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Approval and Promulgation of Implementation Plans; Arizona; Nogales PM_{10} Nonattainment Area Plan; Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA–R09–OAR–2012–0458; FRL–9693–6]

Approval and Promulgation of Implementation Plans; Arizona; Nogales PM_{10} Nonattainment Area Plan

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: EPA is proposing to approve a state implementation plan revision submitted by the Arizona Department of Environmental Quality to address the moderate area PM_{10}, particulate matter with an aerodynamic diameter of less than or equal to a nominal ten micrometers, planning requirements for the Nogales nonattainment area. Consistent with this proposal, EPA is also proposing to approve the following plan elements as meeting the requirements of the Clean Air Act: the Nogales nonattainment area 2008 and 2011 emission inventories; the demonstration that the Nogales nonattainment area is attaining the National Ambient Air Quality Standard for PM_{10}, but for international emissions sources in Nogales, Mexico; the demonstration that reasonably available control measures sufficient to meet the standard have been implemented in the nonattainment area; the reasonable further progress demonstration; the demonstration that implementation of measures beyond those needed for attainment meet the contingency measure requirement; and, the motor vehicle emissions budget for the purposes of determining the conformity of transportation plans, programs, and projects with this PM_{10} plan.

DATES: Written comments must be received on or before July 27, 2012.

ADDRESSES: Submit comments, identified by docket number EPA–R09–OAR–2012–0458, using one of the following methods: Via the Federal eRulemaking Portal, at *www.regulations.gov,* please follow the on-line instructions; via Email to *wamsley.jerry@epa.gov;* via mail or delivery to Jerry Wamsley, Air Planning Office, AIR–2, Environmental Protection Agency (EPA) Region IX, 75 Hawthorne Street, San Francisco, CA 94105–3901.

Instructions: All comments will be included in the public docket without change and may be made available online at *www.regulations.gov*, including any personal information provided, unless the comment includes Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Information you consider to be CBI or otherwise protected should be clearly identified as such and should not be submitted through *www.regulations.gov* or email. *www.regulations.gov* is an ''anonymous access'' system, and EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email directly to EPA, your email address will be automatically captured and included as part of the public comment. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Docket: The index to the docket for this action is available electronically at *www.regulations.gov* and in hard copy at EPA Region IX, 75 Hawthorne Street, San Francisco, California. While all documents in the docket are listed in the index, some information may be publicly available only at the hard copy location (e.g., copyrighted material), and some may not be publicly available at either location (e.g., CBI). To inspect the hard copy materials, please schedule an appointment during normal business hours with the contact listed in the **FOR FURTHER INFORMATION CONTACT** section.

FOR FURTHER INFORMATION CONTACT: Jerry Wamsley, Air Planning Office, AIR–2, EPA Region IX, 75 Hawthorne Street, San Francisco, CA 94105–3901, telephone number: (415) 947–4111, or email address, *wamsley.jerry@epa.gov.*

SUPPLEMENTARY INFORMATION: Throughout this document, wherever ''we'', ''us'' or ''our'' are used, we mean EPA. We are providing the following outline to help locate information in this proposal.

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I. The PM_{10} National Ambient Air Quality Standard and the Nogales PM_{10} Nonattainment Area

A. PM_{10} National Ambient Air Quality Standard

The EPA sets the National Ambient Air Quality Standard (NAAQS) for certain ambient air pollutants at levels required to protect human health and the environment. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers, or PM_{10}, is one of these ambient air pollutants for which EPA has established health-based standards. On July 1, 1987, EPA promulgated two primary standards for PM_{10}: A 24-hour standard of 150 micrograms per cubic meter (μg/m³); and, an annual PM_{10} standard of 50 μg/m³. EPA also promulgated secondary PM_{10} standards that were identical to the primary standards. 52 FR 24634; (July 1, 1987). Because they are identical, we refer to the primary and secondary standards using the singular term, ''standard.'' Effective December 18, 2006, EPA revoked the annual PM_{10} standard but retained the 24-hour PM_{10} standard. 71 FR 61144; (October 17, 2006).

An area attains the 24-hour PM_{10} standard when the expected number of days per calendar year with a 24-hour concentration in excess of the standard (referred to herein as an ''exceedance''), is equal to or less than one,[1] as determined in accordance with 40 CFR part 50, appendix K. See 40 CFR 50.6 and 40 CFR part 50, appendix K. Conversely, a violation of the PM_{10} NAAQS occurs when the number of expected annual exceedances of the 24-hour standard is greater than one.

[1] An exceedance is defined as a daily value that is above the level of the 24-hour standard, 150 μg/m³, after rounding to the nearest 10 μg/m³ (i.e., values ending in five or greater are to be rounded up). Thus, a recorded value of 154 μg/m³ would not be an exceedance since it would be rounded to 150 μg/m³; whereas, a recorded value of 155 μg/m³ would be an exceedance since it would be rounded to 160 μg/m³. See 40 CFR part 50, appendix K, section 1.0.

B. Designation and Classification of PM_{10} Nonattainment Areas, Including the Nogales Nonattainment Area

Areas meeting the requirements of section 107(d)(4)(B) of the Clean Air Act (CAA or ''Act'') were designated nonattainment for PM_{10} by operation of law and classified ''moderate'' upon enactment of the 1990 Clean Air Act Amendments. These areas included all former Group I PM_{10} planning areas identified in 52 FR 29383, (August 7, 1987), as further clarified in 55 FR 45799, (October 31, 1990), and any other areas violating the NAAQS for PM_{10} prior to January 1, 1989. A **Federal Register** notice announcing the areas designated nonattainment for PM_{10} upon enactment of the 1990 Amendments, known as ''initial'' PM_{10} nonattainment areas, was published on March 15, 1991, (56 FR 11101); and, a subsequent **Federal Register** document correcting the description of some of these areas was published on August 8, 1991, (56 FR 37654).

As a former ''Group I'' area, the Nogales nonattainment area (NA) was included in the March 1991 list of initial moderate PM_{10} nonattainment areas. Later, we codified the PM_{10} nonattainment designations and moderate area classifications in 40 CFR part 81 (56 FR 56694; November 6, 1991). For ''moderate'' nonattainment areas, such as the Nogales NA, CAA section 188(c) of the 1990 Amended Act established an attainment date of December 31, 1994. On January 11, 2011, pursuant to section 188(b)(2) of the CAA, we determined that the Nogales NA met the PM_{10} NAAQS as of the applicable attainment date, December 31, 1994. See 76 FR 1532; (January 11, 2011). The designation, classification, and boundaries of the Nogales NA are codified at 40 CFR 81.303.

C. Clean Air Act Plan Requirements for Moderate PM_{10} Nonattainment Areas

Along with the new designations, classifications, and attainment dates, the CAA as amended in 1990 also established new planning requirements. States were required to develop and submit state implementation plan (SIP) revisions providing for, among other elements, implementation of reasonably available control measures (RACM) for control of PM_{10}, a demonstration that the plan would provide for attainment by the applicable attainment date (''attainment demonstration''), and contingency measures, for all moderate PM_{10} nonattainment areas. See CAA sections 172(c) and 189(a). As discussed later, CAA section 179B(a) allows a State to submit a demonstration that the plan would be adequate to attain and maintain the standard but for emissions emanating from outside the United States in lieu of an attainment demonstration. CAA section 179B(a) does not, however, relieve qualifying moderate PM_{10} nonattainment areas of the other SIP requirements, including but not limited to RACM and contingency measures.

In response, on June 14, 1993, the Arizona Department of Environmental Quality (referred to herein as ''ADEQ,'' ''Arizona,'' or ''the State'') submitted the ''Final State Implementation Plan for the Nogales PM_{10} Nonattainment Area,'' June 1993 (''1993 Nogales PM_{10} Plan''). The 1993 Nogales PM_{10} Plan identifies emissions sources located in Mexico as the principal sources affecting ambient PM_{10} concentrations in the area. EPA has not taken action on the 1993 Nogales PM_{10} Plan. Today's action relates to an updated plan for the Nogales PM_{10} nonattainment area that is intended by ADEQ, once submitted in final form, to supersede the 1993 Nogales PM_{10} Plan.

II. Arizona's State Implementation Plan Submittal To Address PM_{10} Attainment in the Nogales Nonattainment Area

A. Arizona's Submittal and Clean Air Act Procedural Requirements

Today's proposed action concerns the *Proposed State Implementation Plan for the Nogales PM_{10} Nonattainment Area* (''Nogales 2012 Plan''), submitted by ADEQ on May 29, 2012. ADEQ concurrently requested that EPA ''parallel process'' our review and proposed action on the Nogales 2012 Plan addressing the CAA's PM_{10} moderate area requirements for the Nogales NA.[2] [3] We have agreed to parallel process the Nogales 2012 Plan concurrently with the ADEQ's public hearing and submittal process using our authority under 40 CFR part 51, appendix V. ADEQ's parallel processing request and the Nogales 2012 Plan consist of the following documents:

[2] Under EPA's ''parallel processing'' procedure, EPA proposes rulemaking action on a proposed SIP revision concurrently with the State's public review process. If the State's proposed SIP revision is changed, EPA will evaluate that subsequent change and may publish another notice of proposed rulemaking. If no significant change is made, EPA will propose a final rulemaking on the SIP revision after responding to any submitted comments. Final rulemaking action by EPA will occur only after the final SIP revision has been fully adopted by ADEQ and submitted formally to EPA for approval as part of the Arizona SIP. See 40 CFR part 51, appendix V.

[3] Letter from Eric Massey, Director, Air Quality Division, Arizona Department of Environmental Quality, to Jared Blumenfeld, Regional Administrator, EPA, dated May 29, 2012.

''Proposed State Implementation Plan for the Nogales PM_{10} Nonattainment Area'' with Appendices A–J, May 17, 2012. The Nogales 2012 Plan, supporting documents, and public hearing information can also be found at ADEQ's Web site, *http://www.azdeq.gov/environ/air/plan/notmeet.html#nog.*

We have reviewed the ADEQ's May 29, 2012 parallel processing submittal against the completeness criteria at 40 CFR part 51, appendix V, section 2.3.1. and find that the submittal is complete. These completeness criteria are used specifically for parallel processing submittals. Once we have received ADEQ's supplemental submittal after the State concludes their public hearing process, we will use the general completeness criteria at 40 CFR part 51, appendix V, 2.0 to determine completeness of that submittal. Our completeness finding on this supplemental submittal will be made as part of our final action on this proposal.

B. Description of the Nogales Nonattainment Area

Covering 76.1 square miles, the Nogales NA is located within Santa Cruz County, Arizona, with the southernmost boundary of the Nogales NA and Santa Cruz County being the United States (U.S.)/Mexico border. Adjacent to the U.S./Mexico border, the city of Nogales, Arizona is 60 miles south of Tucson, Arizona. The city of Nogales, Arizona is the largest city and population center in the Nogales NA.

The Nogales NA is located within the Sonoran Desert. This desert covers 120,000 square miles with a minimum elevation of 2,500 feet above sea level and is in the Basin and Range topographic province. This topography is characterized by north-south elongated valleys surrounded by mountain ranges. Nogales is located in such a north-south valley created by the Nogales Wash running north to the Santa Cruz River. The mean elevation in Nogales, Arizona is 3,865 feet above sea level. Major highways in the Nogales, Arizona area are U.S. Interstate 19 which connects Tucson, Arizona to Nogales, Arizona and continues south into Mexico, where it becomes Federal Highway 15, and Arizona State Route 82, which connects Nogales, Arizona with Patagonia, Arizona (19 miles) and Sonoita (31 miles) to the northeast.

Nogales, Mexico lies directly south of Nogales, Arizona across the U.S./Mexico border. Taken together and referred to as Ambos Nogales, the communities of Nogales, Arizona and Nogales, Mexico comprise the largest international border community in Arizona, with a combined population of 232,550 inhabitants in 2010, approximately 91 percent of whom live in Nogales, Mexico.[4] The mean elevation in Nogales, Mexico is 4,265 feet above sea level.[5]

III. CAA and Regulatory Requirements for Moderate Area PM_{10} Attainment Plans and Nonattainment Areas Influenced by International Transport

A. Moderate PM_{10} Area Planning Requirements

The air quality planning requirements for moderate PM_{10} nonattainment areas are set out in subparts 1 and 4 of the CAA, including sections 110, 172, and 189 of the statute. These sections will be discussed further during the review for each plan element, later in this proposal. Also, we have issued guidance in a General Preamble describing how we will review state submittals under Title I of the CAA, including moderate PM_{10} nonattainment areas. See 57 FR 13498; (April 16, 1992) and 57 FR 18070; (April 28, 1992). In general, moderate area PM_{10} plans must include the following elements: a current, comprehensive emissions inventory of emissions sources in the nonattainment area; provisions to ensure that reasonably available control measures and/or reasonably available control technologies (RACM/RACT) have been implemented in the nonattainment area; provisions demonstrating attainment of the PM_{10} NAAQS with quantitative milestones which show reasonable further progress (RFP) towards attainment of the NAAQS as expeditiously as practicable; contingency measures for RFP and attainment; and, a motor vehicle emissions budget for the purpose of determining the conformity of transportation programs and plans developed by State transportation agencies.[6] Because the Nogales NA lies along the international border with Mexico, the CAA allows Arizona to submit a demonstration that the area would have attained the PM_{10} NAAQS but for international transport from Mexico in lieu of a demonstration that the area has attained the PM_{10} NAAQS. The statutory requirements and guidance for such a demonstration under section 179B of the CAA are discussed next. Under CAA section 179B, however, other SIP requirements, such as RACM and contingency measures, among other requirements, continue to apply to PM_{10} nonattainment areas even if they quality for relief from the attainment demonstration requirement.

B. Clean Air Act Provisions and EPA Guidance Concerning International Border Areas

Because the southern boundary of the Nogales NA lies along the international border with Mexico and transport of PM_{10} emissions from Mexico affects air quality in Nogales, Arizona, there are specific statutory requirements in the CAA that apply to the Nogales NA. With a demonstration from Arizona showing that the Nogales NA would have attained the PM_{10} NAAQS, but for international sources of PM_{10}, EPA may approve an attainment plan provided by the State, even if the attainment plan does not demonstrate attainment of the NAAQS. The PM_{10} attainment plan, however, must meet other requirements of the CAA, contingent upon meeting the NAAQS but for international transport. Such a ''but for'' attainment demonstration, however, must be consistent with statutory and regulatory requirements. First, we will review the statutory basis for a ''but for'' attainment demonstration. Secondly, we will review EPA's published guidance on how such an analysis may be structured. Lastly, we will review how EPA determines whether an area's air quality is meeting the PM_{10} NAAQS using air quality data gathered at monitoring sites in the nonattainment area and our application of 40 CFR part 50, appendix K.

