SIP Revision: Ajo PM_{10} Redesignation Request and Maintenance Plan

Air Quality Division
December 20, 2018 Proposed

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Completeness Criteria
(40 CFR Part 51, Appendix V, § 2.0)

Appendix V § 2.1 - Administrative Materials

(a) A formal signed, stamped, and dated letter of submittal from the Governor or his designee, requesting EPA approval of the plan or revision thereof (hereafter "the plan"). If electing to submit a paper submission with a copy in electronic version, the submittal letter must verify that the electronic copy provided is an exact duplicate of the paper submission.

(b) Evidence that the State has adopted the plan in the State code or body of regulations; or issued the permit, order, consent agreement (hereafter "document") in final form. That evidence shall include the date of adoption or final issuance as well as the effective date of the plan, if different from the adoption/issuance date.

(c) Evidence that the State has the necessary legal authority under State law to adopt and implement the plan.

(d) A copy of the actual regulation, or document submitted for approval and incorporation by reference into the plan, including indication of the changes made (such as redline/strikethrough) to the existing approved plan, where applicable. The submission shall include a copy of the official State regulation/document, signed, stamped, and dated by the appropriate State official indicating that it is fully enforceable by the State. The effective date of any regulation/document contained in the submission shall, whenever possible, be indicated in the regulation/document itself; otherwise the State should include a letter signed, stamped, and dated by the appropriate State official indicating the effective date. If the regulation/document provided by the State for approval and incorporation by reference into the plan is a copy of an existing publication, the State submission should, whenever possible, include a copy of the publication cover page and table of contents.

(e) Evidence that the State followed all of the procedural requirements of the State's laws and constitution in conducting and completing the adoption/issuance of the plan.

(f) Evidence that public notice was given of the proposed change consistent with procedures approved by EPA, including the date of publication of such notice.

(g) Certification that public hearing(s) were held in accordance with the information provided in the public notice and the State's laws and constitution, if applicable and consistent with the public hearing requirements in 40 CFR 51.102.

(h) Compilation of public comments and the State's response thereto.

Appendix V § 2.1 - Technical Support

(a) Identification of all regulated pollutants affected by the plan.

(b) Identification of the locations of affected sources including the EPA attainment/ nonattainment designation of the locations and the status of the attainment plan for the affected areas(s).

(c) Quantification of the changes in plan allowable emissions from the affected sources; estimates of changes in current actual emissions from affected sources or, where appropriate, quantification of changes in actual emissions from affected sources through calculations of the differences between certain baseline levels and allowable emissions anticipated as a result of the revision.

(d) The State's demonstration that the national ambient air quality standards, prevention of significant deterioration increments, reasonable further progress demonstration, and visibility, as applicable, are protected if the plan is approved and implemented. For all requests to redesignate an area to attainment for a national primary ambient air quality standard, under section 107 of the Act, a revision must be submitted to provide for the maintenance of the national primary ambient air quality standards for at least 10 years as required by section 175A of the Act.

(e) Modeling information required to support the proposed revision, including input data, output data, models used, justification of model selections, ambient monitoring data used, meteorological data used, justification for use of offsite data (where used), modes of models used, assumptions, and other information relevant to the determination of adequacy of the modeling analysis.

(f) Evidence, where necessary, that emission limitations are based on continuous emission reduction technology.

(g) Evidence that the plan contains emission limitations, work practice standards and recordkeeping/reporting requirements, where necessary, to ensure emission levels.

(h) Compliance/enforcement strategies, including how compliance will be determined in practice.

(i) Special economic and technological justifications required by any applicable EPA policies, or an explanation of why such justifications are not necessary.

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1 Introduction

Chapter 1 describes the purpose of this State Implementation Plan (SIP) revision for the Ajo PM_{10} nonattainment area, presents general regulatory requirements for PM_{10} planning areas, and provides an overview and history of the nonattainment area.

1.1 Statement of Purpose

Pursuant to Section 107(d)(4)(B) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) designated an area in northwest Pima County as a "moderate" nonattainment area for the 1987 24-hour PM_{10} National Ambient Air Quality Standards (NAAQS) in 1990.[1] EPA based its designation on recorded violations of the standard at an ambient monitoring site within the County.

Under the authority granted by the Governor and the State of Arizona, the Arizona Department of Environmental Quality (ADEQ) is responsible for the preparation and submittal of this State Implementation Plan revision.[2]

This document summarizes the progress of the Ajo area in attaining the PM_{10} NAAQS and demonstrates that all CAA requirements for redesignation to attainment have been satisfied. The clean air quality record, enforceable control measures, and projections of future emissions all show that the area will continue to maintain the PM_{10} air quality standards through 2031 (*see* Chapters 2, 4, and 6). With this submittal, ADEQ requests that EPA approve the enclosed maintenance plan and redesignate the Ajo nonattainment area to attainment for the 24-hour PM_{10} NAAQS.

Prior to its designation as nonattainment for the 1987 PM_{10} NAAQS, the Ajo area was designated as not meeting the total suspended particulates (TSP) air quality standards.[3] ADEQ is not aware of any relevant measures that are contingent upon continuation of the TSP nonattainment designation or would cause a relaxation of control strategies in the area if the TSP designation were deleted. Therefore, ADEQ also requests that EPA remove the total suspended particulates nonattainment designation for the Ajo area (*see* Chapter 3).

1.2 Rules to Be Added to and Removed from the SIP

Table 1-1 documents the rule submitted for approval as a component of the Arizona SIP. The Pima County Department of Environmental Quality (PDEQ) is currently in the process of adopting a new rule into Pima County Code Title 17 - Air Quality Control, Chapter 16 – Emission Limiting Standards, to provide permanence and enforceability for control measures implemented in the Ajo PM_{10} nonattainment area. A Notice of Proposed Rulemaking was posted on October 26, 2018, opening a public comment period for the new rule. The rule is expected to be considered for approval by the County Board of Supervisors in

[1] EPA replaced total suspended particulates with a new indicator for particulate matter, PM_{10}, in 1987. The PM_{10} standard refers to particulate matter that is less than or equal to 10 micrometers. *See also* Section 1.4.
[2] *See* Arizona Revised Statues (A.R.S.) §§ 49-401, 402, 404, and 406 and *Memorandum of Agreement among the Arizona Department of Environmental Quality, Arizona Department of Transportation, Pima County Department of Environmental Quality, and Pima Association of Governments*, August 2000.
[3] *See* 40 CFR 81.303.

January 2019 with an effective date in February 2019. The proposed rule and other rulemaking documentation are included in Appendix C. Discussion of the rule is included in Chapter 4 of this document. A codified version of the final rule will be submitted to EPA for approval into the SIP upon completion of the county rulemaking process.

