



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**REGION IX**

**75 Hawthorne Street  
San Francisco, CA 94105-3901**

**OFFICE OF THE  
REGIONAL ADMINISTRATOR**

**AUG 18 2008**

The Honorable Janet Napolitano  
Governor of Arizona  
1700 West Washington  
Phoenix, AZ 85007

Dear Governor Napolitano:

Thank you for your recommendations on the status of fine particle pollution throughout Arizona. Fine-particle pollution represents one of the most significant barriers to clean air facing our nation today. Health studies link these tiny particles – about 1/30<sup>th</sup> the diameter of a human hair – to serious human health problems including aggravated asthma, increased respiratory symptoms such as coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death in people with heart and lung disease. Fine particle pollution can remain suspended in the air for long periods of time and create public health problems far away from emission sources. Reducing levels of fine-particle (PM<sub>2.5</sub>) pollution is an important part of our nation's commitment to clean, healthy air.

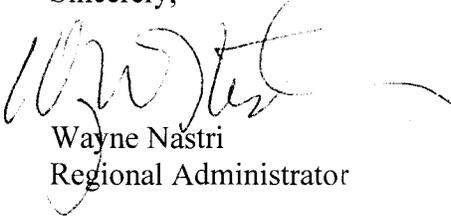
We have reviewed your letter of December 19, 2007 submitting Arizona's recommendations on air quality designations for the 2006 24-Hour PM<sub>2.5</sub> standards. We have also reviewed the technical information submitted to support Arizona's recommendations. We appreciate the effort your state has made to develop this supporting information. Consistent with the Clean Air Act, this letter is to inform you that the Environmental Protection Agency (EPA) intends to support all of Arizona's recommended designations and boundaries.

We have enclosed a detailed analysis of relevant areas that serves as the basis for EPA's preliminary concurrence with your state recommendations. Stephen Owens, the Director of the Arizona Department of Environmental Quality, will also receive a copy of this letter and the enclosure. Should you have additional information that you wish to be considered by EPA in this process, please provide it to Deborah Jordan, Air Division Director, by October 20, 2008.

EPA has taken steps to reduce fine particle pollution across the country, such as the Clean Diesel Program to dramatically reduce emissions from highway, nonroad and stationary diesel engines. In addition, state programs to attain the 1997 PM<sub>2.5</sub> standards will also help to reduce unhealthy levels of fine particle pollution.

We intend to make final designation decisions for the 2006 24-Hour PM<sub>2.5</sub> standards by December 18, 2008. Please also be aware that in the near future, EPA is planning to publish a notice in the Federal Register to solicit public comments on our intended designation decisions. If you have any questions, please do not hesitate to contact me or have your staff contact Deborah Jordan, Air Division Director, at 415-947-8715. We look forward to a continued dialogue with you as we work together to implement the PM<sub>2.5</sub> standards.

Sincerely,



Wayne NASTRI  
Regional Administrator

Enclosure

cc: Stephen Owens, Director, ADEQ  
Nancy Wrona, Air Quality Division Director, ADEQ

## Attachment 1

### **ARIZONA Area Designations For the 24-Hour Fine Particle National Ambient Air Quality Standard**

The table below identifies the counties in Arizona that EPA intends to designate as not attaining the 2006 24-hour fine particle (PM<sub>2.5</sub>) standard.<sup>1</sup> A county will be designated as nonattainment if it has an air quality monitor that is violating the standard or if the county is determined to be contributing to the violation of the standard.

Area	Arizona Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
Nogales	Santa Cruz – partial	Santa Cruz - partial

EPA intends to designate the remaining counties in the state (excluding Indian country) as “attainment/unclassifiable.”

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<sup>1</sup> EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the 24-hour PM<sub>2.5</sub> standard was revised from 65 micrograms per cubic meter (average of 98<sup>th</sup> percentile values for 3 consecutive years) to 35 micrograms per cubic meter; the level of the annual standard for PM<sub>2.5</sub> remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).



## **EPA Technical Analysis for Nogales**

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for the Nogales area identifies the monitor that violates the 24-hour PM<sub>2.5</sub> standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Figure 1 is a map of the counties in the area and other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary, and counties recommended as nonattainment by the State.