1. Section 179B of the Clean Air Act

For international border areas like the Nogales NA, CAA section 179B(a) provides that notwithstanding any other provision of law, an implementation plan or plan revision shall be approved by the Administrator if such plan or

[4] In 2010, Nogales, Arizona had 20,017 inhabitants and Nogales, Mexico had 212,533 inhabitants. U.S. Census Bureau 2010 and Instituto Nacional de Estadistica Geografia e Informatica, (INEGI) 2010.

[5] ''Statistical Municipal Workbook for Nogales, Sonora,'' 2005 edition, INEGI.

[6] The Nogales PM_{10} nonattainment area is subject to the ''moderate'' area, not the ''serious'' area, SIP planning requirements under the CAA. This is because the mandatory ''bump-up'' from ''moderate'' to ''serious'' under CAA section 188(b)(2) is only triggered if any area fails to attain the standard by the applicable attainment date (in this case, 1994), and the Nogales area, which was originally designated nonattainment for PM_{10} based on exceedances measured in the late 1980's, attained the standard by 1994. Several years after 1994, the Nogales area once again began to experience exceedances but such post-attainment date exceedances do not trigger the mandatory ''bump-up'' provision in CAA section 188(b)(2). The issue of the applicability of the ''bump-up'' provision in CAA section 188(b)(2) to the Nogales area was addressed fully in EPA's final determination that the Nogales area attained the PM_{10} standard by the applicable attainment date. See 76 FR 1532; (January 11, 2011).

revision meets all the requirements applicable to it other than a requirement that such plan or revision demonstrate attainment and maintenance of the relevant national ambient air quality standards by the attainment date specified under the applicable provision, or in a regulation promulgated under such provision, and the submitting State establishes to the satisfaction of the Administrator that the implementation plan of such State would be adequate to attain and maintain the relevant national ambient air quality standards by the attainment date specified under the applicable provision, or in a regulation promulgated under such provision, but for emissions emanating from outside of the United States.

As stated above, notwithstanding any other provision of law, should Arizona establish to the satisfaction of the EPA Administrator that the Nogales NA would have attained the PM_{10} NAAQS by the applicable attainment date but for emissions emanating from outside the U.S., then the Nogales NA is not subject to the provisions of CAA section 189(a)(1)(b), requiring a demonstration of attainment of the PM_{10} standards by the applicable attainment date.[7] The underlying purpose of section 179B is to balance the requirements of the CAA in nonattainment areas adjacent to international borders affected by transport of pollution from foreign sources with the consideration that the State does not have the jurisdiction to control these foreign sources of pollution affecting attainment of the NAAQS in that State.

2. The 1994 General Preamble Addendum

As part of guidance relating to serious PM_{10} nonattainment areas (General Preamble Addendum), EPA included a discussion of the requirements applicable to international border areas.[8] The General Preamble Addendum reviews the information and methods that may be used to determine if an international border area qualifies for treatment under CAA section 179B and to demonstrate that the area would attain the relevant NAAQS but for emissions emanating from outside the U.S.

The General Preamble Addendum provides that ''several types of information may be used to evaluate the impact of emissions emanating from outside the U.S.'' The EPA will consider the information ''for individual nonattainment areas on a case-by-case basis in determining whether an area may qualify for treatment under section 179B.'' See 59 FR 42001; (August 16, 1994). The General Preamble Addendum suggests five methods that may be used to determine the impact of emissions emanating from outside the U.S. Below, we describe the five methods in general terms and later, when reviewing Arizona's section 179B analysis and demonstration, we will discuss the particular applicability of these five methods to the analysis done for the Nogales NA.

Method 1. Place several ambient PM_{10} monitors and a meteorological station measuring wind speed and direction in the U.S. nonattainment area near the international border. Evaluate and quantify any changes in monitored PM_{10} concentrations with a change in the predominant wind direction.

Method 2. Comprehensively inventory PM_{10} emissions within the U.S. in the vicinity of the nonattainment area and demonstrate that those sources, after application of reasonably available controls, do not cause the NAAQS to be exceeded. This analysis must include an influx of background PM_{10} in the area. Background PM_{10} levels could be based on concentrations measured in a similar area not influenced by emissions from outside the U.S.

Method 3. Analyze ambient sample filters for specific types of particles emanating from across the border. Although not required, characteristics of emissions from sources may be helpful so as to better demonstrate the causal relationship with and contribution to exceedances in the U.S. nonattainment area due to domestic and international emissions.

Method 4. Inventory the sources on both sides of the border and compare the magnitude of PM_{10} emissions originating within the U.S. to those emanating from outside the U.S.

Method 5. Perform air dispersion and/or receptor modeling to quantify the relative impacts on the nonattainment area of sources located within the U.S., and of foreign sources of PM_{10} emissions.

As stated in the General Preamble Addendum, the EPA will consider the information ''for individual nonattainment areas on a case-by-case basis in determining whether an area may qualify for treatment under section 179B.'' Because the individual circumstances surrounding a nonattainment area may differ widely whether by data, resources, or emissions sources, EPA anticipates that ''the State may use one or more of these types of information or other techniques, depending on their feasibility and applicability, to evaluate the impact of emissions emanating from outside the U.S. on the nonattainment area.'' See 59 FR 42001; (August 16, 1994). Therefore, the analysis Arizona has provided for the Nogales NA is specific to this nonattainment area only and the timeframe, data, and circumstances therein, and EPA is evaluating the analysis as such.

As explained earlier, the underlying purpose of section 179B is to balance the requirements of the CAA in nonattainment areas adjacent to international borders affected by transport of pollution from foreign sources with the consideration that the State does not have the jurisdiction to control these foreign sources of pollution affecting attainment of the NAAQS in that State. In this light, the General Preamble Addendum discusses several attainment plan requirements as applied to nonattainment areas affected by international transport.

The 1994 General Preamble Addendum discusses the requirements for RACM as applied to nonattainment areas affected by international transport. In international border areas, ''RACM/RACT must be implemented to the extent necessary to demonstrate attainment by the applicable attainment date if emissions emanating from outside the U.S. were not included in the analysis.'' See 59 FR 42001; (August 16, 1994). As set forth in section 179B(a)(2), a State's moderate area PM_{10} plan must be ''adequate'' to attain and maintain the PM_{10} NAAQS, but for emissions from outside the U.S. Therefore, nothing in section 179B relieves a State from the requirement to address and implement RACM. Nonetheless, States are not required to implement control measures that go beyond what the plan demonstrates would otherwise be adequate for timely attainment and maintenance of the PM_{10} NAAQS but for emissions from outside the U.S. Furthermore, to the degree that the State can satisfactorily demonstrate that implementation of a control measure clearly would not advance the area's attainment date, EPA may conclude that these control measures are unreasonable and do not constitute RACM for the nonattainment area. See 59 FR 42001; (August 16, 1994).

[7] As discussed earlier, we determined that the Nogales NA met the PM_{10} NAAQS as of the applicable attainment date for moderate nonattainment areas, December 31, 1994; consequently, we did not reclassify the area to ''serious.'' See 76 FR 1532; (January 11, 2011).

[8] ''State Implementation Plans for Serious PM_{10} Nonattainment Areas, and Attainment Date Waivers for PM_{10} Nonattainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990,''; 59 FR 41998, August 16, 1994.

The 1994 General Preamble Addendum also discusses the requirements for reasonable further progress (RFP) and contingency measures as applied to nonattainment areas affected by international transport. Section 179B(a)(1) does not relieve a nonattainment area of the CAA requirements for RFP and contingency measures. In international border areas, however, ''EPA will not require the contingency measures for PM_{10} to be implemented after the area fails to attain if EPA determines that the area would have attained the NAAQS, but for emissions emanating from outside the U.S.'' Conversely, to the degree that contingency measures are needed to control U.S. sources of PM_{10} to meet RFP or attainment contingency measure requirements but for PM_{10} emissions emanating from outside of the U.S., then the statutory requirements for RFP and contingency measures still apply. See 59 FR 42001, 42002; (August 16, 1994).

3. Statutory Requirements and Guidance for Determining Attainment of the PM_{10} NAAQS

EPA determines whether an area's air quality is meeting the PM_{10} NAAQS based upon air quality data gathered at monitoring sites in the nonattainment area. Then, EPA reviews the data to determine the area's air quality status according to 40 CFR part 50, appendix K. Three consecutive years of clean air quality data (i.e., no more than one expected exceedance per year) is generally needed to show attainment of the 24-hour PM_{10} standard. As defined by 40 CFR part 50, appendix K, a complete year of air quality data is composed of all four calendar quarters with each quarter containing data from at least 75 percent of the scheduled sampling days.

Under 40 CFR part 50, appendix K, a nonattainment area meets the 24-hour PM_{10} NAAQS when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms per cubic meter ($\mu g/m^3$) is equal to or less than one. In general, the number of expected exceedances at a site which samples every day is determined by recording the number of exceedances in each calendar year and then averaging them over the most recent three calendar years. For sites which do not sample every day, EPA requires adjusting the observed exceedances to account for days not sampled. The procedures for making this data adjustment are specified in 40 CFR part 50, appendix K.

For this review of the Nogales NA and the contribution of international emissions, the standard we will use to demonstrate attainment of the PM_{10} NAAQS, ''but for'' international emissions, is similar to the one described above: The expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ must be equal to or less than one. To demonstrate that the Nogales NA has met the PM_{10} standard ''but for'' emissions from Mexico, the State's analysis must show that no more than three exceedances, based on data completeness and every day sampling, over the specific three-year analysis period, would have occurred on the U.S. side of the border, setting aside any contributions from Mexican sources of PM_{10}.

IV. Review of the Nogales 2012 Plan

In this section, according to the statutory requirements and guidance discussed above in section III, we will review Arizona's submitted Nogales 2012 Plan and section 179B analysis and demonstration that the Nogales NA is attaining the PM_{10} NAAQS but for international emissions sources from Nogales, Mexico.

A. Emissions Inventories

1. Requirements for Emissions Inventories

Section 172(c)(3) of the CAA requires plan submittals to include a comprehensive, accurate, and current inventory of actual emissions from all sources in the nonattainment area.

2. Review of the Nogales Nonattainment Area Emissions Inventories

Arizona submitted emissions inventories for the Nogales NA for the years 2008 and 2011. These emissions inventories were calculated using information from version 1.5 of EPA's 2008 National Emission Inventory (NEI) and the NEI emissions estimates for Santa Cruz County, Arizona. A Nogales NA 2008 emissions inventory was scaled from the larger Santa Cruz County emissions inventory using a combination of population and land allocation ratios. A specific point source's location was the basis for assigning point sources to the Nogales NA emissions inventory. On-road motor vehicle PM_{10} emissions for 2008 and 2011 were calculated using County-level data for 2008 and 2011 and the MOVES2010a model.[9] The larger and remaining portions of the 2011 emissions inventory, particularly area sources, were calculated from the 2008 emissions inventory according to estimates of population and economic growth. An overview of the Nogales NA 2008 and 2011 emissions inventories is provided here; for detailed results and a complete discussion of the methodology used to produce the emission inventories, see ''PM_{10} Emission Inventories for 2008 and 2011, Nogales Non-Attainment Area, Santa Cruz County, Arizona'', in Appendix B of the Nogales 2012 Plan.

EPA's NEI database contains information about sources that emit criteria air pollutants and their precursors, and hazardous air pollutants. The database includes estimates of annual air pollutant emissions, including PM_{10}, from point, nonpoint, and mobile sources in the 50 states, including Arizona, and specifically Santa Cruz County. Collaborating with the states, EPA develops the emissions inventory and releases an updated version of the NEI database every three years. A complete description of the development of the 2008 NEI may be found at the following URL: *http://www.epa.gov/ttn/chief/net/2008inventory.html.*

In calculating PM_{10} emissions from on-road mobile sources in Santa Cruz County, Arizona used the MOVES2010a version dated September 23, 2010 (hereafter referred to as ''MOVES''). This is the current version of the MOVES model. MOVES allows the use of county-specific data concerning factors such as the average speed distribution of on-road vehicles, daily vehicle miles traveled, and road types among others in place of national default values. The MOVES model requires the use of county-specific data for SIP purposes. In this instance, the MOVES calculation was performed using input data from the 2008 NEI for Santa Cruz County. Similar MOVES model runs were completed to estimate 2011 on-road mobile source PM_{10} emissions.

Although EPA has no specific guidance on assigning emissions sources from a county level of analysis to a smaller area within that county, for the Nogales NA emissions inventory, Arizona used a combination of population ratios, land area ratios, and point source locations within the Nogales NA to determine the appropriate allocation of county-wide emissions to the Nogales NA. See Table

[9] On March 2, 2010, EPA approved the availability of the Motor Vehicle Emissions Simulator model (MOVES2010a) in official SIP submissions to EPA regarding air quality and for certain transportation conformity analyses outside the state of California; see 75 FR 9411. Also see EPA's Web site for more information, *http://www.epa.gov/otaq/models/moves/index.htm.*

1 for the specific population and land allocation ratios used to scale PM_{10} emissions from the County to the Nogales NA level.

TABLE 1—SUMMARY OF LAND AREA AND 2008 POPULATION ALLOCATION RATIOS

	Santa Cruz County	Nogales NA	Allocation ratio (percent)
Land Area (square miles)	[10] 1,237.6	76.1	6.15
2008 Population	[11] 43,091	[12] 23,735	55.1

The State used data from the U.S. Census Bureau to estimate the 2008 population of the Nogales NA population and Santa Cruz County. A land area-weighted emission ratio was developed using U.S. Census geographic data and confirmed with Arizona Commerce Authority data.[13] Some source categories, such as agricultural emissions, are likely to be proportional to land area; consequently, they are logically allocated by the land area ratio. To confirm whether specific point sources in the Santa Cruz County emissions inventory should be included in the Nogales NA emissions inventory, ADEQ and EPA used visual inspections with location information, such as satellite photography using Google Earth.