Table 1-1 Rules to Be Added to and Removed from the SIP

Rule Added	SIP Rule(s) Replaced
Pima County Code 17.16.125 – Inactive Mineral Tailings Impoundment and Slag Storage Area within the Ajo PM_{10} Planning Area	None

1.3 National Ambient Air Quality Standards

Title I of the CAA requires EPA to set National Ambient Air Quality Standards for those pollutants that are considered harmful to both public health and the environment. EPA sets standards for six air pollutants: ground-level ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. There are two types of NAAQS: primary and secondary. Primary standards are set to protect human health and secondary standards are established to protect public welfare, such as decreased visibility and damage to animals, crops, vegetation, and buildings.[4]

The standard for each pollutant is set at a maximum concentration in either parts per million (ppm) by volume, parts per billion (ppb) by volume, or micrograms per cubic meter of air ($\mu g/m^3$). Each standard also has a distinct averaging time in order to provide the necessary level of protection. These standards are periodically reevaluated and are either retained or revised based on review of scientific literature and analyses.[5]

1.4 PM_{10} NAAQS

Particulate matter (PM), or particle pollution, is a complex mixture of very small particles and liquid droplets found in the air. Particulate matter can be directly emitted by a source such as smokestacks, fires, unpaved roads, or construction sites. These particles can also be formed in the atmosphere when gaseous pollutants such as sulfur dioxides and nitrogen dioxides react to form fine particles.[6]

On July 1, 1987, EPA revised the national ambient air quality standards for PM by replacing total suspended particulates with a new indicator for particulate matter, PM_{10}.[7] This new indicator included particles with an aerodynamic diameter less than or equal to 10 micrometers. In order to attain the NAAQS for the 24-hour PM_{10} standard, an air quality monitor cannot measure levels of PM_{10} greater than

[4] *See* https://www.epa.gov/criteria-air-pollutants/naaqs-table (last visited August 4, 2017).
[5] *See* CAA § 109 (42 U.S.C. 7409 [2015]).
[6] *See* https://www.epa.gov/pm-pollution (last visited August 4, 2017).
[7] *See Revisions to Ambient Air Quality Standards for PM*, 52 FR 24634, July 1, 1987 (codified at 40 CFR 50.6).

150 µg/m^3 more than once per year on average over a consecutive three-year period.[8] Table 1-2 provides a summary of the PM_{10} NAAQS for each of EPA's review cycles from 1987 through 2012.[9]

Table 1-2 PM_{10} NAAQS History

Date	Final Rule Citation	Primary/ Secondary	Averaging Time	Level	Form
1987	52 FR 24634 July 1, 1987	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over a 3-year period.
			Annual	50 µg/m^3	Annual arithmetic mean averaged over 3 years.
1997	62 FR 38652 July 18, 1997	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over a 3-year period.[10]
			Annual[11]	50 µg/m^3	Annual arithmetic mean averaged over 3 years.
2006	71 FR 61144 Oct. 17, 2006	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over a 3-year period.
2012	78 FR 3086 Jan. 15, 2013	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over a 3-year period.

1.5 Regulatory Background

PM_{10} Nonattainment Designation and SIP Submittals

As noted above, EPA revised the national ambient air quality standards for particulate matter in 1987 by replacing total suspended particulates with PM_{10} as the indicator for the particulate matter NAAQS.

Due to a general lack of available ambient PM_{10} monitoring data, EPA created a tiered scale to categorize areas based on their probability of violating the new standards. An area with a high probability of violating the standards was classified as a Group I area; an area with a moderate probability of violating was classified as a Group II area; and an area likely to attain the standards was classified as a Group III area. The Ajo area was listed as a "Group II Area," or an area with a moderate likelihood of violating the PM_{10} NAAQS.[12] Arizona was required to submit a SIP revision under CAA section 110 within nine months of

[8] As calculated rounding to the nearest 10 µg/m^3, according to 40 CFR 50, Appendix K (2015). For example, consistent with the rounding conventions, a value of 154 µg/m^3 is rounded down to 150 µg/m^3.
[9] The historical PM NAAQS also include "total suspended particulates" and $PM_{2.5}$, neither of which is included in this summary.
[10] The form of the standard was initially promulgated as 99th percentile, averaged over 3 years; when the 1997 standards were vacated, the form of the 1987 standards remained in place. *See National Ambient Air Quality Standards for PM*, 69 FR 45592, July 30, 2004.
[11] EPA revoked the annual PM_{10} NAAQS in 2006. *See National Ambient Air Quality Standards for PM*, 71 FR 61144, October 17, 2006.
[12] *See* 52 FR 24672, July 1, 1987; 52 FR 29383, August 7, 1987; and 55 FR 45799, October 31, 1990 (the October 31, 1990, publication defined the township boundaries included in the Ajo Group II Area).

promulgation of the new NAAQS, including enforceable commitments to collect and report ambient PM_{10} data. On December 28, 1988, the state submitted *PM_{10} Committal State Implementation Plan, Ajo Group II Area*.

Following the CAA amendments of 1990, areas were designated nonattainment for PM_{10} by operation of law and classified as "moderate" under CAA, Title I, Part D where violations of the PM standard were recorded prior to January 1, 1989; these areas included the former Ajo Group II PM_{10} planning area. EPA published a list and defined the boundaries of the designated PM_{10} areas on March 15, 1991.[13] The designations and classifications were subsequently codified at 40 CFR 81.303.[14]

Under section 189(a)(2) of the amended Act, the state was required to submit a revised SIP for the Ajo nonattainment area by November 15, 1991, and demonstrate attainment of the PM_{10} NAAQS by December 31, 1994. Arizona submitted *Final State Implementation Plan for the Ajo PM_{10} Nonattainment Area* on November 15, 1991. EPA identified several approvability issues in a September 3, 1992, letter, noting that the SIP did not include an adequate reasonably available control measure (RACM) analysis and attainment demonstration, or provide evidence of enforceability for the submitted control strategy.[15] EPA did not otherwise act on the plan.

"Clean Data Determination"

On February 8, 2006, EPA determined that the area had attained the PM_{10} NAAQS.[16] Under EPA's clean data policy, this determination, known informally as a "clean data finding," relieves the obligation to meet certain CAA requirements for PM_{10} nonattainment areas under Title I, Part D, Subpart 1 and Subpart 4. The requirements for a state to submit and obtain approval for the SIP components listed below are suspended for as long as the area continues to attain the NAAQS.

- reasonable further progress (RFP) plan
- demonstration of attainment by the applicable attainment date
- reasonably available control measures (RACM)
- nonattainment plan contingency measures

Following a clean data finding, a state need only submit a SIP that includes the following elements to complete the remaining CAA requirements for the nonattainment area.

- an emissions inventory
- documentation of a permitting program that meets the requirements of CAA section 173
- documentation that the state meets applicable provisions of CAA section 110(a)(2)
- commitments for future conformity demonstrations

Emissions inventories and other documentation were submitted in the 1991 Ajo nonattainment area plan. The current redesignation request and maintenance plan, however, supersedes previous submissions.

[13] *See* 56 FR 11101, March 15, 1991.
[14] *See* 56 FR 56694, November 6, 1991.
[15] *See* letter from Steve Pardiek, EPA Region IX, to Ira Domsky, ADEQ, September 3, 1992.
[16] *See* 71 FR 6352, February 8, 2006. EPA's determination was based on certified, quality assured ambient air monitoring data for the period 2002-2004.