# Nogales, AZ

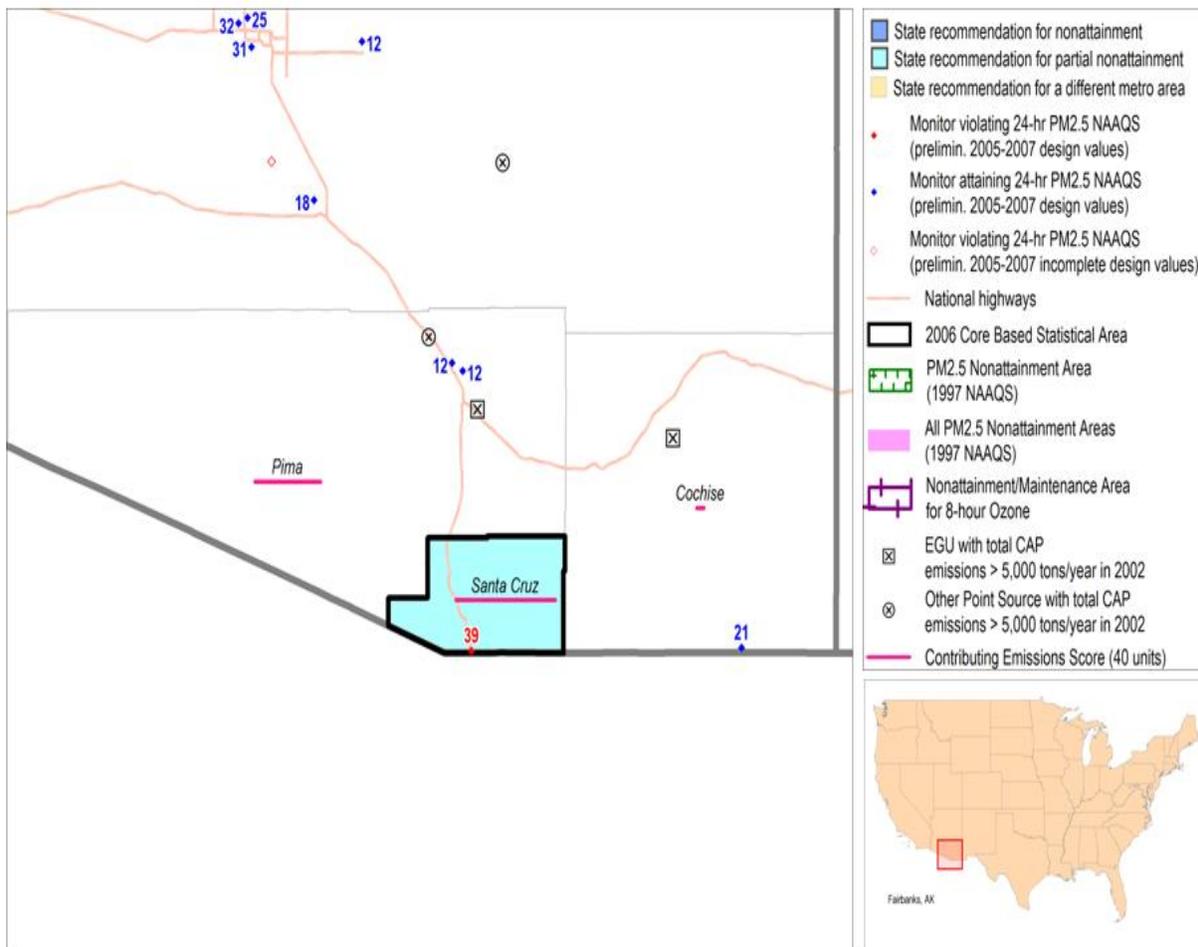


Figure 1

Counties labeled in bold reflect NAAs under 1997 NAAQS

In a December 3, 2007 letter from the Arizona Department of Environmental Quality (ADEQ), Arizona recommended that a portion of Santa Cruz County be designated as “nonattainment” for the 2006 24-hour PM<sub>2.5</sub> standard based on air quality data from 2004-2006. These data are from

Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state.

Air quality monitoring data on the composition of fine particle mass are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. Analysis of these data indicates that the days with the highest fine particle concentrations occur in cool seasons, and the average chemical composition of the highest days is typically characterized by high levels of organic carbon.

