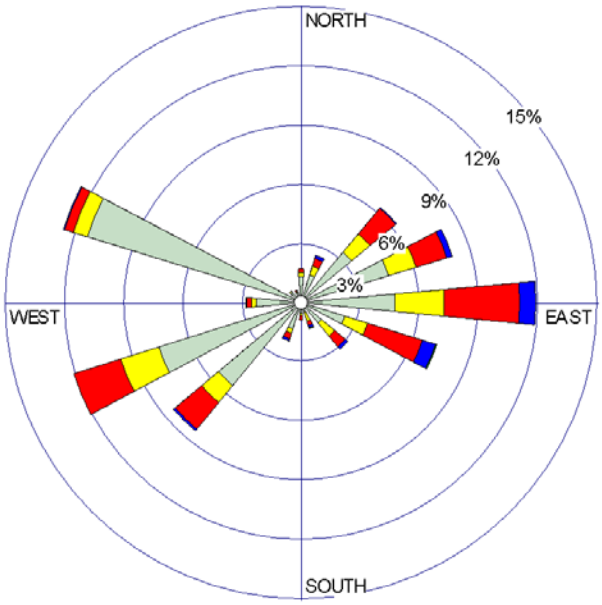
The closest meteorological station to the violating Miami monitor is Globe station CW1546, part of the National Weather Service Cooperative Observer Program. The city of Globe is about five miles from Miami, roughly to the east. Globe is in the Pinal Creek Valley, oriented at right angles to the valley where Miami is located, with a more west-east orientation. The 2010 wind data shows flows consistent with the valley orientation (see Figure 12). Flow toward the west is the most frequent, but flow toward the east-southeast also occurs. Some, but not all of the flows are consistent with diurnal slope flows; the complexity of the surrounding terrain means there are multiple influences controlling the flow. Because of the complex terrain, and the spatial separation from Miami, this data is of limited usefulness for drawing conclusions about the Miami nonattainment area boundary, except to illustrate that flows largely conform to valley orientation, with slope flow being an important phenomenon.

http://www.epa.gov/region9/air/permit/title-v-permits.html

Globe a.m. and p.m wind roses



Globe CW1546 Wind Rose, 2010; A.M. hours



Globe CW1546 Wind Rose, 2010; P.M. hours

Figure 12

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

As shown in Figures 13 and 14, Miami and the FMMI smelter are located in complex terrain. Miami is at roughly 3,500 feet elevation, located in the southwest-northeast tending river valley of the Bloody Tanks Wash. To the northeast, this valley joins the Pinal Wash at a right angle; the Wash then tends northwest and merges with the Pinal Creek Valley. Northeast beyond this juncture, the Apache Peaks rise to 4,300 feet, and to 6,200 feet a bit outside of the intended nonattainment area. To the northwest, Webster Mountain rises to 5,000 feet; the Pinal and other mountain ranges to the south and southwest rise to 6,500 feet; there are various other ridges to the southeast. Thus, Miami is essentially surrounded by mountains in all directions; its immediate valley makes a right-angle turn into the Pinal Creek Valley, which is all within the intended nonattainment area except for a short narrow portion in the north. The existing nonattainment boundaries contain all the areas topographically connected with Miami.