The determination of attainment does not constitute a redesignation of the area to attainment. The nonattainment designation remains until EPA determines that the planning area meets additional CAA provisions required for redesignation including the following.[17]

- area has attained the NAAQS (current)
- area has a fully approved implementation plan under CAA section 110(k)
- area has demonstrated that the improvement in air quality is due to permanent and enforceable control measures
- area has a fully approved maintenance plan under CAA section 175A (demonstrating continued attainment for 10 years after redesignation)
- area meets all applicable requirements under CAA section 110 and part D (e.g., infrastructure and nonattainment area requirements)[18]

Ambient PM_{10} exceedances in 2011 and 2013 contributed to violations of the NAAQS for the period 2011-2013. More recent data, however, shows the area has been in compliance with the air quality standards in 2014, 2015, 2016, and 2017 (*see* Chapter 4).

Sources of PM_{10}

Historically the primary sources of PM_{10} emissions in the Ajo nonattainment area were fugitive dust from tailings piles, mining, milling, distilling, and smelting processes at the Phelps Dodge Corporation copper mine and smelter.[19] Additional sources included Minerals Research & Recovery Inc. (MRRI), a slag reprocessing facility, vehicular traffic on Highway 85, a landfill, unpaved roads, construction, and windblown dust from open areas.

1.6 Nonattainment Area Description

The following sections describe the boundary of the nonattainment area and provide information on the geography, climate, population, and economy of Pima County and the PM_{10} planning area.

1.6.1 Nonattainment Area Boundary

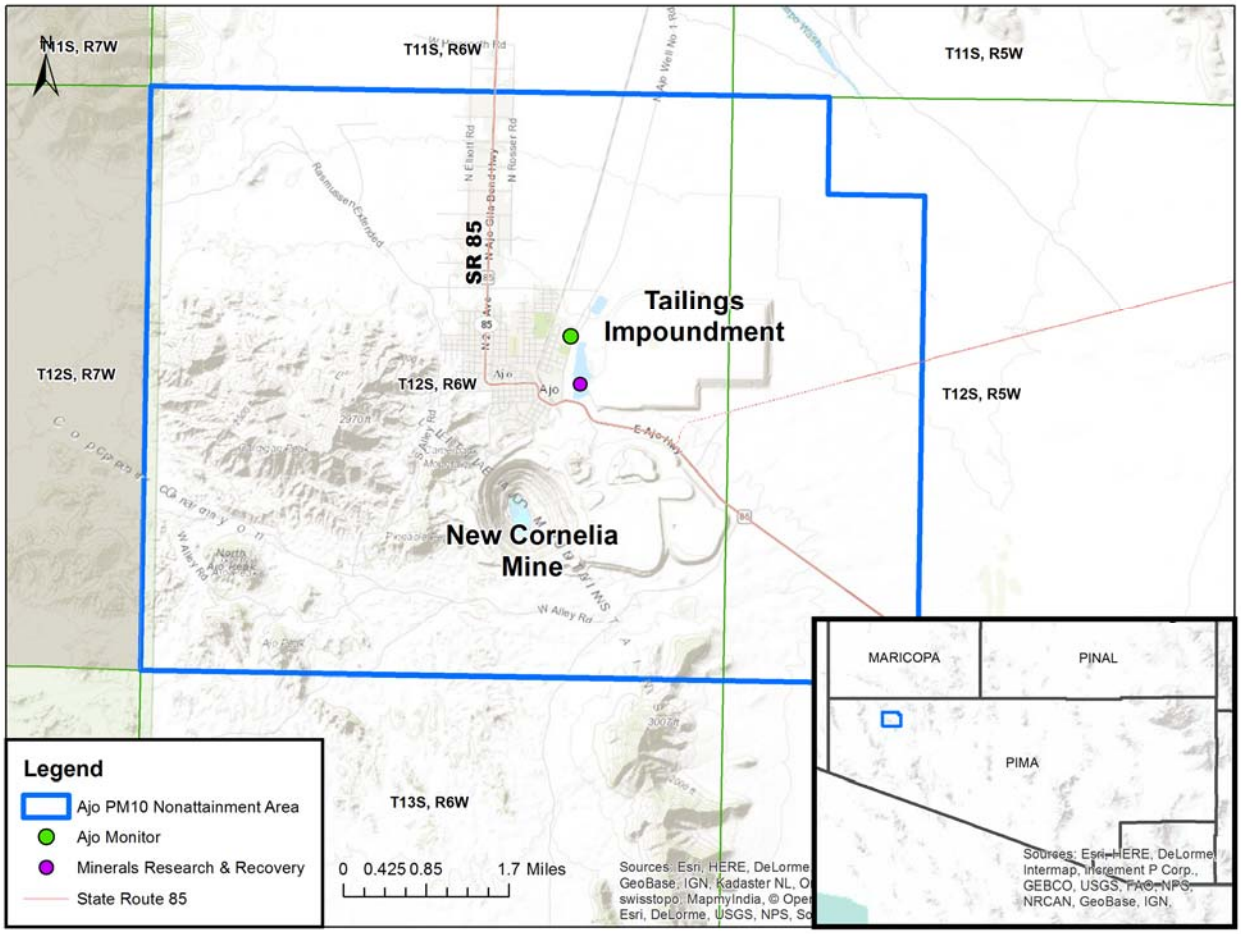
The boundaries of the Ajo PM_{10} nonattainment area are defined by one full and one partial township as codified at 40 CFR 81.303. Figure 1-1 below illustrates the location of the area.

[17] *See* CAA 107(d)(3)(E)(i) through 107(d)(3)(E)(v).

[18] In general, only those section 110 and part D elements that are linked with a particular nonattainment area's designation and classification, or permitting requirements that are associated with an area's demonstration of continued attainment, are applicable requirements for purposes of redesignation. *See* discussion in Section 5.1 of this document.

[19] This closed facility is now owned by Freeport McMoRan Copper & Gold Inc. (FMI), the successor to Phelps Dodge Corporation.