As shown in Table 2, in 2008, the majority of PM_{10} emissions in the Nogales NA came from fugitive dust from four source categories: Unpaved road dust, road construction, commercial/industrial/institutional construction, and paved road dust. The estimated emissions inventory for 2011 only differed slightly as total emissions decreased from 1,524 tons per year (tpy) in 2008 to 1,521 tpy in 2011, due primarily to implementation of new and cleaner engine standards for diesel engines. Little or no growth in population or economic activity occurred from 2008 to 2011. From 2008 to 2011, the emissions estimated for five of the top six source categories remain unchanged, except for residential wood burning which increased by two tons per year. Again, in 2011 as in 2008, these six source categories account for approximately 95 percent of all PM_{10} emissions in the Nogales NA.

TABLE 2—2008 AND 2011 NOGALES NA PM_{10} EMISSIONS INVENTORIES

[Tons per year]

Source category	2008	2011
Dust—Unpaved Road Dust	865	865
Dust—Road Construction	267	267
Dust—Commercial/Industrial/Institutional Construction	143	143
Dust—Paved Road Dust	121	121
Fuel Combustion—Residential—Wood	24	26
Dust—Residential Construction	24	24
Waste Disposal—Residential Garbage Burning	23	25
All other sources	57	50
Total	1,524	1,521

Note: All other sources include emissions from source categories such as all on-road mobile and off-road mobile, all commercial and industrial fuel combustion, agriculture, land clearing and burning activities.

Source: Table 5 in "PM_{10} Emission Inventories for 2008 and 2011, Nogales Non-Attainment Area, Santa Cruz County, Arizona," Appendix B of the Nogales 2012 Plan. Table 5 also provides a detailed listing of all source categories. Due to rounding, totals may not reflect exactly the sum of each source category.

3. Proposed Action on the Nogales Nonattainment Area 2008 and 2011 Emissions Inventories

We propose to find that the Nogales NA emissions inventories for 2008 and 2011 are comprehensive, accurate, and current inventories of actual emissions from all sources in the nonattainment area and that they meet the requirements of section 172(c)(3) of the CAA. The State has provided a 2008 base year and 2011 future year emissions inventory comprehensively addressing all source categories in the Nogales NA. The State also used the most recent iteration of mobile source emissions modeling tool, MOVES2010a, in developing its emissions inventories. Consequently, we are proposing to find that the emissions inventories provided by Arizona meet the requirements of section 172(c)(3) and provide an adequate basis for the attainment demonstration under section 179B, and the State's RACM/RACT and RFP demonstrations.

B. Section 179B Analysis and Demonstration of Attainment but for International Sources of PM_{10} Emissions

1. Review of Statute and Guidance Applied to the Nogales Section 179B Analysis and Demonstration of Attainment but for International Sources of PM_{10} Emissions

As discussed earlier, the General Preamble Addendum provides that "several types of information may be used to evaluate the impact of emissions emanating from outside the U.S." The EPA will consider the information "for individual nonattainment areas on a case-by-case basis in determining

[10] U.S. Census, Quickfacts, Santa Cruz County, Arizona.

[11] 2010 U.S. Census population estimates.

[12] Ibid.

[13] Arizona Department of Commerce Profile: Santa Cruz County Arizona, May 10, 2011, *http://www.azcommerce.com/doclib/commune/SantaCruzpercent20county.pdf.*

whether an area may qualify for treatment under section 179B.'' See 59 FR 42001; (August 16, 1994). The General Preamble Addendum suggests five methods that may be used to determine the impact of emissions emanating from outside the U.S. and explains that ''the State may use one or more of these types of information or other techniques, depending on their feasibility and applicability, to evaluate the impact of emissions emanating from outside the U.S. on the nonattainment area.'' See 59 FR 42001; (August 16, 1994). Below, we discuss these five methods for evaluating the effects from transport of international pollution and the applicability of these methods to the Nogales NA, as presented in the Nogales 2012 Plan.

Method 1. Place several ambient PM_{10} monitors and a meteorological station measuring wind speed and direction in the U.S. nonattainment area near the international border. Evaluate and quantify any changes in monitored PM_{10} concentrations with a change in the predominant wind direction.

The State reviewed the ambient PM_{10} data, meteorology, and topography in the Ambos Nogales area. Arizona maintains a monitor in Nogales, Mexico, as well as three monitors in Nogales, Arizona. The Nogales, Arizona monitors are divided as follows: Two monitors measure ambient PM_{10} levels; and one monitor measures ambient $PM_{2.5}$ levels.[14] Arizona also has two reference monitors at increasing distances from the Nogales NA. Arizona's complete analysis of the ambient data, meteorology, and topography is provided in Appendix D of the Nogales 2012 Plan and is discussed below in section IV.B.2.c of this proposal. This method provided useful information to understand emissions sources and PM_{10} concentrations in the Nogales NA.

Method 2. Comprehensively inventory PM_{10} emissions within the U.S. in the vicinity of the nonattainment area and demonstrate that those sources, after application of reasonably available controls, do not cause the NAAQS to be exceeded. This analysis must include an influx of background PM_{10} in the area. Background PM_{10} levels could be based on concentrations measured in a similar area not influenced by emissions from outside the U.S.

This method implies the use of an air quality model to demonstrate that emissions within the U.S. do not create a violation of the NAAQS. Although a comprehensive, area-wide inventory of PM_{10} emissions is available for Nogales, Arizona, information about the spatial and temporal distribution of those emissions required to support air quality modeling is not readily available and would require significant effort to develop. Furthermore, given the complex topography of the Ambos Nogales area, it is not feasible to develop an adequate demonstration using available modeling tools.

Method 3. Analyze ambient sample filters for specific types of particles emanating from across the border. Although not required, characteristics of emissions from foreign sources may be helpful so as to better demonstrate the causal relationship with and contribution to exceedances in the U.S. nonattainment area due to international emissions.

This method is unlikely to produce useful information for the Nogales NA because the large proportion of crustal PM sources on either side of the international border far outweigh any specific stationary or combustion-based PM source that could be identified by a filter-based analysis, and differentiating between Arizona and Mexican sources of crustal material is not feasible. Also, specific local and international point source emissions information, such as source-specific signature emissions compounds, was not available with which to correlate the filter analyses results.

Method 4. Inventory the sources on both sides of the border and compare the magnitude of PM_{10} emissions originating within the U.S. to those emanating from outside the U.S.

Arizona provided two emissions inventories: The first emissions inventory, discussed above, describes the PM_{10} sources and estimates PM_{10} emissions in and around the Nogales NA, Arizona; and, the second inventory describes the PM_{10} sources and estimates PM_{10} emissions in and around Nogales, Mexico. The Nogales NA PM_{10} emissions inventory is provided in Appendix B and the Nogales Municipality, Mexico emissions inventory is provided in Appendix C of the Nogales 2012 Plan. The results of both inventories are discussed below in section IV.B.2.b. of this proposal. Also, as a basis for these analyses, Arizona reviewed population estimates and relative population differences for these areas, which is further discussed in section IV.B.2.a. of this proposal.

Method 5. Perform air dispersion and/or receptor modeling to quantify the relative impacts on the nonattainment area of U.S. and foreign sources of PM_{10} emissions.

As discussed above, the information necessary to support air dispersion or receptor modeling is not readily available for the Nogales, Arizona area, nor is it available for the Nogales, Mexico area. For example, neither ADEQ, nor EPA, had available a gridded emissions inventory or a data set from an extensive monitoring array of ambient PM_{10} values and meteorological data derived from observations on multiple exceedance days.

Backward wind trajectory analysis using the HYSPLIT model was considered, based on Eta Data Assimilation System (EDAS) gridded meteorological data, but again, neither Arizona nor EPA pursued this analysis.[15] Previously, EPA performed such an analysis for the Nogales, Arizona area and found the resulting wind trajectories to be inconclusive. The EDAS has a 40-kilometer grid resolution; in contrast, the valley containing Nogales is 20 kilometers wide at its widest point. As a result, the EDAS data were not of a fine enough resolution to portray the south-to-north valley air drainage flows that are a key feature of local Nogales meteorology; consequently, further use of HYSPLIT model results for purposes of this section 179B analysis was rejected by the State and EPA.

To summarize, the State analyzed ambient PM_{10} levels in and around the Nogales NA, the local meteorology associated with exceedances of the PM_{10} standards, and sources of PM_{10} emissions on either side of the international border. These analyses are consistent with Methods 1 and 4 described by the General Preamble Addendum. The State examined method 3, but did not pursue this avenue of investigation because it was unlikely that definitive results could be produced given the large crustal source emissions on either side of the international border.

Initially, the State did not pursue Methods 2 and 5 because it did not have the data and the models required for this type of analysis. Instead, the State used the available information consistent with methods 1 and 4, to

[14] $PM_{2.5}$, also called fine particulate, refers to particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers. PM_{10} includes both $PM_{2.5}$ and the particulates with aerodynamic diameter between 2.5 and 10 micrometers, which is referred to as $PM_{10\text{-}2.5}$. This larger fraction is called ''coarse'' particulate. While fine particles originate mostly from combustion sources and secondary aerosol generation processes, coarse particles usually originate from mechanical activities and fugitive source categories.

[15] HYSPLIT is the ''Hybrid Single Particle Lagrangian Integrated Trajectory'' Model, developed and maintained by the National Oceanic and Atmospheric Administration; see *www.arl.noaa.gov/HYSPLIT_info.php* for more information.

demonstrate if the Nogales NA would have attained the standard, but for international emissions.

As stated in the General Preamble Addendum, EPA will consider the information ''for individual nonattainment areas on a case-by-case basis in determining whether an area may qualify for treatment under section 179B.'' See 59 FR 42001; (August 16, 1994). Because the individual circumstances surrounding a nonattainment area may differ widely whether by data, resources, or emissions sources, EPA anticipates that ''the State may use one or more of these types of information or other techniques, depending on their feasibility and applicability, to evaluate the impact of emissions emanating from outside the U.S. on the nonattainment area.'' See 59 FR 42001; (August 16, 1994). The analysis the State has provided for the Nogales NA is specific to this nonattainment area only and the timeframe, data, and circumstances therein, and EPA evaluated the analysis as such.

2. Review of Arizona's Section 179B Analysis and Demonstration of Attainment but for International Sources of PM_{10} Emissions

a. Population Growth in the Ambos Nogales Region

In producing emissions inventories, Arizona reviewed recent 2010 population information from the U.S. Census Bureau and Mexican Census data from the Instituto Nacional de Estadistica Geografia e Informatica (INEGI). While population estimates, by themselves, are not direct indicators of emissions activity, they provide an indication of relative human activity and resulting PM_{10} emissions on either side of the international border. Table 3 provides a comparison of the populations residing in the Nogales NA and the Nogales Municipality, Mexico. The Nogales NA population estimate includes persons residing in the city of Nogales, Arizona, and the surrounding community of Rio Rico within the Santa Cruz County portion of the nonattainment area.

TABLE 3—2010 POPULATION: NOGALES NA, ARIZONA AND NOGALES MUNICIPALITY, MEXICO

Area	Population	Percent
Nogales NA, Arizona	24,059	9.8
Nogales Municipality, Mexico	220,292	90.2
Total	244,351	100

Source: INEGI & U.S. Census.

Although the Nogales Municipality is a larger land area than the Nogales NA, a large proportion of the Municipality's population is concentrated within the city of Nogales, Mexico and the surrounding area. In sum, 90.2 percent of the 2010 population in the Ambos Nogales area can be attributed to the Mexican side of the international border.

It is also instructive to examine population change since 1995, when the Nogales NA met the PM_{10} NAAQS along with the subsequent observed exceedances of the PM_{10} NAAQS.[16] Table 4 shows population estimates for 1995, 2000, 2005, and 2010, while Table 5 shows the annual number of expected exceedances of the PM_{10} NAAQS since 1998, the first year the Nogales NA recorded exceedances after meeting the PM_{10} standard in 1994. The Nogales NA did not record exceedances of the PM_{10} standard from 1995 to 1997.

TABLE 4—NOGALES, ARIZONA AND NOGALES MUNICIPALITY, MEXICO POPULATIONS: 1995, 2000, 2005 AND 2010[17]

	1995	2000	2005	2010
Nogales, Arizona	20,184	20,878	20,421	20,837
Nogales Municipality, Mexico	133,491	159,787	193,517	220,292

Source: INEGI & U.S. Census.

Between 1995 and 2010, Nogales, Arizona population increased approximately three percent, and has fallen slightly since 2000. The 2010 Nogales NA population at 24,059 persons is marginally larger than the city of Nogales because the nonattainment area estimate includes portions of the Rio Rico communities in the northernmost portion of the nonattainment area. In contrast, the Nogales Municipality, Mexico population has increased 65 percent in the 1995 to 2010 timeframe. With the exceptions of 2000 and 2004, exceedances of the PM_{10} standard have been recorded since 1998 in the Nogales NA. The largest number of expected exceedances, 47.9, was recorded in 2006. See Table 5.

TABLE 5—NOGALES, ARIZONA EXPECTED EXCEEDANCES OF 24-HOUR PM_{10} NAAQS FROM 1998–2010

Monitor frequency	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 in 6 day	13.5	15.5	0.0	6.9	6.1	12.3	0.0	17.9	20.0	6.1	6.6	0.0	0.0
Continuous	.....	.....	.....	.....	.....	.....	.....	29.6	47.9	14.0	13.2	2.0	*8.5

*There were no quarters in 2010 where there was a complete data set per 40 CFR part 50, appendix K; see section IV.B.2.c. for a discussion of 2010 data.

Source for expected exceedance data: EPA Air Quality System Database.

[16] See 76 FR 1532; (January 11, 2011) for our determination that the Nogales NA attained the PM_{10} NAAQS by December 31, 1994.

[17] The 1995 Nogales, Arizona population estimate was interpolated from 1990 and 2000 U.S. Census figures; the 1990 population estimate was 19,489.