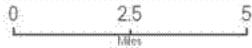
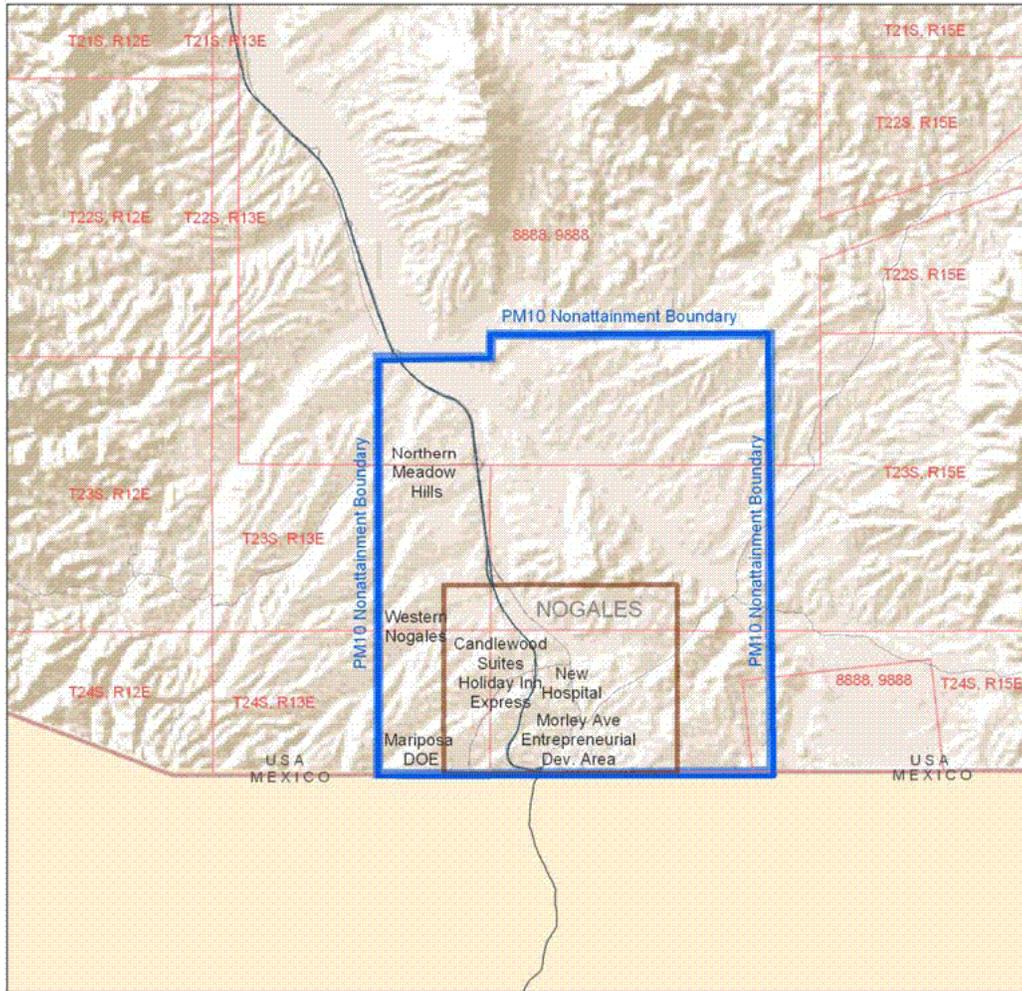
High PM<sub>2.5</sub> values in Nogales generally occur under stagnant, light wind conditions during winter, and are associated with southerly flow (i.e., from the direction of Mexico). Measurements of PM<sub>2.5</sub> composition during an Arizona State University study during the winter of 2005-2006 (quoted in ADEQ's recommendation), showed that the main emission sources are open burning, food cooking, and dust emissions. Carbonaceous emissions with about 15% EC are consistent with wood burning or food cooking, and not consistent with diesel emissions, although those may be important at the U.S.-Mexico border crossing.

Based on EPA's 9-factor analysis described below, EPA believes that a portion of Santa Cruz County should be designated nonattainment for the 24-hour PM<sub>2.5</sub> air-quality standard, based upon currently available information, as shown below. EPA agrees with ADEQ's recommendation that the PM<sub>2.5</sub> nonattainment area for the Nogales Arizona Area should coincide with the existing PM<sub>10</sub> nonattainment area within Santa Cruz County.

Area	State-Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
Nogales PM <sub>10</sub> Nonattainment Area	Santa Cruz County (partial)	Santa Cruz County (partial)

The following is a summary of the 9-factor analysis for the Nogales area.

## Planned Developments Nogales, AZ PM10 Nonattainment Area



- Nogales
- Township/Range
- PM10 Nonattainment



November 2007 Author - N Caroli

Source: ADEQ Technical Support Document for Nogales Recommendation

## Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following PM<sub>2.5</sub> components and precursor pollutants: “PM<sub>2.5</sub> emissions total,” “PM<sub>2.5</sub> emissions carbon,” “PM<sub>2.5</sub> emissions other,” “SO<sub>2</sub>,” “NO<sub>x</sub>,” “VOCs,” and “NH<sub>3</sub>.” “PM<sub>2.5</sub> emissions total” represents direct emissions of PM<sub>2.5</sub> and includes: “PM<sub>2.5</sub> emissions carbon,” “PM<sub>2.5</sub> emissions other”, primary sulfate (SO<sub>4</sub>), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO<sub>2</sub> and NO<sub>x</sub>, are part of “PM<sub>2.5</sub> emissions total,” they are not shown in Table 1 as separate items.) “PM<sub>2.5</sub> emissions carbon” represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and “PM<sub>2.5</sub> emissions other” represents other inorganic particles (crustal). Emissions of SO<sub>2</sub> and NO<sub>x</sub>, which are precursors of the secondary PM<sub>2.5</sub> components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH<sub>3</sub> (ammonia) are also potential PM<sub>2.5</sub> precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See [http://www.epa.gov/ttn/naaqs/pm/pm25\\_2006\\_techinfo.html](http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html).