Figure 1-1 Ajo PM_{10} Nonattainment Area



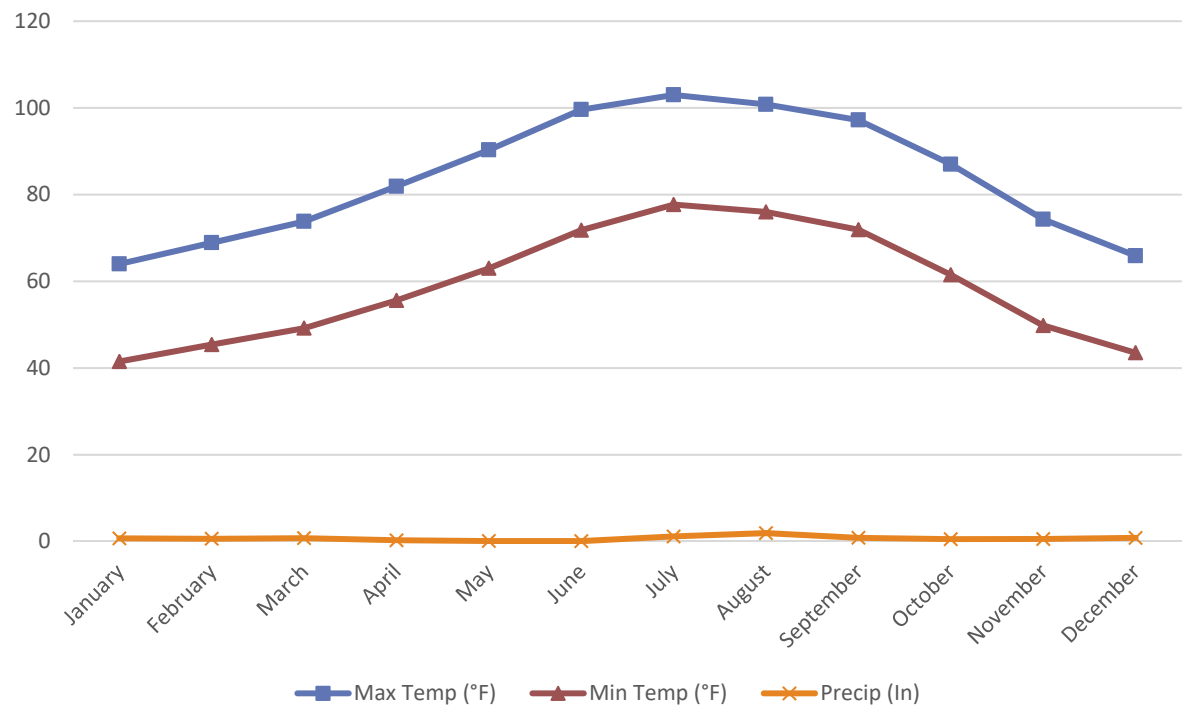
1.6.2 Geography and Climate

Ajo is a small former mining community in the northwest corner of Pima County approximately 90 miles southwest of Phoenix and 113 miles west northwest of Tucson. The unincorporated town is located on the edge of a broad desert valley at an elevation of 1750 feet, bordered by scattered hills and low mountain ranges to the west and south.

Cabeza Prieta National Wildlife Refuge is adjacent to the nonattainment area on the west. The Barry M. Goldwater Air Force Range is less than one mile north and the Tohono O'odham Nation lies approximately five miles to the east. Organ Pipe National Monument is located ten miles to the south.

The climate is warm and arid in the nonattainment area and the county in general. In the community of Ajo average monthly maximum temperatures range from 64.0°F to 103.0°F, and average monthly minimum temperatures range from 41.5°F to 77.7°F. The driest time of the year for the area is typically April through June followed by September through November. Average annual precipitation is 8.40 inches. Figure 1-2 shows average monthly temperatures and precipitation for Ajo, Arizona.

Figure 1-2 Monthly Average Temperatures and Precipitation – Ajo, Arizona



Source: Western Regional Climate Center, monthly climate summary Ajo, AZ; period of record May 1, 1914 to December 31, 2005.

1.6.3 Population

Population statistics provide information regarding the number of people impacted by changes in air quality in the Ajo area and can also be used as a surrogate for estimating current and future emissions from certain source categories (*see also* Appendix A, Section A1.4).

From a high of more than 7,000 inhabitants in 1960, the population of the Ajo Census Designated Place (CDP) declined to around 3,000 residents in 2010, according to the U.S. Census.[20] The most significant reduction occurred between 1980 and 1990 when the population of Ajo decreased by nearly 44 percent, reflecting the waning of mining activities and the shutdown of the Ajo copper smelter in 1985 (*see* Sections 1.6.4 and 4.1). Since that time, the area has experienced little growth compared to other cities and towns in the County. A moderate rebound in residents was experienced in the 1990s, but much of this growth was lost in the following decade. By contrast, the population of Pima County as a whole nearly doubled between 1980 and 2010. The majority of population growth, however, occurred outside the Ajo Planning Area in the eastern part of the County, including its largest population centers; Tucson, Oro Valley, and Marana. Decennial census data for Ajo and Pima County are shown in Table 1-3.

[20] Census Designated Places (CDPs) are delineated for the decennial census. CDPs are places that are not legally incorporated and represent the statistical counterparts of incorporated places such as cities or towns.

Table 1-3 Decennial Census Population of Ajo CDP and Pima County 1960-2010

Area/Percent Change	April 1, 1960	April 1, 1970	April 1, 1980	April 1, 1990	April 1, 2000	April 1, 2010
Ajo CDP	7,049	5,881	5,189	2,919	3,705	3,304
Ajo Decennial Change		-16.6%	-11.8%	-43.7%	26.9%	-10.8%
Pima County	265,660	351,667	531,443	666,957	843,746	980,263
Pima County Decennial Change		32.4%	51.1%	25.5%	26.5%	16.2%

Source: U.S. Bureau of the Census, decennial census counts.

Pima County and Ajo nonattainment area population estimates and projections of selected years for the period 2011 through 2031 are presented in Table 1-4.[21] The population of the nonattainment area is expected to increase 17 percent between 2016 and 2031, the end of the first maintenance period (see Section 6.2).

Table 1-4 Projected Population Growth 2011-2031

Area	2011	2014	2016	2021	2026	2031
Ajo Nonattainment Area	3,226	3,295	3,314	3,521	3,707	3,884
Pima County	986,081	1,007,162	1,013,103	1,076,100	1,133,000	1,187,100

Source: Arizona Department of Administration (ADOA), Office of Economic Opportunity; medium series projections for future years.

1.6.4 Economy

Ajo was one of several early settlements in Arizona in which mining and copper smelting were of prominent importance. Originally, ores from Ajo were shipped to smelters in Wales, and later, to a Phelps Dodge Corporation smelter in Douglas, Arizona, before the company began smelting operations in Ajo in 1950. For several decades, more than 1,000 persons were employed by Phelps Dodge at Ajo, until the closure of its facilities in 1985. The economic viability of this area is currently enhanced by natural scenic attractions, a casino, and other amenities. The only major highway in the Ajo area is Arizona State Route 85 which connects Ajo with U.S. Interstate 8 to the north and allows the area to serve as a gateway for tourists and other visitors to Mexico, Organ Pipe Cactus National Monument, Cabeza Prieta National Wildlife Refuge, and the Tohono O'odham Indian Reservation.

According to the Arizona Department of Administration, the Ajo CDP labor force increased by more than 88 percent in the previous decade, from 755 in 1990 to 1,421 in 2010. Although population grew at a

[21] The urbanized portion of the Ajo CDP is located almost entirely within the PM_{10} nonattainment area.

slower rate over the same period, labor force growth in the Ajo CDP may be attributed to additional employers in the local economy and an increase in persons actively seeking work. Employment is mainly in the commercial, service, and tourism sectors. Unemployment rose from 6.9 percent in 1990 to 16.1 percent in 2010, with the sharpest increase occurring between 2005 and 2010, likely due to the recent economic recession. Table 1-5 shows a selected time series of civilian labor force statistics.