To summarize, population estimates since 1995 show the Nogales NA population remaining relatively constant while the Nogales Municipality, Mexico population has steadily increased to the present where 9 of 10 people in the Ambos Nogales area reside in Mexico. Over the same timeframe, after attaining the PM_{10} NAAQS in 1994 through 1997, expected exceedances of the PM_{10} NAAQS in the Nogales NA increased to a high of 47.9 in 2006 and the area does not meet the NAAQS today. The dramatic differential population increase in Nogales, Mexico compared to Nogales, Arizona and the surrounding nonattainment area supports the inference that a large and growing proportion of PM_{10} emissions in the Ambos Nogales area emanates from outside of the Nogales NA and the U.S.

b. Review and Comparison of U.S./Mexico Emissions Inventories

Both the Nogales NA and the Nogales Municipality, Mexico have similar contributing sources of PM_{10}, primarily fugitive dust from unpaved and paved roads, as well as combustion sources and construction. The Nogales NA emissions inventories were presented above in section IV.A.2 of this proposal. While less detailed than the Nogales NA emissions inventories, the Nogales Municipality, Mexico emissions inventories shows that the largest contributing sources of PM_{10} emissions are from unpaved and paved road dust followed by residential wood combustion and other area sources. Because Nogales Municipality, Mexico specific data could not be found to calculate unpaved and paved road emissions, the State reviewed other U.S./Mexico border emissions inventories to identify data for use in these calculations. Given the range of data generated and used by these U.S./Mexico border emissions inventories, low and high estimates were calculated for the unpaved and paved road source categories. Much of the difference between the low and high estimates of Nogales Municipality emissions is attributed to the low and high estimates of unpaved and paved road emissions. A high estimate for point sources was included because the State did not have readily available source-specific information providing a precise estimate for stationary point sources of PM_{10} in the Nogales Municipality, Mexico.[18] The methods for calculating these estimates are discussed in ''2008 and 2011 PM_{10} Emission Inventories, Nogales Municipality, Sonora, Mexico'' in Appendix C of the Nogales 2012 Plan. The Nogales Municipality, Mexico emissions inventories for 2008 and 2011 are presented in Table 6.

TABLE 6—PM_{10} EMISSIONS INVENTORIES FOR NOGALES MUNICIPALITY, MEXICO FOR 2008 AND 2011

[Tons per year]

Source category		Range	2008	2011
Point Sources		Low Estimate	1.1	1.1
		High Estimate	305	390
Area Sources	Unpaved Road	Low Estimate	2,144	2,308
		High Estimate	5,521	5,944
	Paved Road	Low Estimate	53	57
		High Estimate	646	696
	Agricultural Tilling		0.8	0.8
	Agricultural Burning		1.6	1.6
	Residential Wood Combustion		176	47
	Open Burning of Waste		55	56
	Construction Activities		23	24
	Remaining Area Sources		159	150
Mobile Sources			80	85
Nonroad Sources			20	27
Total		Low Estimate	2,713	2,757
Total		High Estimate	6,987	7,420

Emissions are rounded to the nearest ton/year, or to the nearest tenth of a ton/year for emissions less than 10 tons/year.
Source: Table 18 from ''2008 and 2011 p.m.10 Emission Inventories, Nogales Municipality, Sonora, Mexico'' in Appendix C of the Nogales 2012 Plan.

A review of the emissions inventory data by relative percentage and relative ratio provides two ways of considering the data. A comparison of 2008 and 2011 Nogales Municipality, Mexico low emission inventory estimates with the Nogales NA 2008 and 2011 emission inventory estimates shows a 36/64 percent split in total combined U.S./Mexico emissions inventories between emissions from the Nogales NA, Arizona and Nogales Municipality, Mexico areas, respectively. To characterize the relative difference by ratio using the low emissions estimate for the Nogales Municipality, Mexico, for every one ton of PM_{10} emissions produced annually in Nogales NA, there is an estimated 1.8 tons produced in Nogales Municipality. Similarly, a comparison of 2008 and 2011 Nogales Municipality high emission inventory estimates suggests that there is an 18/82 percent split in total combined U.S./Mexico emissions inventories between emissions from the Nogales NA, Arizona and Nogales Municipality, Mexico areas,

[18] Two methods were used to scale point source emissions from 1999 to 2008 and 2011 generating the high and low estimates for point source PM_{10}: For the low estimate, National point source emissions growth; and, for the high estimate, population based allocation ratio. The starting 1999 baseline for point source emission was 0.9 tpy and the high estimate, therefore, assumes an increase of three orders of magnitude compared to the low estimate. No point sources in the Nogales Municipality, Mexico have been identified as operating at a level of emissions consistent with the high estimate, but lacking source specific data to adjudicate the difference in estimates, the high estimate was reported as an upper bound. See Appendix C of the Nogales 2012 Plan for the Nogales Municipality Emissions Inventory for a complete discussion.

respectively. Again, to characterize the relative difference by ratio using the high emissions estimate for the Nogales Municipality, Mexico, for every one ton of PM_{10} emissions produced annually in Nogales NA, there is an estimated 4.6 tons produced in Nogales Municipality, Mexico.[19]

In summary, a comparison of the State's 2008 and 2011 emissions inventory data shows for every one ton of PM_{10} produced in the Nogales NA, there was between 1.8 and 4.6 tons of PM_{10} emissions produced annually in the Nogales Municipality, Mexico, depending on the choice of either the low or the high estimate of Nogales Municipality, Mexico emissions. The emission sources appear to be similar, with the majority of emissions from fugitive dust sources, such as reentrained unpaved and paved road dust.

c. Review and Analysis of Regional Meteorology, Topography and Ambient PM_{10} Monitoring Data

In its review of the ambient PM_{10} data, meteorological data, and through its analyses, Arizona found that the Ambos Nogales area's meteorology and topography influence the observed exceedances of PM_{10} NAAQS and there is a definite south-to-north directional component to the ambient air quality data underlying the exceedances of the PM_{10} NAAQS. Over the 2007–2009 timeframe, there were 29 exceedances at the Nogales, Arizona Post Office (Model: Met One BAM 1020) monitor.[20]

(i) Ambos Nogales Regional Meteorology and Topography

The State's analysis of ambient concentration and meteorological data identified 26 of the 29 exceedances as having nearly identical diurnal patterns; the three exceptions were January 1, 2007, May 22, 2008, and January 1, 2009.[21] For each of the 26 days, there is a strong pattern of decreasing PM_{10} concentrations in the early morning. Generally, the wind speeds are low and variable overnight and wind direction starts southerly but becomes increasingly variable into the daylight morning hours. The majority of days have a pronounced PM_{10} increase and drop-off between 6:00 a.m. and 9:00 a.m., suggesting a reproducible direct PM_{10} source, noting the times correspond to a morning commute pattern. The PM_{10} concentrations reach their lowest points between 10:00 a.m. and 4:00 p.m., with corresponding increases in ambient temperature and wind speed observed during those times. Usually, northerly winds accompany these increases in temperature and wind speed. As temperatures and wind speeds drop in the evening hours, a pronounced spike in PM_{10} concentration is then observed beginning between 4:00 p.m. and 6:00 p.m., with concentrations remaining high for several hours and gradually dropping off towards midnight. The afternoon spike in PM_{10} concentrations correlates with a significant drop in temperature and wind speed, and generally a shift to low and variable southerly (from the south) winds.

Looking at the topography from south to north, the highest elevation of a primary roadway transect is at 4,331 feet above sea level at the southern edge of Nogales, Mexico, falling to the international border at 3,933 feet, continuing to the northern edge of the Nogales NA at 3,425 feet, and elevation continues to fall along the Santa Cruz River watershed to the north to approximately 3,100 feet.[22] Across this largest 48.5-mile local transect, the elevation falls approximately 1,200 feet from south to north, i.e., from Nogales, Mexico, through the Nogales NA, and to the north towards Tucson, Arizona.

In examining a smaller 14.8-mile transect along a similar primary roadway route, the State found that elevation declines on a south-to-north axis across two sub-transects centering on the international border. The Nogales, Mexico sub-transect shows an elevation drop of 201 feet over 4.8 miles to the international border where there is a slight leveling; starting at 4,134 feet above sea level at the Nogales, Mexico urban boundary and dropping to 3,933 feet at the international border. The Nogales, Arizona sub-transect shows an elevation drop of 508 feet over 10 miles, from the international border to the northern boundary of the Nogales NA; starting at 3,933 feet and dropping to 3,425 feet.[23] In sum, looking at a south-to-north transect along the Nogales Wash, elevations fall from south to north with the highest elevations occurring in the Nogales, Mexico area. Looking at the general topography of the Ambos Nogales area from a northwest perspective in Arizona to the southeast into Mexico, there is a funnel created as the Nogales Wash falls from higher southern elevations to the international border along the route of the Alvaro Obregón Boulevard and into Nogales, Arizona.[24] Small side canyons extend off of the Nogales Wash bottom and into the surrounding hills between the international border and south of the Nogales, Mexico city center, and to a lesser extent into Nogales, Arizona as elevations drop moving to the north.

(ii) Ambient PM_{10} Monitoring Network, Data, Analyses, and Findings

As suggested by method 1 from the General Preamble Addendum, the State analyzed hourly observations of PM_{10} concentrations, wind direction, wind speed and temperature.[25] First, we will provide an overview and review of the Nogales, Arizona monitoring network. Second, we will examine the State's review of the ambient PM_{10} data for 2007–2009. Finally, we will review the findings from the State's analyses of the ambient PM_{10} and meteorological data.

Ambient PM_{10} and Meteorological Monitoring Network. There are five ambient air monitors in the vicinity of Ambos Nogales that the State considered for this analysis.[26] Within the nonattainment area, the Nogales, Arizona Post Office is the primary violating monitor location for PM_{10}. Arizona operates two PM_{10} monitors there, along with a $PM_{2.5}$ monitor. The Nogales, Arizona Post Office monitoring site is 0.3 miles north of the border and this monitoring site is 0.9 miles northeast of the Nogales, Mexico Fire

[19] See Tables 6–9 from ''Clean Air Act, Section 179B Attainment Determination for the Nogales, Arizona PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan for the presentation of the data underlying this relative percentage and relative ratio presentation.

[20] For a listing of the 29 exceedance days by year and observed 24-hour concentrations, see Tables 1–3 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

[21] See, in particular, Section 3 of ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[22] See Figure 18, Long Aerial and Elevation Transect of Nogales Arizona and Nogales, Sonora, in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[23] See Figure 19, Short Aerial and Elevation Transect of Nogales, Arizona and Nogales, Sonora, from ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[24] See Figure 17, Elevated Topographical View of Ambos Nogales Area from Northwest Perspective with Nogales, Sonora Highlighted and International Border in Red Line, from ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[25] Observations of PM_{10} concentrations, wind direction, wind speed and temperature were taken at the Nogales, Arizona Post Office site; hourly temperature observations were taken at the Nogales International Airport, 7.6 miles from the Nogales Post Office monitoring site and within the Nogales NA.

[26] These monitors are described in detail in Section 2 of ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan. Also, see Figure 2 of the same document for a map of their locations.

Station monitoring site. The Green Valley and Corona de Tucson monitoring sites are approximately 35 and 45 miles away from the U.S./Mexico border, respectively. The Nogales Post Office and the Nogales, Mexico Fire Station monitors are operated by ADEQ. The Corona de Tucson and the Green Valley monitors, located near Tucson, Arizona, are operated by the Pima County Department of Environmental Quality (PDEQ).

Also, Arizona operates a meteorological data collection station at the Nogales, Arizona Post Office monitoring site. Wind speed observations discussed in its analyses were collected at that location. Temperature observations were collected at the Nogales International Airport, located approximately six miles northeast of the Nogales, Arizona Post Office monitoring site and within the nonattainment area.

EPA performed independent Technical System Audits (TSAs) of ADEQ's ambient air monitoring program in December 2004, September 2009, and April 2012 and TSAs of PDEQ's ambient monitoring program in June 2008 and September 2011, per requirements in 40 CFR part 58, appendix A, section 2.5.[27] We assessed ADEQ and PDEQ's compliance with established regulations governing the collection, analysis, validation, and reporting of ambient air quality data and concluded that ADEQ and PDEQ have a robust ambient air monitoring program, with an appropriate quality system in place for collecting ambient air monitoring data. EPA reviewed and subsequently approved the 2011 ADEQ annual monitoring network plan on December 1, 2011.[28] We found that ADEQ's 2011 monitoring network plan was complete and met the requirements for annual network plans described in 40 CFR 58.10.

Ambient PM_{10} Data for 2007–2009. The 24-hour PM_{10} NAAQS is based on the number of expected exceedances greater than 150 μg/m³ averaged over three years.[29] For this analysis, the State considered the most recent and most complete three-year data range available: 2007–2009. There was a large period of missing data at the Nogales, Arizona Post Office PM_{10} federal equivalency method (FEM)/special purpose monitor between March 16 and October 27, 2010. Consequently, we concur with the State that 2007 to 2009 is the most appropriate timeframe for this section 179B analysis and attainment demonstration. At the Nogales, Arizona Post Office monitors, PM_{10} data completeness for each quarter within the 2007–2009 timeframe is greater than 75 percent.

In the 2007–2009 period, there were 29 exceedances at the Nogales, Arizona Post Office, FEM/special purpose monitor.[30] [31] Of those exceedances, 14 occurred in 2007, 13 in 2008, and two in 2009. Twenty-seven of the twenty-nine exceedances were observed in the October through March annual timeframe. Twenty-four hour PM_{10} concentrations on exceedance days varied between 155 and 238 μg/m³, with some hourly measurements reaching 900 μg/m³. Arizona has not flagged any of these 2007, 2008, or 2009 exceedance days for potential exclusion from air quality planning considerations under EPA's Exceptional Events Rule.[32] The State focused on the data from the Nogales, Arizona Post Office FEM/Met One BAM 1020 monitor for the following reasons: it is comparable to the NAAQS; it has recorded all the exceedances in the area; it has recorded hourly ambient values; and, it has a sufficiently complete dataset for comparison to the NAAQS.

The State did not use 2010 and 2011 data for its detailed meteorological analysis and attainment demonstration for two reasons. First, the 2010 dataset did not meet the completeness criteria specified in 40 CFR part 50, appendix K; no quarter in 2010 had complete data. This was due to a large data gap from March 16 to October 27 resulting from poor quality assurance and control results. Second, at the time of this analysis, the 2011 dataset had yet to be entered completely into the EPA's Air Quality System (AQS) database and certified by Arizona. As stated earlier, a complete year of air quality data, as defined by 40 CFR part 50, appendix K, comprises all four calendar quarters with each quarter containing data from at least 75 percent of the scheduled sampling days. While the 2010 and 2011 ambient data do not provide the basis for the State's attainment demonstration, the State examined this data and found no information to contradict its conclusions using the 2007–2009 data set.[33]

The State reviewed the 2010 and 2011 data to see how ambient PM_{10} levels compared to the 2007–2009 dataset. In 2010, the Nogales, Arizona Post Office (FRM/Met One BAM 1020) monitor recorded six exceedances of the 24-hour PM_{10} NAAQS; these 24-hour average ambient values ranged from 159 μg/m³ to 191 μg/m³. There was one exceedance of the PM_{10} standard in 2011. Arizona has not flagged any of these 2010 or 2011 exceedances for potential exclusion from air quality planning considerations under EPA's Exceptional Events Rule.