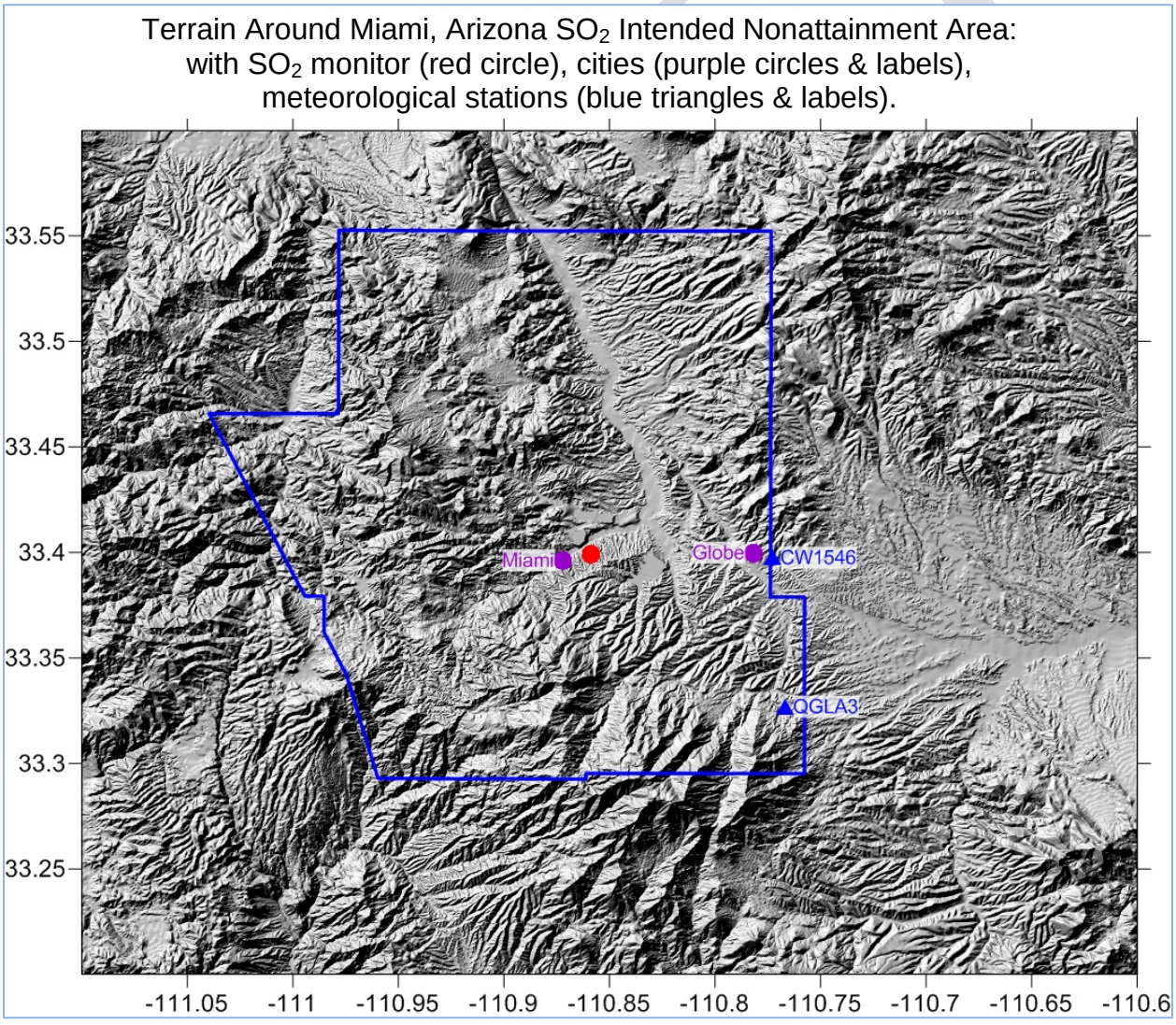


Figure 13

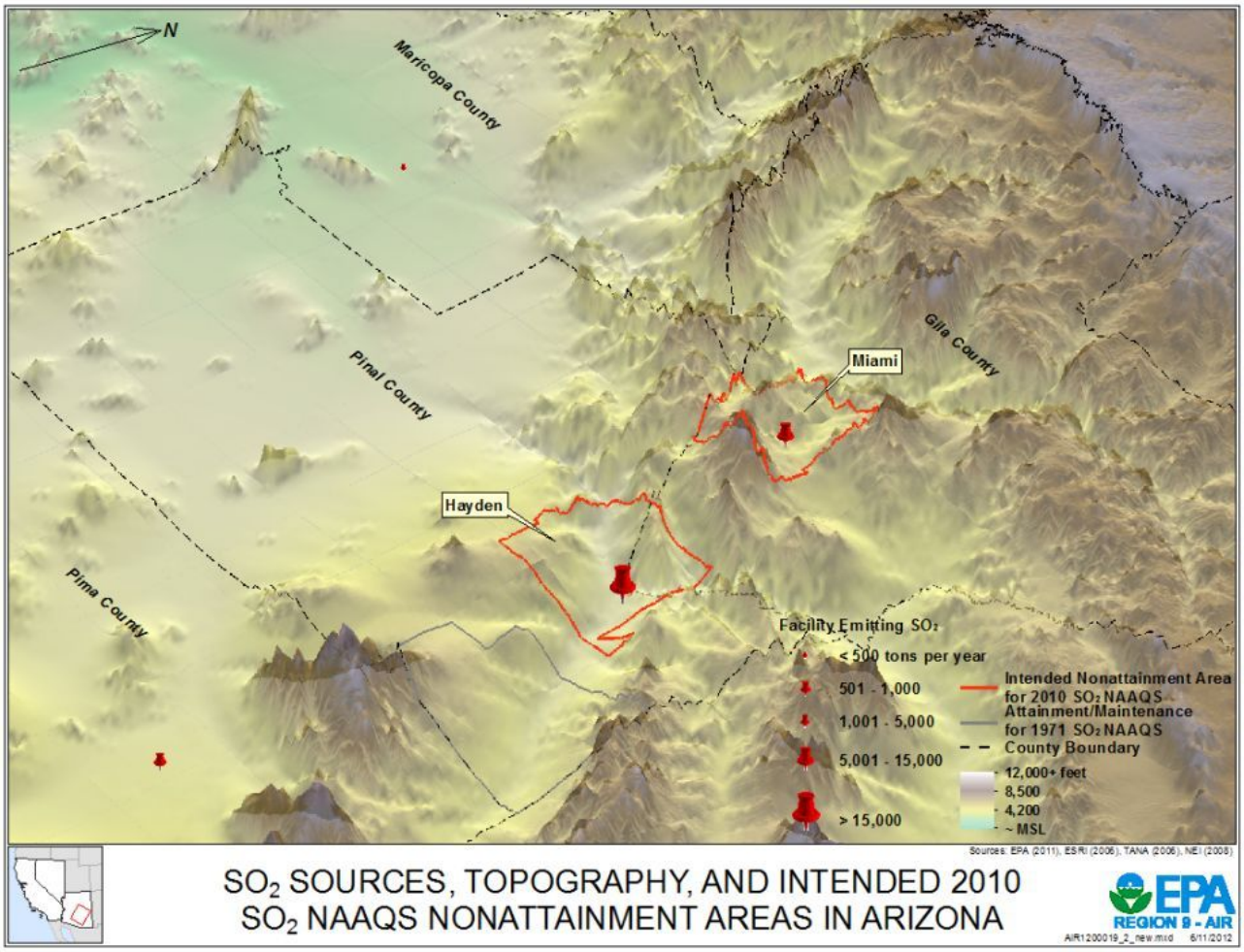


Figure 14

Jurisdictional boundaries

The Office of Management and Budget (OMB) defines metropolitan (metro) and micropolitan (micro) statistical areas based on census information. A metro statistical area contains a core urban area of 50,000 or more in population, and a micro statistical area contains an urban core of at least 10,000 but less than 50,000 in population. A Core Based Statistical Area (CBSA) is a collective term for both metro and micro areas. OMB may further define a combined statistical area (CSA) as an aggregate of adjacent metro or micro statistical areas that are linked by commuting ties.

The state of Arizona is divided into 15 counties (listed in Table 5). Within the state, OMB has defined 11 CBSAs: six metro statistical areas and five micro statistical areas. OMB has not aggregated any metro or micro statistical areas in Arizona into a CSA. Two counties in Arizona, Apache and La Paz, are not defined by OMB as a metro or micro statistical area.

The intended Miami nonattainment area represents a portion of Gila County, located close to the borders of Maricopa and Pinal counties. Gila County comprises the entirety of the Payson Micropolitan

Statistical Area. Although Gila County is adjacent to the Phoenix-Mesa-Glendale Metropolitan Statistical Area (composed of Maricopa and Pinal counties), the degree of socio-economic integration between the Payson and the Phoenix-Mesa-Scottsdale CBSAs is not sufficient to meet the OMB definition of a CSA.