Table 1-5 Labor Force Data for the Ajo CDP

Employment Statistic (annual average)	1990	1995	2000	2005	2010	2015
Labor Force	755	939	1,129	1,219	1,421	1,586
Number Unemployed	52	45	79	101	229	405
Unemployment Rate	6.9%	4.8%	7.0%	8.3%	16.1%	25.5%

Source: Average annual labor force data, Arizona Department of Administration, Local Area Unemployment Statistics, updated December 15, 2011. Data for 2015 obtained from U.S. Census Bureau, American Community Survey 5-year estimates, March 6, 2018 (data estimate margin of error +/-9.7 percent).

1.7 General SIP Approach

1.7.1 Clean Air Act Requirements for Redesignation

Clean Air Act Title I, Part A, Section 107 contains the planning and control elements necessary for EPA to redesignate a nonattainment area to attainment. Table 1-6 lists those requirements and explains how the demonstrations included in this document satisfy those obligations for the Ajo PM_{10} planning area.

Table 1-6 Clean Air Act Requirements for Redesignation to Attainment

CAA Citation	Requirement	Action to Meet Requirement	Location in Document
§ 107(d)(3)(E)(i) – Attainment of the Standard	*A nonattainment area cannot be redesignated to attainment unless the EPA Administrator determines that the area has attained the national ambient air quality standard.*	On February 8, 2006, EPA determined that the Ajo nonattainment area had attained the PM_{10} NAAQS. The area is also currently attaining the PM_{10} standard. Chapter 2 includes a summary of historical and current air quality data.	Section 1.5 and Chapter 2
§ 107(d)(3)(E)(ii) – Fully Approved Implementation Plan	*The area must have a fully approved implementation plan under section 110(k).*	This SIP revision includes documentation that Clean Air Act requirements for the nonattainment area have been	Chapters 3 and 5

CAA Citation	Requirement	Action to Meet Requirement	Location in Document
		met and includes a maintenance plan demonstrating attainment of the NAAQS through 2031. ADEQ requests full approval of all outstanding obligations.	
§ 107(d)(3)(E)(iii) – Permanent and Enforceable Improvement in Air Quality	*The state must demonstrate, and EPA concur, that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions.*	The primary measures responsible for bringing the area into attainment are the stabilization of the Ajo tailings impoundments in 1991 and slag reprocessing area in 2015. Chapter 4 describes the measures adopted to ensure continued attainment and maintenance of the PM_{10} NAAQS.	Chapter 4
§ 107(d)(3)(E)(iv) – Maintenance Plan	*The area must have a fully approved maintenance plan meeting the requirements of CAA section 175A.*	This SIP revision includes a maintenance plan that demonstrates continued attainment through 2031.	Chapter 6
§ 107(d)(3)(E)(v) – Section 110 and Part D Requirements	*The state must meet all requirements applicable to the area under section 110 and part D.*	Demonstrations that all applicable implementation plan requirements have been met are included in Chapter 5.	Chapter 5

Table 1-7 lists CAA Maintenance Plan requirements and indicates how these requirements are met by the Ajo PM_{10} planning area.

Table 1-7 CAA Requirements for Maintenance Plans

CAA Citation	Requirement	Action to Meet Requirement	Location in Document
§ 175A(a) – Plan Revision	*Each state that submits a request to redesignate a nonattainment area to attainment shall also submit a revision to the applicable state implementation plan to provide for maintenance of the NAAQS*	This plan includes control measures necessary to demonstrate maintenance of the PM_{10} NAAQS through 2031.	Chapters 4 and 6

CAA Citation	Requirement	Action to Meet Requirement	Location in Document
	for at least 10 years after the redesignation. The plan should contain additional measures, as may be necessary, to ensure such maintenance.		
§ 175A(b) – Subsequent Plan Revisions	*Eight years after redesignation as an attainment area the state shall submit to EPA an additional revision of the applicable SIP for maintaining the NAAQS for 10 years after the expiration of the first 10-year maintenance period.*	ADEQ commits to submit an additional SIP revision, eight years after redesignation of the nonattainment area to attainment in order to demonstrate maintenance of the PM_{10} NAAQS for an additional 10-year period.	No additional location in document.
§ 175A(c) – Nonattainment Requirements Applicable Pending Plan Approval	*Until the maintenance plan is approved and the area is redesignated to attainment, the requirements of CAA title I, part D, Plan Requirements for Nonattainment Areas, shall continue in force and effect with respect to the area.*	ADEQ and PDEQ commit to continue to implement all required provisions as necessary.	No additional location in document.
§ 175A(d) – Contingency Provisions	*Each plan revision shall contain contingency provisions to assure that the state will promptly correct any violation of the standard which occurs after the redesignation of the area as an attainment area. Such provisions shall include a requirement that the State will implement all measures which were contained in the state implementation plan for the area before redesignation of the area as an attainment area.*	A contingency plan is included in Section 6.5 below.	Section 6.5

Table 1-8 lists CAA requirements for transportation and general conformity, programs applicable in both nonattainment and maintenance areas.

Table 1-8 CAA Requirements for Transportation and General Conformity

CAA Citation	Requirement	Action to Meet Requirement	Location in Document
§ 176(c) – Transportation Conformity	"Transportation conformity is required by the Clean Air Act section 176(c) (42 U.S.C. 7506(c)) to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a state air quality implementation plan (SIP)."[22]	Discussion of state conformity rules is included in Section 5.2.1.10. Evaluation of on-road mobile sources for regional emissions analyses purposes is included in Chapter 7.	Section 5.2.1.10 and Chapter 7
§ 176(c) – General Conformity	Similar to Transportation Conformity, which applies to highways and mass transit projects, General Conformity is applicable to all other federally supported activities to ensure that the actions taken by federal agencies in nonattainment and maintenance areas do not interfere with a state's plans to meet national air quality standards.	General Conformity for the Ajo planning area must be addressed to ensure PM_{10} emissions from any federal actions or plans do not exceed the rates outlined in 40 CFR 93.153(b).[23] Criteria for making determinations and provisions for general conformity are located in Arizona Administrative Code R18-2-1438. ADEQ and Pima County commit to review and comment, as appropriate, on any federal agency draft general conformity determination it receives pursuant to 40 CFR 93.155 for activities planned in this air quality planning area. Discussion of state conformity rules is included in Section 5.2.1.10.	See also Section 5.2.1.10

1.7.2 EPA Guidance

Guidance utilized in the preparation of this plan include the following documents.

[22] Source: *General Information for Transportation Conformity*, https://www.epa.gov/state-and-local-transportation/general-information-transportation-and-conformity (July 19, 2017).
[23] *See* 58 FR 63253, November 30, 1993.

- *PM_{10} SIP Development Guideline*, U.S. EPA, June 1987 (Publication No. EPA-450/2-86-001)
- *Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992
- *Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency*, Potter, J. C., Adams, T. L., Blake, F. S., Memorandum, U.S. EPA, September 23, 1987
- *Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency*, Alushin, M. S., Eckert, A. W., Seitz, J. S., Memorandum, U.S. EPA, September 23, 1987
- *Adequacy Review and Conformity Checklist*, U.S. EPA Online SIP Processing Manual, June 1, 2016

1.8 Intergovernmental Participation/Consultation; Stakeholder Process

Federal law requires consultation and participation by local political subdivisions and federal land managers having authority over land to which the plan applies.[24] The SIP must identify and define the responsibilities of each organization that will participate in developing, implementing, and enforcing the plan. The plan must also include any related agreements or memoranda of understanding among the organizations.[25] Additional consultation procedures are required when transportation conformity budgets are established in the submitted plan.[26]

ADEQ works with its partners and the regulated community to analyze emissions and develop control strategies in order to achieve attainment of the NAAQS. Participation is encouraged and technical advice sought through meetings and discussion with governmental departments and agencies, municipalities, members of the regulated community, and other interested parties; and through the public comment process for SIP revisions and rulemakings.