Analyses of 2007–2009 Ambient PM_{10} Data, Meteorological Data and Findings. To understand and characterize the ambient PM_{10} data and meteorological data from the Nogales NA on the 29 exceedance days chosen for this analysis, the State conducted two initial studies: an examination of hourly ambient PM_{10} concentrations, hourly wind speed observations, and hourly temperatures; and, several analyses of hourly wind direction observations and hourly ambient PM_{10} concentrations.

The first study of hourly observations of ambient PM_{10} concentrations, wind speeds, and temperatures on the 29 exceedance days involved line plots of these three variables over the 24 hour exceedance day.[34] These line plots showed a relatively tight grouping among the three subject variables across 29 exceedance days except for three days that were distinct from the rest. The line plot of hourly PM_{10} concentrations versus time of day for all exceedance days identified January 1, 2007, May 22, 2008, and January 1, 2009 as having a significantly different diurnal pattern.[35] The remaining 26 of

[27] See EPA's ''Arizona Department of Environmental Quality Technical System Audit'' final October 2005; ''Technical System Audit Report, Arizona Department of Environmental Quality, Air Quality Division, Ambient Air Quality Monitoring Program,'' final September 2010; and ''Pima County Department of Environmental Quality, Technical System Audit'' final February 2009. Final reports for the April 2012 TSA of ADEQ and September 2011 TSA of PDEQ are not yet complete.

[28] See ADEQ's ''State of Arizona Air Monitoring Network Plan For the Year 2011, Final Report'' dated August 2, 2011 and EPA's approval letter from Matthew Lakin, Manager of EPA Region 9's Air Quality Analysis Office, to Eric Massey, Director of the Air Quality Division of Arizona Department of Environmental Quality, dated December 1, 2011.

[29] The NAAQS for all pollutants can be found at *www.epa.gov/air/criteria.html.*

[30] This monitor is formally designated as AQS ID: 04–023–0004, POC 3.

[31] For a list of the 29 exceedance days by year and observed 24-hour concentrations at all five Nogales area monitors, see Tables 1–3 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

[32] For the Exceptional Events Rule see ''Treatment of air quality monitoring data influenced by exceptional events''; 40 CFR 50.14.

[33] See Section 4.5 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[34] See Figures 4, 5, 6, and 7 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[35] See Figure 4 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in

the 29 observed exceedances have nearly identical diurnal patterns.[36] Line plots of hourly wind speed versus time of day for all exceedance days show wind speeds were eight miles per hour (mph) or below for all exceedance days, with the exception of May 22, 2008, when elevated wind speeds were observed.[37] Line plots of hourly temperatures versus time of day for all exceedance days show a distinct diurnal heating and cooling pattern with no particular day deviating substantially from the others.[38]

In a second set of analyses of ambient PM_{10} concentrations and wind direction on exceedance days, the State found that high PM_{10} concentrations are associated with wind direction from a southerly quadrant, or southerly air flows, more often than what is typically observed on non-exceedance days. Also, the State found that the largest number of hourly ambient values above 150 μg/m³ and the highest ambient values, including those markedly above 150 μg/m³, originated from a southerly wind direction quadrant.[39] These observations suggest a greater influence on ambient PM_{10} concentrations from sources in Mexico during these hours of southerly wind direction.

Beginning with wind rose analyses, the State determined that the prevailing wind direction was from the south, and to a lesser degree, from the west southwest directions on non-exceedance days, but almost primarily from the south on exceedance days.[40] Following with pollution rose studies that link hourly ambient PM_{10} concentration and wind direction observations, these studies showed a significant percentage of values greater than 150 μg/m³ originating from the southerly wind direction quadrant.[41] A presentation of the Figure 11 pollution rose data in tabular form is provided in Table 7. The largest proportion of hourly values above 150 μg/m³ and the highest hourly concentrations were found in the southerly wind direction quadrant. When ambient PM_{10} values above 150 μg/m³ were sorted by 100 μg/m³ increments to 550 μg/m³ and greater, the analysis showed that within each increment above 150 μg/m³, 71 to 92 percent of the ambient PM_{10} observations were from the southerly wind quadrant. Again, these observations suggest a greater influence on ambient PM_{10} concentrations from sources in Mexico during these hours of southerly wind direction.

TABLE 7—HOURLY AMBIENT PM_{10} CONCENTRATIONS SORTED BY CONCENTRATION AND WIND DIRECTION, 2007–2009 EXCEEDANCE DAYS

Wind direction quadrant	Range of ambient concentration values (microgram/m³)						
	<150 (percent)	150–250 (percent)	250–350 (percent)	350–450 (percent)	450–550 (percent)	>=550 (percent)	Share of all wind direction observations
Northerly NW to NNE	27	6	3	3	3	0	17
Easterly NE to ESE	15	16	16	11	3	8	14
Southerly SE to WSW	41	71	72	84	92	92	57
Westerly SW to WNW	18	6	8	3	3	0	12
Total	100	100	100	100	100	100	100

Source: Table 11 in ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

Finally, in a third analysis, the State examined the wind direction and hourly PM_{10} concentrations on each exceedance day to determine two average ambient values for each exceedance day: one value for the southerly wind quadrant and a second value representing all other wind direction quadrants.[42] The results showed that two of the 29 exceedance days, January 1, 2007 and January 26, 2008, have an average ambient concentration greater than 150 μg/m³ for the ''all other wind direction'' quadrants. The ratio of the southerly quadrant concentration to the ''all other direction'' quadrant concentration ranges from 0.86 to one to 11 to one, with an average ratio value of 3.83 to one. Only one day, January 1, 2007, has a ratio value less than 1.0 to one; i.e., the ''all other direction'' quadrants' share exceeds the southerly quadrant share. This analysis also suggests a greater influence on ambient PM_{10} concentrations from sources in Mexico during these hours of southerly wind direction.

To summarize, the State analyzed hourly ambient concentrations on exceedance days and found that high PM_{10} concentrations are associated with wind direction from a southerly quadrant, or southerly air flows, more often than what is typically observed on non-exceedance days. The State found that the largest number of hourly ambient values above 150 μg/m³ and the highest ambient values, including those markedly above 150 μg/m³, originated from a southerly wind direction quadrant. These studies of hourly ambient data confirm these general findings; however, the January 1, 2007 and January 26, 2008 exceedance days may be exceptions. Also, due to the differing meteorology exhibited on May 22, 2008 and January 1, 2009, these days are marked for further study. All four of these exceedance days are reviewed and discussed further, below.

Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[36] See Figure 5 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[37] See Figure 6 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[38] See Figure 7 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[39] Throughout these analyses and this document, the term ''southerly wind direction quadrant'' refers to wind originating from between 135 and 224 degrees on a compass rose. Similarly, the term ''all other wind direction quadrants'' refers to the remaining 270 degrees of wind direction between 225 and 134 degrees on a compass rose.

[40] See Figures 8 and 9 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[41] See Figures 11 and 12 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'', in Appendix D of the Nogales 2012 Plan.

[42] See Table 12 for all estimated values on all exceedance days in ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

d. Findings From Reviews of Emission Inventories, and Studies of Ambient PM_{10} Data, and Meteorological Data

From the State's analyses, the Nogales NA emissions inventories, the Nogales Municipality, Mexico emissions inventories, and the 2007–2009 ambient data and meteorological analyses, the State made the findings listed below.

- The majority of exceedances, 79 percent, occurred in the October to January timeframe, mostly in November.[43] Also, given the high desert environment and winter light regime, temperatures usually drop dramatically, 20 degrees Fahrenheit over the 3–4 hours after sunset.[44]
- From the Nogales NA and Nogales Municipality, Mexico emission inventories, the State estimated pollution loads may differ by a ratio of 1.8 (low estimate)—4.6 (high estimate) to one on a south-to-north basis in relation to the international border.
- The largest sources of PM_{10} emissions in the Ambos Nogales area are reentrained dust from unpaved and paved roads.
- Overall, elevations drop approximately 709 feet across the entire south-to-north local transect, from the southernmost edge of the Nogales, Mexico urban boundary to the Nogales NA northern boundary line.
- Of the 29 exceedance days in 2007–2009, 26 of those days showed a similar pattern of ambient PM_{10} concentrations, wind speeds, wind direction, and temperature variation over a 24-hour period; the three exceptions were January 1, 2007, May 22, 2008, and January 1, 2009.
- On exceedance days, the largest proportions, 71–92 percent, of hourly values exceeding 150 μg/m^3 and almost all of the highest observed PM_{10} concentrations of observations above 450 μg/m^3, 92 percent, are associated with a southerly wind direction quadrant.[45]
- The ambient PM_{10} concentration attributed to the southerly wind quadrant exceeds 150 μg/m^3 on all 29 exceedance days. In contrast, two exceedance days from the ''all other wind direction'' quadrants show a value greater than 150 μg/m^3: January 1, 2007, and January 26, 2008.
- Only one of 29 exceedance days shows the concentration attributed to the ''all other wind direction'' quadrants greater than that of the concentration attributed to the southerly wind quadrant: January 1, 2007.
- On exceedance days, the average ratio of the southerly wind quadrant share of 24-hour ambient PM_{10} values to all other wind quadrants share of ambient values is 3.83 to one. This ratio is relatively consistent with the estimated pollution loads ratio of 1.8–4.6 to one, from south-to-north across the international border. This comparison of the hourly ambient PM_{10} value/wind direction ratio and the pollution load ratios suggests that the pollution load ratios and the low and high emissions inventory estimates are both conservatively low and high estimates of ambient conditions.

Upon review of the ambient PM_{10} data, meteorology, and the State's analyses, we concur with the State's findings listed above.

e. Arizona's Demonstration of Attainment for the Nogales Nonattainment Area but for International Sources of PM_{10} Emissions

(i) Daily Analysis to Demonstrate Attainment but for International Sources of PM_{10} Emissions

As described above, 26 of the 29 2007–2009 exceedances showed a similar pattern of ambient PM_{10} concentrations, wind speeds, wind direction, and temperature variation over a 24-hour period; the exceptions were January 1, 2007, May 22, 2008, and January 1, 2009. Two of these days, January 1, 2007, and January 1, 2009, with higher early morning PM_{10} concentrations, only vary from the diurnal profile of PM_{10} concentrations observed for the other exceedances, but have similar meteorological and concentration patterns throughout the rest of the day. Two of the 29 exceedance days, January 1, 2007, and January 26, 2008, had high average ambient concentrations during hours when the wind was out of directions other than the south. Thus, there are 25 exceedance days that are equivalent and can be considered as a group, setting aside the dissimilar exceedance days listed above, January 1, 2007, January 26, 2008, May 22, 2008, and January 1, 2009.

A Conceptual Model of 2007–2009 Exceedance Days. Considering these 25 similar exceedance days, the State explained how the elements of pollution loads and sources, temperature changes, and wind direction may contribute to producing the majority of observed ambient PM_{10} values exceeding the NAAQS in Nogales, Arizona.[46] The data concerning January 1, 2007, January 26, 2008, May 22, 2008, and January 1, 2009 are reviewed later in more detail in this daily analysis.

Within the cited Figure 3, the State shows the average PM_{10} concentration, wind speed, and temperature across 26 similar exceedance days and including 25 of those days in the conceptual model. The 24-hour pattern of these variables on these 25 days is similar. Beginning at midnight, the data indicate that there is a strong pattern of decreasing PM_{10} concentrations from the previous day's high values into the early morning hours. Then, there is a pronounced PM_{10} increase and drop-off between 6:00 a.m. and 9:00 a.m., suggesting a regularly occurring direct PM_{10} source, such as reentrained road dust from the morning commute. As morning temperatures rise, so does wind speed as wind direction changes from south to north dispersing the spike in morning PM_{10} concentrations. The PM_{10} concentrations continue to fall through the afternoon and reach their lowest points between 10:00 a.m. and 4:00 p.m. The morning and afternoon increases in ambient temperature and wind speed can be attributed to the heating portion of a diurnal heating and cooling cycle where heated air flows from lower elevations in the north to the higher elevations in the south.

On the 25 days, the meteorological and ambient concentration data also provide an explanation for regularly occurring increases in PM_{10} concentrations during the evening hours. As sunset approaches and night falls, the diurnal cooling cycle begins. Ambient temperatures drop and lower elevation air masses no longer rise with convection, causing wind speed to drop and wind direction to be variable. As temperatures continue to drop after sunset, wind speeds drop and cold air masses flow downslope from higher elevations, causing wind direction to shift from a variable/northerly direction to a southerly direction. A pronounced spike in PM_{10} concentration is then

[43] See Figure 3 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

[44] See Figures 7 and 14 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

[45] See Table 11 above. For a visual representation of this data, see the pollution roses in Figures 11 and 12, ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

[46] For a graphical depiction of the interplay between ambient PM_{10} concentrations, wind speed, and temperatures described by the conceptual model, see Figure 3 in ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan. As explained in the footnote to Figure 3, although the diurnal emissions pattern of the January 26, 2008 exceedance day is very similar to the 25 exceedance days summarized by the conceptual model other parts of the discussion may not be consistent with the observed data from January 26, 2008.

observed beginning between 4:00 p.m. and 6:00 p.m.; roughly corresponding with the evening commute hours. Concentrations remain high for several hours into the evening and gradually begin to decrease as midnight approaches. The highest concentrations of PM_{10} occur in these evening hours when reentrained dust from unpaved and paved roads may be captured by cold air flows moving south to north from higher to lower elevations (later in the discussion this phenomenon is referred to as ''downslope air flows''). Also, home heating combustion may add a component to the evening PM_{10} load and also be captured in the evening southerly and downslope air flows from Nogales, Mexico into Nogales, Arizona.

This pattern of exceedances is usually observed during times when the general weather pattern allows for stagnation and a relatively still air mass subject to movement by the diurnal cooling and heating cycle. At other times of the year, frontal systems move through often enough and with enough energy to prevent a stagnant air mass in the Ambos Nogales region and this diurnal heating and cooling cycle exerts less influence on the local meteorology.

The conceptual model the State has presented to explain the exceedances in the Nogales NA is consistent with the study by Arizona State University, ''Atmospheric, Hydroclimatic, and Anthropogenic Causes of Fugitive Dust in the Nogales, Arizona-Nogales, Sonora Airshed.''[47] In this study—based on a regression analysis of 815 daily PM_{10} observations at Nogales, Arizona, and 457 daily PM_{10} observations at Nogales, Mexico, and other information—the authors conclude that stagnant atmospheric conditions over a large scale (i.e., a stagnant synoptic atmosphere) is the most important factor in predicting high daily PM_{10} concentrations.