As discussed in the technical analysis for the intended Hayden nonattainment area, for air quality management purposes, Gila County falls under the jurisdiction of ADEQ. Originally, the currently intended Miami SO_2 nonattainment area was not separately defined but rather was included in a county-wide SO_2 nonattainment area (see 43 FR 8968, March 3, 1978). At the request of the state of Arizona, the boundaries were reduced to nine townships in and around the city of Miami (44 FR 21261, April 10, 1979). See also, 40 CFR section 81.303. In addition, six adjacent townships were designated as ''cannot be classified.'' Section 107(d)(1)(C) of the 1990 Clean Air Act Amendments (CAAA) brought forward, by operation of law, the nonattainment designations for areas, such as the Miami SO_2 area, that continued to be designated as nonattainment at the time of enactment of the CAAA, i.e., areas that had not been redesignated to ''attainment'' prior to the CAAAs' November 15, 1990 enactment date. The area achieved attainment with the 1971 SO_2 NAAQS in 1984, and ADEQ submitted a maintenance plan to EPA in 2002. In January 2007, EPA redesignated the Miami nonattainment area to attainment (72 FR 3061, January 24, 2007). In this redesignation and maintenance plan approval, EPA also corrected the boundary of the Miami SO_2 nonattainment area to exclude a noncontiguous township that was erroneously included in the description of the area and to fix a transcription error in the listing of one of the other townships (see 72 FR 3061, January 24, 2007 and 40 CFR section 81.303). The intended Miami nonattainment area for the 2010 SO_2 NAAQS is the same area as the 1971 SO_2 NAAQS maintenance area.

Other Relevant Information

In its May 25, 2011 letter, ADEQ provided additional information to support its assertion that presumptive use of full county boundaries as the nonattainment area boundary is inappropriate for geographically large counties. The state argued that the use of full county boundaries as the presumptive nonattainment area boundary for a violating monitor results in regional disparities in the size of nonattainment areas. For example, the state compared the area of Gila County (4,796 square miles) with the area of the entire state of Connecticut (4,845 square miles). A violating monitor in Middlesex County, Connecticut, would result in a presumptive nonattainment area boundary encompassing 369 square miles. Applying this presumption in Arizona would result in a nonattainment area (Gila County) that is 13 times larger than a full-county nonattainment area in Connecticut. Therefore, the state concluded that its consideration of partial counties for the Hayden and Miami nonattainment areas was appropriate.

Conclusion

After considering the factors described above, EPA intends to concur with the state's recommendation to initially include the portion of Gila County listed in Table 1 as the Miami nonattainment area for the 2010 SO_2 NAAQS, based on the violating monitor.

The air quality monitor in Gila County shows a violation of the 2010 SO_2 NAAQS, based on 2009-2011 air quality data. The Freeport-McMoRan Miami Inc. (FMMI) copper smelter located less than

1,400 meters (less than 0.86 mile) away from the violating monitor is expected to be the source of the emissions causing the violation. Miami is essentially surrounded by mountains in all directions. Due to the constraints imposed by the complex terrain in the Miami area (see Geography/Topography discussion above), the extent of the area exceeding the SO_2 standard is expected to be confined to a relatively small area around the main source of SO_2 emissions, the FMMI copper smelter. For the same reason, locations outside the particular valley containing Miami are not expected to contribute to Miami monitor's exceedances. The meteorology factor did not play a significant role in determining a boundary for the nonattainment area, but available data confirms the relevance of the topography in limiting the intended nonattainment area to the nearby river valleys and their surroundings. The nonattainment boundaries recommended by the state are therefore expected to contain all the areas topographically connected with Miami and causing or contributing to the violation.

Based on the consideration of all the relevant and available information, as described above, EPA's preliminary conclusion is that the boundaries described herein for the intended Miami, Arizona nonattainment area encompass an area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the 2010 SO_2 NAAQS, based on the violating monitor information. No areas of Indian country are included in the intended Miami, Arizona nonattainment area.