The following tables list the names and roles of governmental entities, the regulated community, and other interested parties participating in the development of this plan.

Table 1-9 Governmental Entities

Name	Role
Arizona Department of Environmental Quality (ADEQ)	Develop state implementation plan and emissions inventories. Analyze and participate in developing appropriate control strategies for the SIP. Original jurisdiction including permits for certain sources including smelting of metal ores.[27]

[24] *See* CAA §§ 110(a)(2)(J), 110(a)(2)(M), and 121.
[25] *See* 40 CFR 51.240 and 51.241. *See also Memorandum of Agreement among the Arizona Department of Environmental Quality, Arizona Department of Transportation, Pima County Department of Environmental Quality, and Pima Association of Governments*, August 2000.
[26] *See* 40 CFR 93. *See also* Chapter 7.
[27] The division of jurisdiction between ADEQ and county air pollution control agencies in Arizona is governed by A.R.S. § 49-402(A) and (B). For more information regarding ADEQ and county jurisdiction for the nonattainment NSR and PSD programs see ADEQ's *State Implementation Plan Revision, New Source Review, Supplemental Information, July 2014* (submitted to EPA on July 2, 2014).

Name	Role
Pima County Department of Environmental Quality (PDEQ)	Consultation/participation in SIP development. Provide technological information for emissions inventories and any associated control measure analysis. Control measure development (rules) and implementation. Primary permitting authority in Pima County.[28]
Pima County and Other Departments	Consultation/participation in SIP development. Provide technological and economic information for emissions inventory development and any associated control measure analysis.[29]
Pima Association of Governments (PAG)	Consultation/participation in SIP development. Provide technological and economic information for emissions inventory development and any associated control measure analysis. Consultation on transportation related issues.
Arizona Department of Transportation (ADOT)	Provide technological information for emissions inventory development (e.g., MOVES data, vehicle miles traveled (VMT) data, construction information, etc.). Consultation on transportation related issues.
EPA Region 9	Participate in an advisory capacity throughout the SIP development process including review of the SIP Development Plan, Inventory Preparation Plan (IPP), and Technical Protocol; review and act on the SIP submitted by ADEQ.
Tohono O'odham Nation	Consultation/notification regarding control measure and SIP development.

Table 1-10 Other Stakeholders

Name	Role
Freeport McMoRan Inc. (FMI)	Owner of historic copper mining and smelting operations. Participate in and provide technological and economic information for the control measure analysis and implementation.
Members of the Public	Review and comment on proposed control strategy and plan.

[28] *Ibid.*

[29] *See also Ajo Nonattainment Area Inventory Preparation Plan*, October 5, 2017.

2 Attainment of the Standard – CAA § 107(d)(3)(E)(i)

"The State must show that the area is attaining the applicable NAAQS."[30]

2.1 Description of the Ambient PM_{10} Monitoring Network

ADEQ operates an air quality monitor at the Arizona Department of Transportation maintenance yard (*see Figure 1-1*). The location was selected in an effort to monitor particulate matter emissions impacts from the now dismantled copper smelter and mine tailings. An automated monitor for recording continuous PM_{10} (Thermo TEOM 1400AB, Federal Equivalent Method EQPM-1090-079) was installed at the site in 2009, replacing a filter based sampler (R&P Partisol 2000 H, Federal Reference Method RFPS-1298-126) that operated on a one in six-day schedule. The TEOM monitor was replaced by a Met One BAM 1020 (FEM EQPM-0798-122) instrument in April 2015. ADEQ also operates instrumentation to collect temperature, humidity, and wind data at this site.

The Ajo ambient air monitoring station is operated according to the requirements of 40 CFR Part 58. Collected data are quality assured and reported to EPA's Air Quality System (AQS) for comparison to the NAAQS.

2.2 Ambient PM_{10} Data Trends

EPA defines an "exceedance" as a discrete event, where a measured value at a monitor is higher than the level of the standard. The PM_{10} standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. The number of expected exceedances at a site, also known as the design value, is determined by recording the actual number of exceedances in each calendar year and then averaging them over the most recent 3 year period.[31]

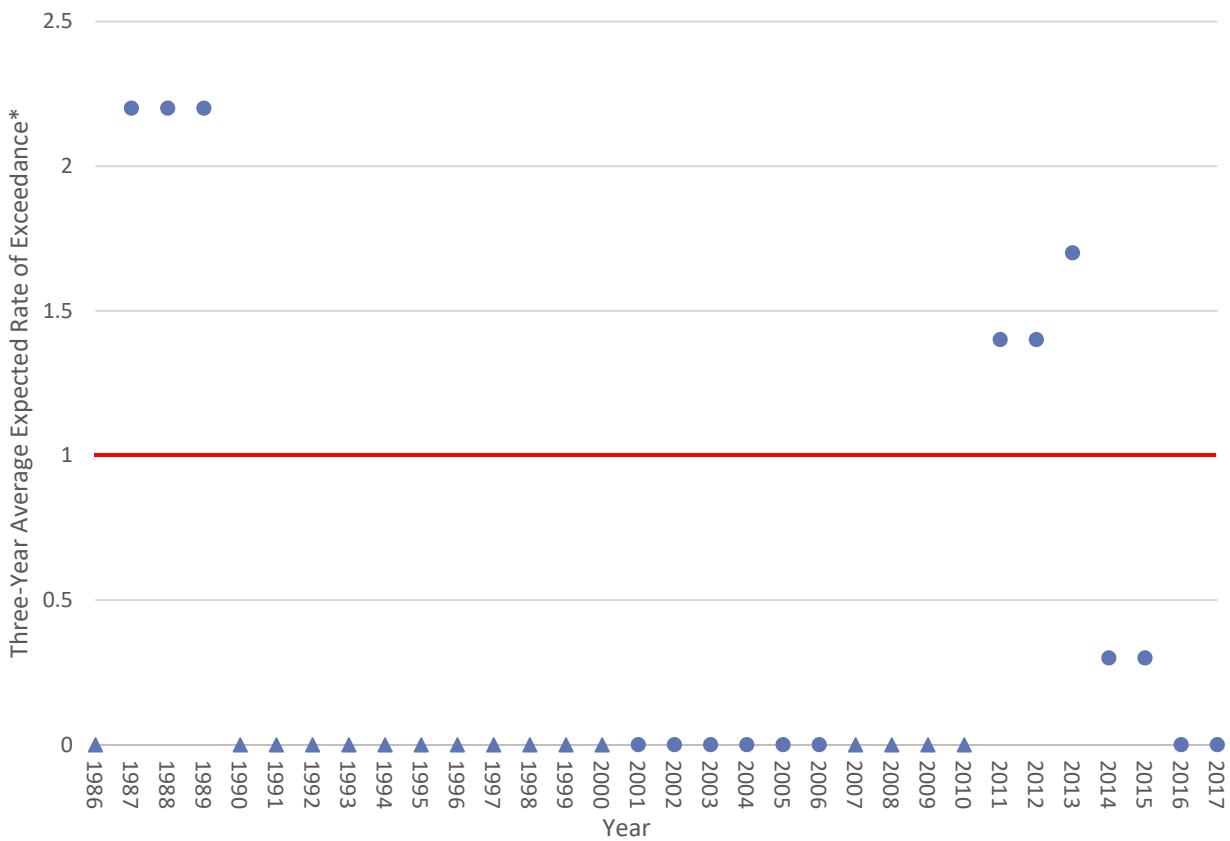
All monitored exceedances must be included when calculating design values for comparison to the NAAQS unless the state or local agency can show that the exceedances are due to invalid data (e.g., monitor malfunction, etc.) or due to an exceptional/natural event (e.g., regional high wind event).