For the 25 similar days examined by ADEQ, the ambient PM_{10} concentration attributed to the southerly wind direction quadrant always exceeds the 150 $\mu g/m^3$ level, in most cases markedly.[48] Conversely, the ambient concentration attributed to the ''all other wind direction'' quadrants never exceeds the 150 $\mu g/m^3$ level. Across all 25 days, the average of the hourly monitored PM_{10} concentration values for the hours with a southerly wind direction ranges from 163 to 369 $\mu g/m^3$ for each of the days, with an average value across the 25 days of 264 $\mu g/m^3$. In comparison, the average of the hourly concentration values for all other wind direction quadrants ranges from 38 to 148 $\mu g/m^3$ for each of the days, with an average value across the 25 days of 80 $\mu g/m^3$. This suggests that emissions sources to the south in Mexico are contributing significantly to those hourly ambient concentrations and the resulting 24-hour average concentrations.

In sum, for 25 of the 29 exceedance days, the State provided a conceptual model explaining how exceedances of the PM_{10} NAAQS occur in the Nogales NA. Moreover, for all of these 25 days, the origin and contribution of PM_{10} to exceedances of the standard at the Nogales, Arizona Post Office monitor has a very large southerly component. Given the wind direction, the proximity of the monitor to the border, and the comparison of the magnitude of emissions on either side of the border, the majority of the emissions that result in these 25 exceedances most likely originate from the Nogales, Mexico side of the international border.

Analysis of Four Days Differing From Conceptual Model: January 1, 2007; January 26, 2008; May 22, 2008; and, January 1, 2009. The conceptual model of Mexican influence on Nogales NA PM_{10} concentrations described above fits the observations on 25 of the 29 exceedance days in 2007–2009. The State identified four specific exceedance days that differ in one or more ways from the 25-day conceptual model of PM_{10} exceedances in the Nogales NA: January 1, 2007, May 22, 2008, January 26, 2008, and January 1, 2009. See Table 8 for more information.

TABLE 8—24-HOUR PM_{10} CONCENTRATION ($\mu G/M^3$) AND HOURLY CONCENTRATION AVERAGES ($\mu G/M^3$) DISAGGREGATED BY SOUTHERLY WIND DIRECTION QUADRANT FOR EXCEEDANCE DAYS DIFFERING FROM CONCEPTUAL MODEL

Date	24-hour concentration	Southerly wind quadrant (135 to 224 degrees) average concentration	All other wind direction (225 to 134 degrees) average concentration
January 1, 2007	210	199 (15 of 24 values)	231 (9 of 24 values).
January 26, 2008	204	257 (7 of 24 values)	182 (17 of 24 values).
May 22, 2008	217	217 (24 of 24 values)	No Observed Values.
January 1, 2009	238	323 (14 of 24 values)	119 (10 of 24 values).

Data Source: Air Quality System database; and, Table 4.2 in Nogales 2012 Plan.

The State examined each of these days in further detail to evaluate the influences on the high ambient PM_{10} values that occurred on those days and to determine whether the four remaining exceedance days—January 1, 2007, January 26, 2008, May 22, 2008, and January 1, 2009—should be assigned to the category of exceedance days having a significant contribution from emission sources originating from the Nogales, Mexico side of the international border. The State's analysis is summarized below.

January 1, 2007 Exceedance Day Review. Considering the January 1, 2007 exceedance day, it differs from the conceptual model average exceedance day in the timing and distribution of observed ambient PM_{10} values and high $PM_{2.5}$ component most likely caused by a combustion source.[49] The PM_{10}: $PM_{2.5}$ ratio for January 1, 2007 is the lowest in the 29-day sample (1.49 to 1). What differs in the case of the January 1, 2007 exceedance is that the 270 degree wind direction quadrants contain enough high values to contribute disproportionately to the overall 24-hour average concentration. Although more detailed and different field studies might prove otherwise, with the information available, the State's analysis is inconclusive as to whether this exceedance is attributable to a disproportionate international

[47] Completed in 2002 by A.W. Ellis, the final report is available through The Southwest Center for Environmental Research and Policy at *http://scerpfiles.org/cont_mgt/doc_files/A-02-2.pdf.*

[48] For the estimated values providing the basis for the conceptual model's 25 exceedance day values discussed in this paragraph, see Table 12 in ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

[49] For the complete discussion of coarse versus fine particulate matter on all exceedance days, see Section 4.4 and Table 8 in ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

contribution and the Nogales NA would not have exceeded the 24-hour PM_{10} standard but for Mexican emissions.[50]

January 26, 2008 Exceedance Day Review. The State's review of the January 26, 2008 exceedance day suggests that this day is most like the conceptual model average exceedance day in the timing and distribution of observed ambient PM_{10} values. While the southerly wind direction quadrant contains enough high values to contribute disproportionately to the overall 24-hour average concentration, there are enough remaining high values in the 17 of 24 hourly observations from the 270 degree wind direction quadrants to be above the 150 $\mu g/m^3$ level. Again, while specifically designed field studies might help clarify the relative contributions to this exceedance, with the information available, the State's analysis is inconclusive as to whether this exceedance is attributable to a disproportionate international contribution and the Nogales NA would not have exceeded the 24-hour PM_{10} standard but for Mexican emissions.[51]

May 22, 2008 Exceedance Day Review. The May 22, 2008 exceedance day is wholly different from the State's conceptual model exceedance day given the relative high wind speeds, a 17 mph high observation, and higher than usual coarse PM component likely from disturbed surfaces.[52] The PM_{10}:$PM_{2.5}$ ratio for May 22, 2008 is the highest in the 29-day sample (10.96 to 1), well beyond the sample average of 6.24 to 1. As with total PM_{10} emissions, emissions of coarse PM (e.g., unpaved roads) are higher from Nogales, Mexico, than they are from the Nogales NA. The wind direction is from a southerly quadrant in all hourly observations. See Table 8. Given this information, we concur that the day should be placed with the 25 other exceedance days in the conceptual model, because it is likely that the sources of PM_{10} causing the exceedance originated from the Nogales, Mexico side of the international border.[53]

January 1, 2009 Exceedance Day Review. Like the January 1, 2007 exceedance, the January 1, 2009 exceedance day is different from the conceptual model exceedance day in the timing and distribution of observed ambient PM_{10} values and high $PM_{2.5}$ component most likely caused by a combustion source. As with total PM_{10} emissions, emissions of fine PM (e.g., combustion sources) are higher from Nogales, Mexico, than they are from the Nogales NA. For example, a comparison of the 2008 Nogales Municipality, Mexico and Nogales NA emissions inventories for the residential woodburning source category shows 176 tpy compared to 24 tpy, respectively (see Tables 2 and 6, above). The key factor for assigning this day is the contribution of high hourly ambient concentrations with a southerly wind direction quadrant compared to the remaining 270 degree wind direction quadrants. See Table 8. Consequently, we concur that the day should be placed with the 25 other exceedance days in the conceptual model, because it is likely that the sources of PM_{10} causing the exceedance originated from the Nogales, Mexico side of the international border.[54]

To summarize, the State concludes that two exceedance days, May 22, 2008 and January 1, 2009, should be categorized with the 25 exceedance days where the State found that there was a high likelihood of a large contribution of PM_{10} from sources on the Nogales, Mexico side of the international border such that the Nogales NA would likely have attained the PM_{10} standard but for emissions from Mexico. The two remaining exceedance days, January 1, 2007 and January 26, 2008, have contributions from PM_{10} sources on the Nogales NA side of the international border such that it cannot be determined that there is a similarly high likelihood that the Nogales NA would not have exceeded the PM_{10} standard but for PM_{10} emissions originating from the Mexican side of the international border. Therefore, according to this daily analysis, the State found that at least 27 of 29 exceedances of the PM_{10} NAAQS observed in the Nogales NA during 2007–2009 can be attributed primarily to sources of PM_{10} from across the international border. Based on these two exceedances and on data completeness and every day sampling for the 2007–2009 timeframe, the State calculated a maximum expected annual exceedance rate of 0.7 exceedances per year.

(ii) Hourly Analysis to Demonstrate Attainment But For International Sources of PM_{10} Emissions

In a second analysis, the State classified each hourly PM_{10} concentration value from the 29 exceedance days based on the likely influence of emissions from Mexico and then recalculated the 24-hour average concentration that would have occurred but for international transport of PM_{10} emissions from Nogales, Mexico. An hourly concentration was classified as influenced by international transport if it met one of four criteria, or decision rules, related to hourly observations of wind direction, wind speed, and temperature change:

(1) Hours with sustained (more than one hour consecutively) southerly winds greater than 4.5 mph (2 meters/second (m/s)), suggesting the primary influence of wind-blown PM_{10} from across the international border;

(2) hours with southerly winds or air flow and decreasing or stable temperatures preceded by *or* followed by hours with similar conditions, suggesting sustained downslope air flows from higher elevations south of the international border;

(3) any hour preceded by *and* followed by hours with southerly wind or air flow and decreasing or stable temperatures, suggesting continued influence of downslope air flow from higher elevations south of the international border; and,

(4) surface wind speed less than or equal to 1.1 mph (0.5 m/s), preceded by or followed by hours with similar conditions, suggesting sustained air mass stagnation where PM_{10} emissions suspended in previous hours remain suspended in the stagnant air mass.

The first decision rule identifies periods consistent with sustained high winds from the south carrying wind-blown PM_{10}, as discussed earlier concerning the May 22, 2008 exceedance day. The second and third decision rules identify periods influenced by downslope wind flow conditions described in the conceptual model as usually occurring in the late afternoon and evening and transporting PM_{10} from higher elevations in Nogales, Mexico to lower elevations in the Nogales NA. The fourth decision rule identifies periods of sustained air mass stagnation usually found in the late night and early morning hours after the early evening downslope wind or air flow has ebbed and before sunrise, after which wind speeds begin to increase from their overnight low values.

[50] For a detailed review of the January 1, 2007 exceedance day, see Section 4.2.1 of ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

[51] For a detailed review of the January 26, 2008 exceedance day, see Section 4.2.2 of ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

[52] See Figure 6 in ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

[53] For a detailed review of the May 22, 2008 exceedance day, see Section 4.2.3 of ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

[54] For a detailed review of the January 1, 2009 exceedance day, see Section 4.2.4 of ''Clean Air Act, Section 179B Attainment Determination for the Nogales PM_{10} Nonattainment Area'' in Appendix A of the Nogales 2012 Plan.

Using the low estimate of total Nogales Municipality, Mexico PM_{10} emissions, the analysis of emissions inventories discussed earlier showed that U.S. sources are responsible for a maximum of 36 percent of PM_{10} emissions in the Ambos Nogales region; see Table 9. Conversely, using the high estimate of total Nogales Municipality, Mexico emissions, U.S. sources are responsible for a minimum of 17 to 18 percent of PM_{10} emissions in the Ambos Nogales region in 2008 and 2011, respectively.

TABLE 9—2008 AND 2011 TOTAL PM_{10} EMISSION INVENTORIES: NOGALES NA, ARIZONA AND NOGALES MUNICIPALITY, MEXICO

[Low estimate, tons per year]

	2008	2011	Percent
Nogales NA, Arizona	1,524	1,521	36
Nogales Municipality, Mexico	2,713	2,757	64
Total Ambos Nogales Region	4,237	4,278	100

Source: Tables 6–7 from "Clean Air Act, Section 179B Attainment Determination for the Nogales, Arizona PM_{10} Nonattainment Area" in Appendix A of the Nogales 2012 Plan.

Therefore, for each hour that meets one of the four criteria listed above, instead of assuming that the concentration is entirely due to Mexican sources, a more conservative assumption is that up to 36 percent of the hourly concentrations may be due to contributions from U.S. emission sources. Therefore, in this next step, the observed hourly concentrations were weighted by 0.36 for each hour that meets any one of the four criteria listed above and used this weighted concentration to estimate the 24-hour average concentration that would have occurred in the Nogales NA but for international transport from Mexico.

To show the effects of each decision rule, an estimated 24-hour concentration was calculated after the application of Rule 1, Rules 2 and 3, Rules 1–3, and Rules 1–4. The results are summarized below.[55]

- The application of Rule 1 only removes one day, May 22, 2008, leaving 28 days showing a concentration value greater than 150 μg/m³.
- The application of Rules 2 and 3 removes 27 days, leaving January 1, 2007 and January 26, 2008 showing a concentration value greater than 150 μg/m³; 196 μg/m³ and 244 μg/m³, respectively.
- The application of Rules 1, 2, and 3 again removes 27 days, leaving January 1, 2007 and January 26, 2008 showing a concentration value greater than 150 μg/m³; 196 μg/m³ and 244 μg/m³, respectively.
- The application of Rules 1, 2, 3, and 4 removes 29 days, leaving no estimated days with a value greater than 150 μg/m³. The highest 24-hour average concentration estimated was 107 μg/m³.

In sum, based on this analysis apportioning hourly concentration data using the four criteria to produce an estimated 24-hour average concentration but for international emissions, no exceedance days would have been expected to occur in the Nogales NA, but for transport from Mexico.

Considering the relatively large differences in emissions inventories between the Nogales NA and Nogales Municipality, Mexico and the meteorology described by the conceptual model, it is likely that observed pollution during southerly downslope wind flows originating from Nogales, Mexico also contributed to observed pollution during following hours of sustained stagnation. With the wind direction varying under low wind speeds and stable temperatures, it remains possible, however, that a greater proportion of PM_{10} pollution during hours of sustained stagnation may be coming from U.S. sources. Therefore, a slightly more conservative approach would be to relax the decision rules by not considering sustained stagnation (Rule 4) and assign PM_{10} levels during these hours entirely to the Nogales NA. Consequently, when considering Mexican influence to only occur under conditions of relative high wind speeds (Rule 1) and sustained downslope wind flows from the south (Rules 2 and 3), two exceedance days would have been expected to occur but for international transport: January 1, 2007 and January 26, 2008. Given the finding that no more than two exceedance days would have occurred applying criteria one through three, as determined by this hourly analysis of concentration data, the maximum expected number of annual exceedances is 0.7.