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive way for consideration of data for these factors. A summary of the CES is included in attachment 2, and a more detailed description can be found at [http://www.epa.gov/ttn/naaqs/pm/pm25\\_2006\\_techinfo.html#C](http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C).

Table 1 shows emissions of PM<sub>2.5</sub> and precursor pollutants components (given in tons per year) and the CES for violating and potentially contributing counties in the Nogales area. Counties are listed in descending order by CES.

County	State Recommended Nonattainment?	CES	PM <sub>2.5</sub> emission total	PM <sub>2.5</sub> emission carbon	PM <sub>2.5</sub> emission other	SO <sub>2</sub>	NO <sub>x</sub>	VOCs	NH <sub>3</sub>
Pima	No	66	4,220	1,678	2,542	6,133	30,326	32,966	1,947
Santa Cruz	Yes (P)	18	631	287	344	116	1,520	3,156	466
Cochise	No	7	1,691	496	1,195	3,712	16,151	7,123	3,404

P = partial

It is interesting to note that Santa Cruz County has much lower PM<sub>2.5</sub> and precursor emissions than Pima County and Cochise County, where there are no PM<sub>2.5</sub> violations. ADEQ provided summary information from a winter 2005 study by Arizona State University (ASU), which indicated that the majority of PM<sub>2.5</sub> concentrations in Nogales, Arizona are a result of transport from Nogales, Sonora, Mexico, via nighttime drainage flows. The ASU study identified wood burning, food cooking, open burning, dust emissions, and tailpipe emissions from on-road and

off-road vehicles as the primary sources. The Sonora, Mexico side has 94% of the total emissions, i.e., its emissions are 15 times higher than the U.S. side, according to PM<sub>10</sub> and PM<sub>2.5</sub> emission inventories developed by ADEQ for the 1993 Nogales PM<sub>10</sub> State Implementation Plan (SIP). Since the CES tool does not include these Mexican emissions, the CES county results above are not conclusive for purposes of setting the nonattainment area boundary.

With respect to the CES values, Pima County has the highest CES score of 66, followed distantly by the violating county, Santa Cruz, and Cochise County. Tucson, Arizona, in Pima County is located approximately 60 miles north of Nogales and does not appear to contribute to the PM<sub>2.5</sub> air quality problems in Nogales. It is too far away and there is no commuting relationship between Tucson and Nogales. In addition, there are no violating monitors in Pima County or in Green Valley to the south of Tucson. We are eliminating Pima County from further consideration given these facts. As indicated by the very low CES, Cochise County does not impact Nogales at all and is, in fact, separated from Nogales by the Patagonia Mountains. We are also eliminating Cochise County from further consideration given the low emissions, low CES score, and the topographical barrier. ADEQ recommended that both these counties be designated as attainment.

ADEQ also recommended that only part of Santa Cruz County be included in the PM<sub>2.5</sub> nonattainment area. Given the low emissions and CES value, Santa Cruz would not be included as part of the PM<sub>2.5</sub> nonattainment area except that it is the County with the violating monitor. It should also be noted that emissions sources in this part of Santa Cruz County are concentrated along Interstate 19, in the valley formed by the Nogales Wash (see population and geography factors below).

**Factor 2: Air quality data**

This factor considers the 24-hour PM<sub>2.5</sub> design values in micrograms per cubic meter (µg/m<sup>3</sup>) for air quality monitors in counties in the Nogales area based on data for the 2004-2006 and 2005-2007 periods. A monitor’s design value indicates whether that monitor attains a specified air quality standard. The 24-hour PM<sub>2.5</sub> standards are met when the 3-year average of a monitor’s 98<sup>th</sup> percentile values are 35µg/m<sup>3</sup> or less. A design value is only valid if minimum data completeness criteria are met.

The 24-hour PM<sub>2.5</sub> design values for counties in the Nogales area are shown in Table 2.