On February 8, 2006, EPA determined that the Ajo area had attained the PM_{10} NAAQS based on data for the period 2002-2004.[32] Recent exceedances of the air quality standard are discussed in Section 2.2.1 below.

Figure 2-1 presents the calculated design values for years 1986 through 2017.

[30] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.
[31] The number of exceedances in a calendar year is an estimated value for non-continuous monitors.
[32] *See* 71 FR 6352, February 8, 2006.

Figure 2-1 Ajo PM_{10} Design Values 1986-2017



Source: EPA's Air Quality System, AMP480 Preliminary Design Value Reports, dated May 3, 2016, March 22, 2017, and March 2, 2018.

* Although there were no recorded exceedances for years 1986, 1990-2000, and 2007-2010, and the calculated design values equaled 0, the AQS AMP480 reports indicate these data may not be valid for compliance purposes until additional analyses are performed. As explained in the reports, the certifying agency and/or EPA has determined that questions remain regarding the quality of these data due to data completeness, quality assurance procedures, or other issues. The design values for these years are represented by a triangle marker (Δ) in Figure 2-1. The red line indicates the PM_{10} NAAQS.

2.2.1 Nature of Exceedances

The Ajo nonattainment area has not exceeded the PM_{10} NAAQS for 26 of the last 28 years. In the period 1990 through 2017 there were five exceedances at the Ajo ambient monitor; four in 2011 and one in 2013. No exceedances have been recorded following the shutdown of nearby emissions sources and completion of stabilization work in 2015 (*see* Sections 4.1, *Sources of PM_{10}*, and 4.4, *Improvement in Air Quality*).

An evaluation of meteorological data indicates that the exceedances in 2011 and 2013 are likely associated with blowing dust generated from thunderstorm outflow or regional high wind events. Table 2-1 lists the exceedance dates and describes the meteorological patterns for those days. The nature of these events is more fully described in Appendix A, Section A4 and Subsection A4.3.

Table 2-1 Ajo Exceedance Days 1990-2017

Date	Local/Regional Meteorology*
June 29, 2011	Blowing dust due to regional high wind event. A low-pressure system/trough tracked through the region passing by to the north. Strongest impacts occurred before frontal passage with gusty winds out of the southwest. Maximum wind speed 27.72 miles per hour (mph).
August 18, 2011	Blowing dust likely generated from nearby thunderstorm outflow. Wind southerly. Maximum wind speed 32.84 mph.
August 26, 2011	Blowing dust likely generated from nearby thunderstorm outflow. Wind southwesterly. Maximum wind speed 28.23 mph.
August 27, 2011	Blowing dust likely generated from nearby thunderstorm outflow. Wind southwesterly. Maximum wind speed 46.17 mph.
April 8, 2013	Blowing dust due to regional high wind event. A low-pressure system/trough tracked through the region passing by to the north. Strongest impacts occurred before frontal passage with gusty winds out of the south and southwest. Maximum wind speed 44.58 mph.

* Wind data were obtained from ADEQ meteorological instrumentation at the Ajo monitoring site.

2.3 24-Hour PM_{10} NAAQS Compliance

Based on complete quality-assured data, the Ajo planning area met the PM_{10} NAAQS for the period 2014-2016. Table 2-2 presents the annual expected exceedance rates, maximum 24-hour concentrations, and 2016 design value for the Ajo monitoring site.

Table 2-2 PM_{10} Compliance Summary – 2014-2016

AQS ID	2014		2015		2016		Three-year Average Expected Rate of Exceedance
	Maximum 24-hr Avg.	Expected Exceed.	Maximum 24-hr Avg.	Expected Exceed.	Maximum 24-hr Avg.	Expected Exceed.	
04-019-0001	134	0	67	0	141	0	0

The Ajo planning area is also currently meeting the PM_{10} NAAQS based on data for the period 2015-2017.[33] Table 2-3 presents the annual expected exceedance rates, maximum 24-hour concentrations, and 2017 design value.

[33] ADEQ certified 2017 data in AQS on April 27, 2018.

Table 2-3 PM_{10} Compliance Summary – 2015-2017

AQS ID	2015		2016		2017		Three-year Average Expected Rate of Exceedance
	Maximum 24-hr Avg.	Expected Exceed.	Maximum 24-hr Avg.	Expected Exceed.	Maximum 24-hr Avg.	Expected Exceed.	
04-019-0001	67	0	141	0	109	0	0

3 Fully Approved Implementation Plan – CAA § 107(d)(3)(E)(ii)

"The SIP for the area must be fully approved under CAA section 110(k), and must satisfy all requirements that apply to the area." "An area cannot be redesignated if a required element of its plan is the subject of a disapproval; a finding of failure to submit or to implement the SIP; or -partial, conditional, or limited approval." "… approval action on SIP elements and the redesignation request may occur simultaneously." [34]

PM10 Nonattainment Area

Consistent with Clean Air Act requirements, the state previously submitted the following plans applicable to the Ajo PM_{10} planning area.

- *PM_{10} Committal State Implementation Plan, Ajo Group II Area*, December 28, 1988
- *Final State Implementation Plan for the Ajo PM_{10} Nonattainment Area,* November 15, 1991
- *1987 PM_{10} Infrastructure State Implementation Plan*, June 30, 2017

The June 30, 2017, plan was submitted to address certain basic elements or the "infrastructure" of state and local air quality management programs under CAA Sections 110(a)(2)(A) through (M). According to EPA policy, only those portions of the infrastructure SIP linked to the Ajo planning area's designation and classification are applicable requirements for purposes of redesignation.[35] Infrastructure plan elements and Arizona's demonstrations to meet plan requirements are more fully described in Chapter 5.

The 1988 and later the 1991 plans were submitted to meet CAA nonattainment plan requirements for the Ajo PM_{10} planning area under CAA Title I, Part D. A clean data finding in 2006, however, suspended many nonattainment plan requirements (*see* Sections 1.5 and 5.2). Additionally, the current redesignation request and maintenance plan supersedes the 1988 and 1991 submissions.