3. Proposed Action on the Nogales Nonattainment Area Section 179B Analysis and Demonstration of Attainment but for International Sources of PM_{10} Emissions

We propose to approve Arizona's section 179B analysis and demonstration of attainment but for international sources of PM_{10} emissions. After meeting the PM_{10} NAAQS from 1994–1997, an increasing number of exceedances occurred in the Nogales NA. While population in the Nogales NA has grown slightly since 1995, the Nogales Municipality population has increased 65 percent, such that in 2010, 90 percent of the Ambos Nogales regional population is the Nogales Municipality, Mexico area. This difference in relative population and population growth over time supports the inference that a much larger proportion of PM_{10} in the Nogales NA comes from emissions sources on the Nogales, Mexico side of the international border.

A comparison of 2008 and 2011 emission inventories between the Nogales Municipality and the Nogales NA shows that pollution loads may differ by a ratio of 1.8–4.6 to one on a south-to-north basis relative to the international border. The Nogales NA contributes 17 to 36 percent of PM_{10} emissions in the Ambos Nogales region, depending on the emissions inventory estimate chosen for the Nogales Municipality, Mexico. Conversely, the Nogales Municipality, Mexico contributes 83 to 64 percent of PM_{10} emissions in the Ambos Nogales region.

In its review of the ambient PM_{10} data, meteorological data, and through its analyses, Arizona found that the Ambos Nogales area's meteorology and topography influence the observed exceedances of PM_{10} NAAQS and there is a definite south-to-north directional component to the ambient air quality

[55] The observed concentrations and meteorological data for each hour of each exceedance day, the classification based on the criteria listed above, and the re-calculation of the estimated 24-hour average concentrations but for international transport are provided in Section 3.7 of "Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009" in Appendix D of the Nogales 2012 Plan.

data underlying the exceedances of the PM_{10} NAAQS. Finally, daily and hourly analyses of the most recent three years of quality assured and State certified ambient PM_{10} and meteorological data from 2007–2009 show that no more than two, and likely none, of the 29 exceedances would have occurred in the Nogales NA, but for PM_{10} emissions from Mexico.

Based on these two exceedances, data completeness, and every day sampling for the 2007–2009 timeframe, the calculated maximum expected annual exceedance rate is 0.7 exceedances per year. The standard we use to demonstrate attainment of the PM_{10} NAAQS, ''but for'' international emissions, is that the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ must be equal to or less than one. To conclude, we propose to determine that Arizona has met this standard and to approve their section 179B Analysis and demonstration of attainment but for international emissions for the Nogales NA.

Even if a nonattainment area would have attained the PM_{10} NAAQS but for international transport of emissions from outside the U.S., section 179B still requires the area to meet the statutory requirements for a nonattainment plan. Section 179B suspends the obligation to provide an attainment demonstration showing actual attainment of the NAAQS, but a nonattainment area still has to meet basic requirements such as RACM/RACT, RFP and contingency measures. We will discuss how the 2012 Nogales PM_{10} Plan addressed these requirements in the following sections of this proposed rule.

C. Reasonably Available Control Measures (RACM)/Reasonably Available Control Technology (RACT) and Adopted Control Strategy

1. Requirement for RACM/RACT

CAA section 172(c)(1) requires that an attainment plan ''provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology), and shall provide for attainment of the national primary ambient air quality standards.'' EPA defines RACM as measures that a State finds are both reasonably available and contribute to attainment as expeditiously as practicable in its nonattainment area. See also the General Preamble, 57 FR 13560; (April 16, 1992).

The General Preamble also discusses the moderate area PM_{10} requirements for RACM/RACT at section 189(a)(1)(C). As a starting point, a State should review the list of available control measures provided with the General Preamble and provide a reasoned judgment for rejecting any of these available control measures. A State may show that one or more control measures are unreasonable because emissions from those sources are insignificant within the nonattainment area; as such, those control measures would not be considered RACM for the nonattainment area. Any remaining control measures from the General Preamble list should then be evaluated for reasonableness according to their technological feasibility and cost of control. See 57 FR 13540–13541; (April 16, 1992).

The 1994 General Preamble Addendum also discusses the requirements for RACM as applied to nonattainment areas affected by international transport. In international border areas, ''RACM/RACT must be implemented to the extent necessary to demonstrate attainment by the applicable attainment date if emissions emanating from outside the U.S. were not included in the analysis.'' As set forth in section 179B(a)(2), a State's moderate area PM_{10} plan must be ''adequate'' to attain and maintain the PM_{10} NAAQS, but for emissions from outside the U.S. Therefore, nothing in section 179B relieves a State from the requirement to address and implement RACM. Nonetheless, States are not required to implement control measures that go beyond what the plan demonstrates would otherwise be adequate for attainment and maintenance of the PM_{10} NAAQS but for emissions from outside the U.S. See 59 FR 42001; (August 16, 1994). For a nonattainment area making a showing under section 179B, the area is required to implement RACM/RACT sufficient to attain the standard by the applicable attainment date, but for emissions from outside the U.S., and to maintain the level of emissions from U.S. sources sufficient to provide for continued attainment of the NAAQS, but for the emissions from outside the U.S.

2. RACM/RACT in the Nogales Nonattainment Area

For the Nogales 2012 Plan, ADEQ reviewed the RACM/RACT demonstration from the 1993 Nogales PM_{10} Plan in light of the updated emissions inventories and section 179B demonstration and concluded that no additional RACM beyond that already implemented is required. In support of this conclusion, ADEQ describes the status of implementation of the RACM adopted as part of the 1993 Nogales PM_{10} Plan. Based on our review of both the 1993 plan and the current 2012 plan, and for the reasons given below, we agree with ADEQ's conclusion that no further RACM is required.

First, we note that, based on the emissions inventories from the 1993 and 2012 plans, entrainment of PM_{10} by vehicle travel over unpaved surfaces, primarily roads, remains the most significant source of PM_{10} emissions generated within the Nogales NA, and while PM_{10} emissions from this source are certainly lower than they would have been without additional paving, they still account for more than 50 percent of the overall PM_{10} inventory in the Nogales NA.

In the late 1980s, ADEQ, Santa Cruz County, and the city of Nogales recognized the importance of PM_{10} emissions from entrainment by vehicle travel over unpaved surfaces. To reduce such emissions, the city of Nogales undertook a program to pave the unpaved roads in the city, paving an average of two miles of unpaved roads per year from 1989 through 1992,[56] to chip-seal the city's equipment yard, and to pave the unpaved parking areas of Memorial Park and Neighborhood Center. Over this same period, within the unincorporated area of the Nogales NA, Santa Cruz County undertook a program to chip-seal unpaved county roads and chip-sealed approximately 2–3 miles of previously unpaved roads per year.[57]

Through the 1993 Nogales PM_{10} Plan, the city of Nogales committed to paving the remainder of its unpaved streets by 1998, and Santa Cruz County committed to chip-seal at least one mile of unpaved road per year over 1993 and 1994 within the Nogales NA.[58]

The 1993 Nogales PM_{10} Plan also cited diesel-powered truck idling at two ports of entry (DeConcini and Mariposa) along the U.S. Mexico border in Nogales as a source of PM_{10} emissions within the Nogales NA and identified the reduction of idling time by such trucks as a RACM for implementation by the U.S. Customs Service. In response, the U.S. Customs Service committed to complete certain

[56] To put a rate of two miles of paving per year into context, we note that, by 1993, there remained approximately 10 miles of unpaved public roads within the city of Nogales.

[57] For perspective on the county's rate of paving/chip sealing of unpaved roads, we note that as of 2011 there were approximately 40 to 50 miles of unpaved roads remaining in the unincorporated area of the Nogales NA.

[58] See 1993 Nogales PM_{10} Plan, pages 31 and 46.

capital improvements, including the addition of four north-bound lanes at the DeConcini Port of Entry (central business district within Nogales) and three north-bound lanes at the Mariposa Port of Entry (west of the central business district).

Third, in the late 1980s and early 1990s, the dragging of the unpaved border road by the U.S. Border Patrol (to detect fresh footprints) was considered another source of PM_{10} emissions contributing to ambient PM_{10} concentrations in Nogales. The 1993 Nogales PM_{10} Plan does not identify RACM for this source. However, the 1993 Nogales PM_{10} Plan notes that, in 1992, the U.S. Border Patrol discontinued the practice of dragging a 1.5-mile stretch of border road within the Nogales NA.[59] The Border Patrol discontinued the practice over this stretch of road because it was ineffective. The road was also wired for movement sensors to detect human movement. These changes reduced this source of PM_{10} emissions within the Nogales NA.

By the end of 1994, which was the applicable attainment date for the Nogales PM_{10} nonattainment area, the city of Nogales had paved an additional four miles of unpaved roads (beyond that completed through 1992); Santa Cruz County had paved an additional four miles of South River Road; and the U.S. Customs Service had completed the capital improvements described above at the DeConcini and Mariposa Ports of Entry. Together, these measures, in addition to those PM_{10}-reducing measures completed in the late 1980s and early 1990s and certain other measures implemented outside of the SIP process (i.e., the discontinuance of dragging the border road), were sufficient to reduce PM_{10} concentrations in the Nogales NA such that maximum 24-hour PM_{10} concentrations decreased from greater than 200 $\mu g/m^3$ in the late 1980s to less than 120 $\mu g/m^3$ by 1994.

Based on the data collected during the 1992–1994 period, EPA determined that the Nogales area had attained the PM_{10} standard by the 1994 area's statutory attainment date. See 76 FR 1532; (January 11, 2011). Thus, the measures implemented by the city of Nogales, Santa Cruz County, and U.S. Customs Service provided for attainment by the applicable attainment date and thereby met the RACM requirement. The Nogales 2012 Plan did not include the RACM commitments contained in the 1993 Nogales PM_{10} Plan but, given their prior completion and permanent nature, we do not believe that the commitments need be made a part of the SIP.

EPA does recognize that violations of the PM_{10} standard began to occur once again in Nogales beginning in 1998 and that such violations continue to the present, but, based on the section 179B demonstration contained in the 2012 Nogales Plan, and evaluated in section IV.B herein, we do not believe that additional RACM are required to be implemented within the Nogales NA because we believe that the violations that have occurred since 1998 would not have occurred but for emissions from Mexico.

Our conclusion in this regard recognizes that PM_{10} emissions in various important PM_{10} source categories are affected by changes in population, and whereas the population in the Nogales NA increased by approximately 5,000 persons during the 20-year period from 1990 to 2010, the population in Nogales, Mexico increased by approximately 118,000 persons during that same period. Moreover, the passage of the North American Fair Trade Agreement (NAFTA) in 1994 has continued to fuel the already high level of industrial (Maquiladoras) development on the Mexican side of the border. Most significantly, however, we note ADEQ's detailed evaluation, as part of the section 179B demonstration, of the 29 exceedances measured during the 2007–2009 period and determination that the highest 24-hour PM_{10} concentration in Nogales, but for emissions from Mexico, was 107 $\mu g/m^3$, i.e., well below the 150 $\mu g/m^3$ standard.[60] ADEQ's section 179B demonstration, which we are proposing to approve, thus provides support for the conclusion that the violations that have occurred since 1998 would not have occurred but for the emissions from Mexico and thus no additional RACM need be implemented within the Nogales NA.

D. Reasonable Further Progress Demonstration and Contingency Measures in the Nogales Nonattainment Area

1. Reasonable Further Progress

CAA section 172(c)(2) requires that plans for nonattainment areas shall provide for reasonable further progress (RFP). RFP is defined in section 171(1) as ''such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable [NAAQS] by the applicable date.''

The Nogales 2012 Plan cites EPA's determination that the area attained the PM_{10} standard by the applicable attainment date as affirming that RFP requirements have been met. We agree that the RFP requirement was met in the Nogales NA by 1994 through the various paving projects and other measures implemented by the city of Nogales, Santa Cruz County, and U.S. Customs Service because the measures in fact provided the incremental reductions needed by the area to attain by the applicable attainment date (1994). In addition, for the same reasons that no additional RACM need be implemented in the Nogales NA, notwithstanding the advent of violations of the PM_{10} standard once again in 1998, we believe that no additional RFP demonstration must be submitted by ADEQ for this area.

2. Contingency Measures

Regarding contingency measures, under CAA section 172(c)(9), all attainment plans must include contingency measures to be implemented if an area fails to meet RFP (RFP contingency measures) and contingency measures to be implemented if an area fails to attain the PM_{10} NAAQS by the applicable attainment date (attainment contingency measures). These contingency measures must be fully adopted rules or control measures that are ready to be implemented quickly without significant additional action by the State. They must also be measures not relied on in the plan to demonstrate RFP or attainment and should provide SIP-creditable emissions reductions equivalent to one year of RFP. Finally, the SIP should contain trigger mechanisms for the contingency measures and specify a schedule for their implementation.

EPA guidance also provides that contingency measures could be implemented early, i.e., prior to the milestone or attainment date.[61] Consistent with this policy, states are allowed to use excess reductions from already adopted measures to meet the CAA section 172(c)(9) contingency measure requirement. This is because the purpose of contingency measures is to provide extra reductions that are not

[59] See 1993 Nogales PM_{10} Plan, page 30.

[60] The estimated 24-hour average concentrations but for international transport for the 29 exceedance days are provided in Section 3.7 of ''Analysis of Ambient PM_{10} Levels, Topography, and Meteorological Data in Nogales, Arizona: 2007–2009'' in Appendix D of the Nogales 2012 Plan.

[61] Memorandum, G.T. Helms, Chief, Ozone/Carbon Monoxide Programs Branch to Air Directors, ''Contingency Measures for Ozone and Carbon Monoxide Redesignations,'' June 1, 1992.

relied on for RFP or attainment that will provide for continued progress while the plan is being revised to fully address the failure to meet the required milestone or failure to meet the standard by the applicable attainment date. Nothing in the CAA precludes a State from implementing such measures before they are triggered. This approach has been approved in numerous SIPs. See 62 FR 15844; (April 3, 1997), (approval of the Indiana portion of the Chicago area 15 percent Rate of Progress plan); 66 FR 30811; (June 8, 2001), (proposed approval of the Rhode Island post-1996 ROP plan); and 66 FR 586 and 66 FR 634; (January 3, 2001), (approval of the Massachusetts and Connecticut 1-hour ozone attainment demonstrations). In the only adjudicated challenge to this approach, the court upheld it. See *Louisiana Environmental Action Network* v. *EPA,* 382 F.3d 575 (5th Cir. 2004). The Nogales 2012 Plan points to the paving projects that have been implemented since 1994 as meeting the contingency measure requirement for the Nogales NA and as the justification for not including any additional contingency measures in the 2012 Nogales Plan. In assessing the extent of road paving in the Nogales NA, ADEQ consulted with officials in the city of Nogales and Santa Cruz County to determine the extent of road paving since 1992, when the Nogales NA began to record ambient PM_{10} levels below the NAAQS.