Table 2. Air Quality Data			
County	State Recommended Nonattainment?	24-hr PM <sub>2.5</sub> Design Values, 2004-2006 (µg/m <sup>3</sup> )	24-hr PM <sub>2.5</sub> Design Values, 2005-2007 (µg/m <sup>3</sup> )
Santa Cruz	Yes,(P)	38	39

P=partial

The City of Nogales in Santa Cruz County, Arizona shows a violation of the 24-hour PM<sub>2.5</sub> standard. Therefore, Santa Cruz County is a candidate for nonattainment. There are no violating monitors elsewhere in the County or in Pima County to the north. However, this factor alone is not sufficient to eliminate the remainder of Santa Cruz County as a candidate for nonattainment

status. EPA considered other relevant factors when determining the boundaries of the Nogales nonattainment area. Since the violating monitor is located in the City of Nogales, and the state-recommended nonattainment area (the existing PM<sub>10</sub> nonattainment area) includes the City of Nogales plus a much larger area surrounding the City, EPA considered a partial county designation if the remaining factors supported such a recommendation.

Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with a FRM or FEM monitor. All data from Special Purpose Monitors (SPM) using an FRM, FEM, or Alternative Reference Method (ARM) which has operated for more than 24 months is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr PM<sub>2.5</sub> NAAQS for designation purposes.

**Factor 3: Population density and degree of urbanization (including commercial development)**

Table 3 shows the 2005 population for Santa Cruz County plus the City of Nogales, as well as the population density for each of these areas. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour PM<sub>2.5</sub> standards.

County	State Recommended Nonattainment?	2007 Population	2007 Population Density (pop/sq mi)
Santa Cruz County, AZ	Yes (P)	46,907	38
City of Nogales	Yes	21,746	1,046

P = partial

These data show that the City of Nogales is densely populated, but that Santa Cruz County is sparsely populated. In the entire County, there are only 47,000 people, or 38 people per square mile. Based solely on this factor, Santa Cruz County would not be considered for designation as nonattainment. The figures supplied by ADEQ indicate that the population density in Nogales, Sonora in Mexico is 17,411 people per square mile to support its contention that the major portion of PM<sub>2.5</sub> emissions in the City of Nogales, Arizona comes from Nogales, Sonora, which has a large metropolitan population of approximately 200,000 people.

Based on this factor, the Nogales area is a candidate for a nonattainment status for PM<sub>2.5</sub> but the rest of Santa Cruz County is not.

#### Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive in Santa Cruz County, the percent of total commuters in each county who commute in Santa Cruz County, as well as the total Vehicle Miles Traveled (VMT) for Santa Cruz County in thousands of miles (see Table 4). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Since truck traffic is an integral part of the Nogales Area, this information has been included as well.

County / City	State Recommended Non-attainment?	2005 VMT (1000s mi)	Number Commuting to any violating counties	Percent Commuting to any violating counties
Santa Cruz	Yes, P	464	10,960	87%

Major highways in the Nogales, Arizona area are Arizona State Route 82, which connects Nogales, Arizona with Patagonia, Arizona (19 miles) and Sonoita (31 miles) to the northeast, and US Interstate 19 which connects Tucson, Arizona to Nogales, Arizona and continues south into Mexico. The numbers above indicate that most traffic is local and stays within Santa Cruz County. There is no commuting pattern between the City of Nogales and the City of Tucson, in Pima County to the north. Rather, most of the traffic is personal or commercial coming to and from the ports of entry.

Two ports of entry connect the Nogales, Arizona area with Sonora, Mexico. These ports of entry are the Mariposa Port of entry, which handles primarily commercial truck traffic, and the DeConcini Port of Entry, which primarily handles passenger cars, buses and non-commercial trucks. In 2006, approximately 3.2 million personal vehicles, 289,000 trucks, and 11,500 buses used the Nogales ports of entry. This traffic is the major commuting pattern in the Nogales Area and in Santa Cruz County. The average daily truck traffic is approximately 2001-5000 trucks. See Figure 3.

# Nogales, Arizona - Population Density, Truck and Commuting Traffic

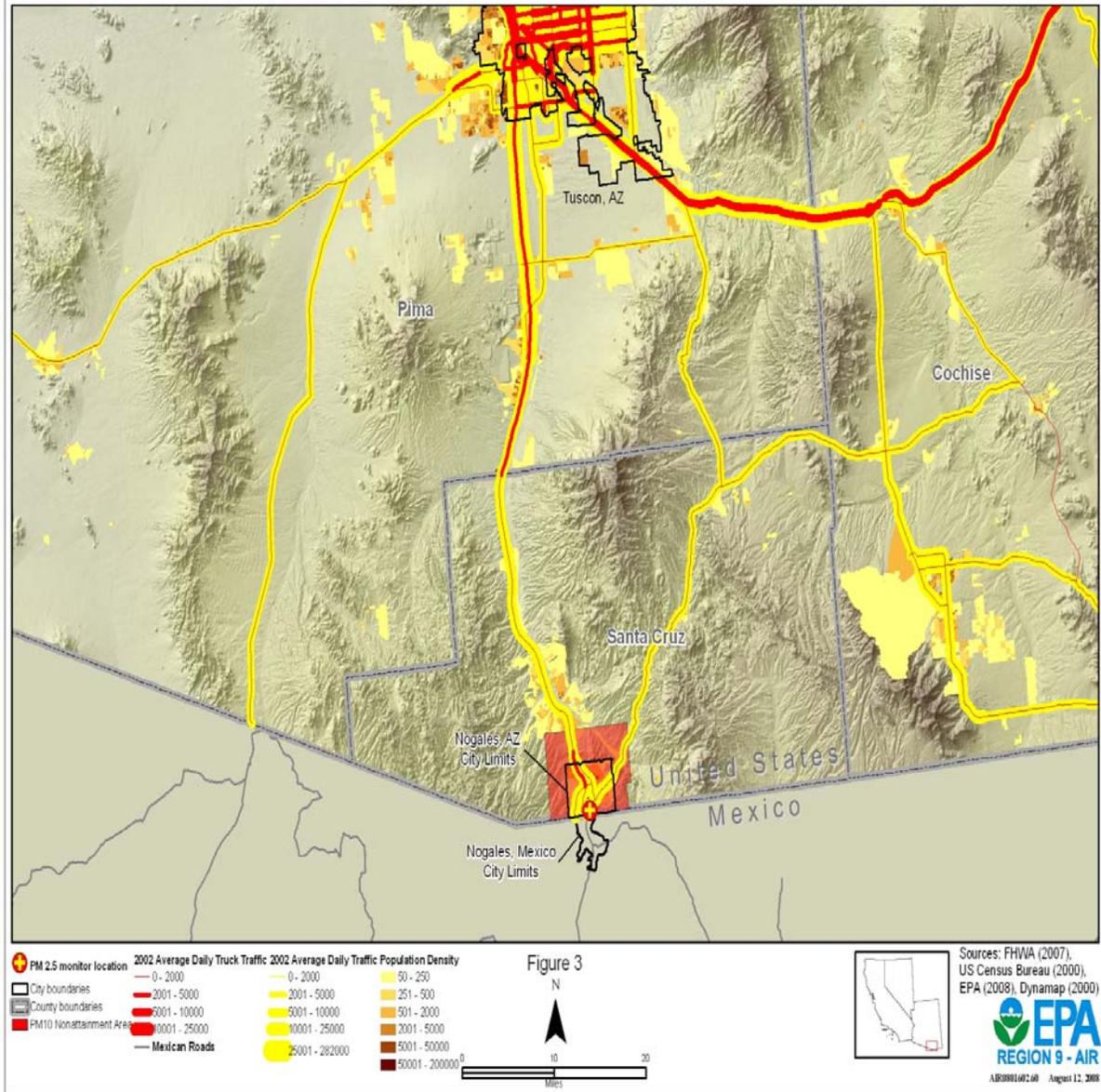


Figure 3

A significant number of vehicles travel from within Santa Cruz County to the City of Nogales. In addition, there is significant traffic from the Mexican border to beyond the city limits of the City of Nogales. Figure 3 indicates that the heaviest truck and daily traffic is on Interstate 19 that winds from the Mexican border to the City of Nogales and through Santa Cruz County to Tucson. ADEQ identifies this traffic as a possible cause of high levels of mobile source PM<sub>2.5</sub> emissions

Because the truck traffic goes beyond the city limits of the City of Nogales and with the analysis of geography and topography described in the following factor, we agree with the recommendation of Arizona that the border of the PM<sub>2.5</sub> nonattainment area should be the same as the current border of the PM<sub>10</sub> nonattainment area.

The 2005 VMT data used for table 5 and 6 of the 9-factor analysis has been derived using methodology similar to that described in “Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: [atftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002\\_mobile\\_nei\\_version\\_3\\_report\\_092807.pdf](atftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf). The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

**Factor 5: Growth rates and patterns**

This factor considers population growth from 2000-2005 and growth in vehicle miles traveled for 1996-2005 for Santa Cruz County, as well as patterns of population and VMT growth. A county with rapid population or VMT growth is generally an integral part of an urban area and likely to be contributing to fine particle concentrations in the area.

Table 6 below shows population, population growth, VMT and VMT growth for Santa Cruz County.

Table 6. Population and VMT Values and Percent Change				
County	Population (2005)	Population % change (2000 - 2005)	2002 VMT (1000s mi)	VMT % change (1996 to 2005)
Santa Cruz County,	42,012	9 %	464	(1%)

ADEQ estimates that population growth for Nogales, Arizona and the Nogales PM<sub>10</sub> nonattainment area is projected to be small, and the population growth for Santa Cruz County is projected to be moderate. Between 2007 and 2015, the population of Santa Cruz County is projected to increase 20% to 56,144 residents, compared to a significantly slower growth rate of 10% or 23,858 residents for the City of Nogales. However, Nogales, Arizona will still represent a plurality of the population of Santa Cruz County.