As noted above, in the 1993 Nogales PM_{10} Plan, the city of Nogales committed to paving all public roads in the city by 1998. For the purposes of the Nogales 2012 Plan, ADEQ reviewed the status of implementation of the city's paving program, and using aerial photography, ADEQ identified 11 unpaved roads that were paved between 1993 and 1996 totaling 8.4 miles.[62] Among these 11 roads, ADEQ could locate traffic data for only nine of them (totaling 7.7 miles) from which to estimate the associated reduction in PM_{10} emissions. Based on the control effectiveness of paving and available traffic data, ADEQ estimated that paving of the nine roads between 1993 and 1996 reduced PM_{10} emissions by approximately 80 tons per year. See Table 5.3 from the Nogales 2012 Plan.[63] Assuming that half that reduction occurred after 1994, the resulting reduction that was surplus to the attainment needs for the Nogales NA was approximately 40 tons per year, although the actual reduction was greater than 40 tons per year because two specific roadways that were paved (but for which no traffic data was available) were not included in the calculation. ADEQ also checked on the status of the paving program with officials from the city of Nogales who reported that all of the unpaved public roads in Nogales have been paved and accepted into the City's Street Maintenance Program.[64]

In a similar implementation review using aerial photography and data provided by Santa Cruz County, ADEQ estimated that Santa Cruz County paved/chip-sealed 40 miles of unpaved roads between 1994 and 2001 and an additional 40 miles of unpaved roads between 2002 and 2008. Traffic data was available, however, for only approximately 10 miles of the total 80 miles of paving/chip-sealing in the post-attainment era, but ADEQ estimates that paving/chip-sealing this subset of the larger amount reduced PM_{10} emissions in the Nogales NA by approximately 110 tons per year. See Table 5.4 in the 2012 Nogales Plan.[65] [66] Overall, Santa Cruz County and ADEQ provided different estimates of the number and extent of paved/chip-sealed roads and unpaved roads in the unincorporated area of the Nogales NA, but both sets of estimates indicate that more than 70 percent of the roads in the unincorporated area within the Nogales NA are paved/chip-sealed at the present time.

Based on our review of the data collected by ADEQ and presented in the Nogales 2012 Plan, we agree with ADEQ that post-1994 paving projects in the Nogales NA have provided PM_{10} emissions reductions beyond those relied upon by RFP or attainment and have also served to ensure that emissions generated within the Nogales NA do not cause a violation of the PM_{10} standard. The city of Nogales and Santa Cruz County did not wait until a triggering event to implement the paving projects but continued the paving programs that began in the late 1980s and that helped the Nogales NA attain the standard by the applicable attainment date (1994). These projects have provided significant PM_{10} emissions reductions, i.e., greater than 150 tons per year if all of the unpaved roads that were paved/chip-sealed were included, beyond that required for attainment by the applicable attainment date.

We consider such ''early'' implementation of contingency measures to be acceptable in this instance because the associated emissions reductions provide extra reductions that are not relied upon for RFP or attainment and that provide extra assurance that no violations would occur in the Nogales NA but for emissions from Mexico. The effectiveness of implementation of the contingency measures is supported by the conclusion in ADEQ's section 179B demonstration that estimates that the highest 24-hour PM_{10} concentration in Nogales, but for emissions from Mexico, during the 2007–2009 period was 107 $\mu g/m^3$, i.e., well below the 150 $\mu g/m^3$ standard. Therefore, we conclude that implementation of the post-1994 paving projects in the Nogales NA meets the contingency measure requirement of section 172(c)(9).

E. Motor Vehicle Emissions Budgets for Transportation Conformity

1. Requirements for Transportation Conformity

Transportation conformity is required by section 176(c) of the CAA. Actions involving Federal Highway Administration (FHWA) or Federal Transit Administration (FTA) funding or approval are subject to the EPA's transportation conformity rule, codified at 40 CFR part 93, subpart A. Our transportation conformity rule requires that transportation plans, programs, and projects developed by Metropolitan Planning Organizations (MPOs) in nonattainment and maintenance areas conform to SIPs and establishes the criteria and procedures for determining whether or not they do so. Conformity to the SIP means that transportation activities will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards or any interim milestone.

Control strategy SIP submittals (such as RFP and attainment SIP submittals) must specify the maximum emissions of transportation-related emissions from existing and planned highway and transit systems allowed in the appropriate years, *i.e.,* the motor vehicle emissions budgets (MVEB or ''budgets''). The submittal must also demonstrate that these transportation-related emissions levels, when considered with emissions from all

[62] See Appendix E.4 of the Nogales 2012 Plan for aerial photography used in implementation review.

[63] See Appendix E of the Nogales 2012 Plan for the Technical Support Document concerning the calculation of these emission reduction estimates.

[64] Correspondence from Juan Guerra, City Engineer, City of Nogales, Arizona to James Wagner, ADEQ; April 11, 2012; see Appendix F.3 of Nogales 2012 Plan.

[65] See appendix E.4 of the Nogales 2012 Plan for aerial photography used in implementation review.

[66] See Appendix E.2 of the Nogales 2012 Plan for supporting information from Santa Cruz County concerning paving/chip-sealing projects completed by the County.

other sources, are consistent with RFP or attainment of the NAAQS, whichever is applicable. MPOs cannot use the budgets and the U.S. Department of Transportation (USDOT) cannot approve a Regional Transportation Plan (RTP) or Transportation Improvement Program (TIP) conformity analysis using the budgets until EPA had made an affirmative adequacy finding based on a preliminary review of the SIP. MPOs must use budgets in a submitted but not yet approved SIP, after EPA has determined that the budgets are adequate. For EPA to find these emissions levels or ''budgets'' adequate and/or approvable, the submittal must meet the conformity adequacy provisions of 40 CFR 93.118(e)(4) and (5). Also, motor vehicle emissions budgets cannot be approved until EPA completes a detailed review of the entire SIP and determines that the SIP and the budgets will achieve their intended purpose (*i.e.,* RFP, attainment or maintenance). For more information on the transportation conformity requirement and applicable policies on budgets, please visit our transportation conformity Web site at: *http://www.epa.gov/otaq/stateresources/transconf/index.htm.*

PM_{10} attainment and RFP plans should identify budgets for direct PM_{10} and PM_{10} attainment plan precursors. Direct PM_{10} budgets should include PM_{10} motor vehicle emissions from tailpipe, brake wear, and tire wear. States must also consider whether reentrained paved and unpaved road dust or highway and transit construction dust are significant contributors and should be included in the direct PM_{10} budget. (See 40 CFR 93.102(b) and 93.122(e) and the conformity rule preamble at 69 FR 40004, 40031–40036; (July 1, 2004)). The applicability of emission trading between conformity budgets for conformity purposes is described in 40 CFR 93.124(c).

2. Motor Vehicle Emissions Budget for the Nogales Nonattainment Area

Usually, States are required to consult with local metropolitan planning organizations (MPOs) when developing a MVEB. The Nogales NA does not have an MPO. To develop the MVEB, ADEQ consulted with EPA and the Arizona Department of Transportation (ADOT). The Federal Highway Administration's Highway Statistics statewide series data on Arizona shows a decline in vehicle miles traveled (VMT) between 2007 and 2008, and no change in VMT between 2008 and 2009. Emission inventory estimates for 2011 show a slight decrease in VMT. This trend is consistent with economic conditions. As discussed earlier in this proposed rule, the section 179B demonstration shows attainment of the PM_{10} standard in the Nogales NA, but for emissions from Mexico. The section 179B demonstration, proposed for approval herein, relies on a detailed analysis of PM_{10} exceedances that occurred during a specific three-year period (2007–2009), but assuming the 2007–2009 period is representative of the post-attainment date (1994) period, the conclusion that no violations would occur in Nogales but for emissions from Mexico can be applied throughout the post-attainment period. As such, there are several different years which are consistent with the applicable requirements for reasonable further progress and attainment, and which could be used for development of a MVEB.[67] The State chose 2011 as the year for the MVEB. The MVEB was determined using information from the emissions inventories described in Chapter 3 and included in Appendix B of the Nogales 2012 Plan.

The State's estimated MVEB for the Nogales NA includes PM_{10} emissions from all on-road vehicle emissions source, and reentrained fugitive dust from unpaved and paved roads. EPA's current MOVES (MOVES2010a) emissions model for on-road mobile sources was used to estimate the on-road motor vehicle portion of the 2011 MVEB. MOVES estimates tailpipe emissions from cars, trucks, motorcycles, buses, as well as brake and tire wear. Secondary PM_{10} derived from PM_{10} precursors are not identified as sources of PM_{10} contributing to exceedances of the PM_{10} NAAQS in the Nogales NA, either in the emissions inventories or in the plan, in general.

Fugitive emissions from paved and unpaved roads are affected by the number of VMT, silt volume on paved roads, and other local factors. Emissions estimates for these source categories were based on data obtained from State and federal agencies for the 2008 NEI. Estimates for Santa Cruz County were then apportioned to the Nogales NA based on population. The 2011 p.m.10 motor vehicle emissions budget for the Nogales NA was estimated at 1,000.3 tons per year. See Table 10.

[67] 40 CFR 93.118(e)(4)(iv) requires motor vehicle emissions budget(s), when considered together with all other emissions sources, to be consistent with applicable requirements for reasonable further progress, attainment, or maintenance (whichever is relevant to the given implementation plan submission).

TABLE 10—2011 NOGALES NA PM_{10} MOTOR VEHICLE EMISSIONS BUDGET

[Tons]

Source category	PM_{10}
Unpaved Road Dust	864.9
Paved Road Dust	121.4
On-road Motor Vehicle—Gasoline	2.6
On-road Motor Vehicle—Diesel	11.4
Total	1,000.3

Source: Table 7.1 of the Nogales 2012 Plan and "2008 and 2011 PM_{10} Emissions Inventories for the Nogales NA, Santa Cruz County, Arizona" in Appendix B of the Nogales 2012 Plan.

3. Proposed Action on the Motor Vehicle Emissions Budget for the Nogales Nonattainment Area

We propose to approve the MVEB for the Nogales NA as submitted by ADEQ contingent upon ADEQ's inclusion of road construction PM_{10} in the MVEB. Road construction PM_{10} should be included because, as the second largest source of PM_{10} emissions generated within the Nogales NA, road construction PM_{10} is a significant contributor to the overall Nogales NA PM_{10} inventory. See 40 CFR 93.122(e). As revised to include road construction PM_{10}, we propose to approve the MVEB for three reasons. First, we find that the MVEB is derived from a comprehensive, accurate, and current emissions inventory that we believe meets the requirements of section 172(c)(3) of the CAA. Second, the MVEB includes all on-road sources of PM_{10} including fugitive dust emissions from unpaved and paved roads and will include road construction PM_{10}, and was estimated using the latest motor vehicle emissions model available at the time of the emissions inventory was composed, the MOVES2010a model. Third, the MVEB are derived from emissions estimates used by ADEQ in the section 179B demonstration to show that the Nogales area would attain the PM_{10} standard, but for emissions from Mexico.

VI. EPA's Proposed Action and Request for Comment

Based on our review, EPA proposes to approve this moderate area plan submitted by Arizona to attain the PM_{10} NAAQS for the Nogales nonattainment area. Specifically, under CAA section 110(k)(3), EPA proposes to approve the following elements of the Nogales 2012 p.m.10 attainment plan:

(1) The 2008 base year and 2011 emissions inventories as meeting the requirements of CAA section 172(c)(3);

(2) the demonstration of attainment but for international emissions as

meeting the requirements of CAA section 179B(a)(1);

(3) the implementation of paving projects and capital improvement projects at the Ports of Entry within the Nogales NA prior to the attainment deadline (1994) as meeting the RACM/RACT requirements of CAA sections 172(c)(1), 179B(a)(2), and 189(c)(1)(C);

(4) the implementation of paving projects and capital improvement projects at the Ports of Entry to meet the RFP demonstration requirement of CAA sections 172(c)(2) and 179B(a)(2);

(5) the implementation of post-1994 paving projects as meeting the contingency measure requirements of CAA sections 172(c)(9) and 179B(a)(2); and,

(6) the 2011 attainment year motor vehicle emissions budget if revised to include road construction PM_{10}, because, as revised, it is derived from the section 179B demonstration and meets the requirements of CAA section 176(c) and of 40 CFR 93, subpart A.

Even with our proposed approval of Arizona's demonstration that the Nogales NA is attaining the PM_{10} NAAQS but for international transport from Mexico, any final action resulting from this proposal would not constitute a redesignation to attainment under CAA section 107(d)(3) because we have not determined that the area has met the other CAA requirements for redesignation to attainment of the PM_{10} NAAQS. The classification and designation status in 40 CFR part 81 would remain moderate nonattainment for the Nogales NA until such time as EPA determines that Arizona has met the CAA requirements for redesignating the Nogales NA to attainment for the PM_{10} NAAQS. EPA is soliciting public comments on the issues discussed in this **Federal Register** Notice. We will accept comments from the public on this proposal for the 30 days after publication of this proposed rule in the **Federal Register**. We will consider these comments before taking final action.

VII. Statutory and Executive Order Reviews

With this action, we propose to approve the moderate area PM_{10} plan submitted by Arizona for the Nogales NA and, if finalized, this proposed action would not impose additional requirements beyond those imposed by State law or by the CAA. For that reason, this proposed action:

- Is not a ''significant regulatory action'' subject to review by the Office of Management and Budget under Executive Order 12866 (58 FR 51735, October 4, 1993);
- Does not impose an information collection burden under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 et seq.);
- Is certified as not having a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.);
- Does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4);
- Does not have Federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);
- Is not an economically significant regulatory action based on health or safety risks subject to Executive Order 13045 (62 FR 19885, April 23, 1997);
- Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001);
- Is not subject to requirements of section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the Clean Air Act; and
- Does not provide EPA with the discretionary authority to address disproportionate human health or environmental effects with practical, appropriate, and legally permissible methods under Executive Order 12898 (59 FR 7629, February 16, 1994).

In addition, this proposed action does not have Tribal implications as specified by Executive Order 13175 (65 FR 67249; November 9, 2000), because the SIP obligations discussed herein do not apply to Indian Tribes and thus will not impose substantial direct costs on Tribal governments or preempt Tribal law.

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Intergovernmental relations, Particulate matter, Reporting and recordkeeping requirements.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: June 20, 2012.

Jared Blumenfeld,

Regional Administrator, EPA Region IX.

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