With regard to VMT, Santa Cruz County shows a 1% decrease in VMT from 2000 to 2005. According to ADEQ, there will be moderate population growth in Santa Cruz County from 2007

and 2015 and the number of registered vehicles in Santa Cruz County has grown from 41,527 in January 2004 to 47,460 in July 2007. There are no statistics for what proportion of the vehicles are owned by residents of the City of Nogales, but since 80% of the total county population resides in the City of Nogales, a large proportion of VMT is within the City of Nogales.

While there is population growth, it is contained within the boundaries of the area proposed by ADEQ which coincides with the existing PM<sub>10</sub> nonattainment area. There is no evidence of significant population growth or high VMT anywhere else in Santa Cruz County.

#### **Factor 6: Meteorology (weather/transport patterns)**

For this factor, EPA considered data from National Weather Service instruments in the area. Wind direction and wind speed data for 2004-2006 were analyzed, with an emphasis on “high PM<sub>2.5</sub> days” for each of two seasons (an October-April “cold” season and a May-September “warm” season). These high days are defined as days where any FRM or FEM air quality monitors had 24-hour PM<sub>2.5</sub> concentrations above 95% on a frequency distribution curve of PM<sub>2.5</sub> 24-hour values.

EPA developed a “pollution rose” to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. However, the data available to produce these were from Tucson, Arizona, which is a considerable distance from Nogales, and subject to different geographical barriers. Thus, EPA drew no conclusions from the pollution roses.

The meteorology factor is also considered in each county’s Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high PM<sub>2.5</sub> days.

EPA also directly examined exceedance day backward wind trajectories from the HYSPLIT model, based on Eta Data Assimilation System (EDAS) gridded meteorological data. These trajectories were not conclusive. However, that is not surprising given that EDAS has a 40 km grid resolution, whereas the valley containing Nogales is at most 20 km wide: the data were not resolved enough to portray the south-north valley drainage flows that are a key feature of local Nogales meteorology.

The Arizona Department of Environmental Quality maintains a meteorological site located at the Nogales Post Office. Review of four years of hourly wind data, from the meteorological site at the Nogales Post Office, indicates that 47% of the time winds were out of the south (between 145 and 225 degrees). Winds out of the north (315 to 45 degrees) occurred 18% of the time, east (45 through 145 degrees) 20% of the time, and west (225 through 315 degrees) occurred 15% of the time. These data show a definite south to north wind flow along the Nogales Wash, likely aided by the decrease in elevation from the south to the north.

The 2005 study by Arizona State University (ASU) mentioned above confirmed that PM<sub>2.5</sub> crosses the border from Mexico to Arizona, primarily via southerly drainage flow during the evening hours. This drainage flow is strongest during the winter months when there are strong temperature inversions and light to no winds. Air quality modeling performed in 1999 found that

PM<sub>10</sub> concentrations drop to low levels by the time they reach the northern boundary of the old PM<sub>10</sub> nonattainment area. A similar pattern would hold for PM<sub>2.5</sub>, though concentrations would drop off more slowly. The information provided by ADEQ indicates that there is transport from Mexico to the Nogales Area and that concentrations decline with distance from the border.

**Factor 7: Geography/topography (mountain ranges or other air basin boundaries)**

The geography/topography analysis looks at physical features of the land that might have an effect on the air shed and, therefore, on the distribution of PM<sub>2.5</sub> over the Nogales area.

The City of Nogales, Arizona encompasses 21 square miles and lies 3,865 feet above sea level. With the Pajarito, Atascosa, and Tumacacori Mountains about 7 miles to the west and the Patagonia Mountains roughly 13 miles east, Nogales rests between the two mountain ranges in the Nogales Wash. While the crests of these ranges are roughly 20 miles apart, the intervening high terrain makes for a narrow north-south valley. This valley contains the Nogales Wash, Interstate 19, and the anthropogenic sources in the southern portion of the County.

To the north and northeast are the Santa Rita Mountains, including Mount Wrightson at 9,432 feet. The existing PM<sub>10</sub> nonattainment area's northern edge roughly corresponds to this range. The range forms a partial barrier to northward flow, though the main north-south valley continues northward after angling to the west. This partial barrier is a reasonable northern edge to the PM<sub>2.5</sub> area; there is not really another compelling jurisdictional or geographical boundary to use for the northern edge.

The elevation decreases from south of the US/Mexico border heading north toward Tucson, Arizona. Thus, nighttime drainage flow is typically from south to north along the Nogales Wash. According to ADEQ, the narrow valley topography can trap air pollutants, especially during the evening hours when the diurnal flow is from the south, out of Nogales, Sonora. Figure 3, above, shows the local topography for the Nogales Area.

The majority of the PM<sub>2.5</sub> emissions, emitted primarily in Mexico, remain within the recommended PM<sub>2.5</sub> nonattainment boundary. Also, as shown above under factors 3 – 5 covering emissions and population, the nonattainment PM<sub>10</sub> area includes all the U.S. sources that would be subject to emission controls to reduce those concentrations. Considering these factors together, the PM<sub>10</sub> nonattainment area appears appropriate for the PM<sub>2.5</sub> area as well.

The Nogales Area is situated between three mountain ranges located east, west, and north of the city. It appears that these topographical features appear to retain PM<sub>2.5</sub> pollution and prevent it from extending to the rest of Santa Cruz County. This factor leads EPA to believe that a partial county designation that is consistent with the existing PM<sub>10</sub> nonattainment area would be appropriate for the PM<sub>2.5</sub> nonattainment area.

**Factor 8: Jurisdictional boundaries (e.g., existing PM and ozone areas)**

In evaluating the jurisdictional boundary factor, consideration should be given to existing boundaries and organizations that may facilitate air quality planning and the implementation of

control measures to attain the standard. Areas designated as nonattainment (e.g. for PM<sub>2.5</sub> or 8-hour ozone standard) represent important boundaries for state air quality planning.

The analysis of jurisdictional boundaries considered the planning and organizational structure of the Nogales Area to determine if the implementation of controls in a potential nonattainment area can be carried out in a cohesive manner. Santa Cruz County has no air quality planning agency. Consequently, the Arizona Department of Environmental Quality is responsible for developing any state implementation plans that are required for the Nogales Area.

Santa Cruz County encompasses an existing nonattainment area for the 24-hour PM<sub>10</sub> standard and is in attainment for the 8-hour ozone standard. ADEQ is the air quality agency responsible for preparing the PM<sub>10</sub> Plan, and is also responsible for preparing any PM<sub>2.5</sub> plan that is required. EPA believes that the boundaries established for implementing the existing PM<sub>10</sub> standards are appropriate for implementing the new 24-hour PM<sub>2.5</sub> standard, since both standards are violated in the Nogales Area. Establishment of the same boundaries for nonattainment of both PM standards facilitates overall air quality planning for attaining both standards.

#### **Factor 9: Level of control of emission sources**

This factor considers emission controls currently implemented for major sources in the Nogales area.

The emission estimates in Table 1 (under Factor 1) include any control strategies implemented by the state in the Nogales area before 2005 that may influence emissions of any component of PM<sub>2.5</sub> emissions (i.e., total carbon, SO<sub>2</sub>, NO<sub>x</sub> and crustal PM<sub>2.5</sub>).

While there are no Electric Generating Units in the nonattainment area, there is a coal-fired power plant (TEP Irvington) to the north in the City of Tucson in Pima County. This is the reason that Pima County has a high CES value. However, the emissions from this power plant do not impact the Nogales Area due to distance, wind flow, and topographical barriers to transport.

## Attachment 2

### Description of the Contributing Emissions Score

The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Using this methodology, scores were developed for each county in and around the relevant metro area. The county with the highest contribution potential was assigned a score of 100, and other county scores were adjusted in relation to the highest county. The CES represents the relative maximum influence that emissions in that county have on a violating county. The CES, which reflects consideration of multiple factors, should be considered in evaluating the weight of evidence supporting designation decisions for each area.

The CES for each county was derived by incorporating the following significant information and variables that impact PM<sub>2.5</sub> transport:

- Major PM<sub>2.5</sub> components: total carbon (organic carbon (OC) and elemental carbon (EC)), SO<sub>2</sub>, NO<sub>x</sub>, and inorganic particles (crustal).
- PM<sub>2.5</sub> emissions for the highest (generally top 5%) PM<sub>2.5</sub> emission days (herein called “high days”) for each of two seasons, cold (Oct-Apr) and warm (May-Sept)
- Meteorology on high days using the NOAA HYSPLIT model for determining trajectories of air masses for specified days
- The “urban increment” of a violating monitor, which is the urban PM<sub>2.5</sub> concentration that is in addition to a regional background PM<sub>2.5</sub> concentration, determined for each PM<sub>2.5</sub> component
- Distance from each potentially contributing county to a violating county or counties

A more detailed description of the CES can be found at [http://www.epa.gov/ttn/naaqs/pm/pm25\\_2006\\_techinfo.html#C](http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C).