In summary, this SIP revision includes demonstrations that all applicable Clean Air Act requirements for the PM_{10} nonattainment area have been met.

TSP Designation

Prior to promulgation of the PM_{10} NAAQS the Ajo area (one township) was designated as not meeting the primary total suspended particulates air quality standards.[36] EPA revised the particulate matter NAAQS in 1987 by replacing TSP with a new indicator for particulate matter, PM_{10} (*see* Section 1.4). The Ajo area was subsequently also designated nonattainment for PM_{10} following the CAA amendments of 1990. Because the TSP NAAQS were replaced with the new PM_{10} standard, ADEQ is seeking to update the status of the Ajo area and requests that EPA remove its TSP nonattainment designation.

When establishing the PM_{10} NAAQS in 1987, EPA indicated that it "would consider deletion of TSP area designations once EPA had reviewed and approved revised SIPs that include control strategies for the

[34] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.
[35] *See* 73 FR 22312, April 25, 2008.
[36] *See* 40 CFR 81.303.

PM_{10} NAAQS and once EPA had promulgated PM_{10} increments for the prevention of significant deterioration (PSD) program."[37]

In its 2014 action to redesignate Las Vegas Valley, Nevada, to attainment for the PM_{10} standard, EPA stated "that the relevant considerations for evaluating whether the necessity of retaining the TSP area designations depend upon the status of a given area with respect to TSP and PM_{10}."[38] Further, "For areas that are nonattainment for TSP but attainment for PM_{10}, we generally find that the TSP designations are no longer necessary and can be deleted when EPA (1) approves a State's revised PSD program containing the PM_{10} increments, (2) promulgates the PM_{10} increments into a State's SIP where the State chooses not to adopt the increments on their own, or (3) approves a State's request for delegation of PSD responsibility under 40 CFR 52.21(u).[39]

"For areas that are nonattainment for TSP and nonattainment for PM_{10}, an additional consideration is whether deletion of the TSP designations would automatically relax any emissions limitations, control measures or programs approved into the SIP. If such a relaxation would occur automatically with deletion of the TSP area designations, then we will not delete the designations until we are satisfied that the resulting SIP relaxation would not interfere with any applicable requirement concerning attainment, reasonable further progress (RFP), or maintenance of the NAAQS or any other requirement of the Clean Air Act in the affected areas. See section 110(l) of the Act."[40]

EPA also commented that the considerations for both types of areas described above (nonattainment for TSP/attainment for PM_{10}, nonattainment for TSP/nonattainment for PM_{10}) are relevant for areas that are currently nonattainment for PM_{10}, but for which the state has requested redesignation to attainment for PM_{10}.

As background, Arizona Revised Statutes, Title 49, "The Environment," divides responsibility for meeting the requirements of the CAA among the state and local agencies. County agencies have original jurisdiction for the issuance, administration, and enforcement of permits.[41] State law also provides direct county authority to adopt and enforce programs, rules, and ordinances for the prevention, control, and abatement of air pollution.[42] ADEQ, however, has original jurisdiction for mobile and certain stationary sources including smelting of metal ore, coal-fired electrical generating stations, and portable sources but may delegate jurisdiction to a local agency as allowed under state law.[43]

ADEQ has an approved PSD program, except for greenhouse gasses (GHG), under sections 160 through 165 of the CAA.[44] The Pima County Department of Environmental Quality currently implements the Federal PSD program in 40 CFR 52.21 for all regulated new source review (NSR) pollutants pursuant to a delegation agreement. Additionally, ADEQ is not aware of any relevant ADEQ or Pima County emissions limitations, control measures or other programs that are contingent upon continuation of the TSP nonattainment designation or would cause a relaxation of control strategies in the area if the TSP

[37] *See* 52 FR 24672, at 24682, July 1, 1987, and 79 FR 42258, July 21, 2014.
[38] *See* 79 FR 42258, at 42273, July 21, 2014.
[39] *See* 58 FR 31622, at 31635, June 3, 1993.
[40] *See* 79 FR 42273, July 21, 2014.
[41] A.R.S. § 49-402.
[42] A.R.S. Title 49, Chapter 3, Article 3.
[43] A.R.S. §§ 49-107 and 402.
[44] ADEQ is currently administering the requirements for GHGs under a delegation agreement with EPA.

designation were deleted. Therefore, ADEQ requests that EPA delete the total suspended particulates nonattainment designation for the Ajo area.

Particulate Matter FIP

In 1972, prior to establishment of the PM_{10} NAAQS, EPA promulgated a particulate matter Federal Implementation Plan (FIP) for Pima County (and other counties) at 40 CFR 52.126 *Control strategy and regulations: Particulate matter*. The FIP replaced state submitted rules for the regulation of particulate matter emissions from stationary process sources including *Regulation 7-1-3.6 of the Arizona Rules and Regulations for Air Pollution Control* and *Rule 2(B) of Regulation II of the Rules* and *Regulations of the Pima County Air Pollution Control District (Phoenix-Tucson Intrastate Region)*.[45] In its disapproval of the submitted rules EPA stated that the "Arizona implementation plan did not meet the requirements of 40 CFR 51.13 and 51.22 since it did not provide for the attainment and maintenance of national standards for particulate matter in the Phoenix-Tucson Air Quality Control Region (AQCR)."[46]

Within the Phoenix-Tucson AQCR, Pima County subsequently adopted new regulations for process industries under its jurisdiction. The new Pima County regulations, which incorporated the federal emissions rates, were submitted to EPA on June 14, 1974. EPA proposed approval of the rules on August 21, 1975.[47] Additionally, a review of emissions sources shows that no "process sources" under state or county jurisdiction currently operate within the Ajo PM_{10} nonattainment area.[48]

[45] *See* 37 FR 15094, 15096, July 27, 1972, and 38 FR 12704, May 14, 1973.
[46] *See* 37 FR 10842, May 31, 1972, and 40 FR 36577, 36578, August 21, 1975.
[47] *See* 40 FR 36577, 36578, August 21, 1975.
[48] If a state regulated source applies for a permit to operate in Pima County A.R.S. § 49-402(D) requires the permit to include emissions standards adopted by the county if the standards are more stringent than state standards and if the county standards are identified as applicable to the permitted source (requirement applies to certain listed state sources). The division of jurisdiction between ADEQ and county air pollution control agencies in Arizona is governed by A.R.S. § 49-402(A) and (B). For more information regarding ADEQ and PDEQ jurisdiction for the nonattainment NSR and PSD programs see ADEQ's *State Implementation Plan Revision, New Source Review, Supplemental Information, July 2014* (submitted to EPA on July 2, 2014).

4 Permanent and Enforceable Improvement in Air Quality – CAA § 107(d)(3)(E)(iii)

"The State must be able to reasonably attribute the improvement in air quality to emission reductions which are permanent and enforceable. Attainment resulting from temporary reductions in emission rates (e.g., reduced production or shutdown due to temporary adverse economic-conditions) or unusually favorable meteorology would not qualify as an air quality improvement due to permanent and enforceable emission reductions." [49]

4.1 Sources of PM_{10}

Primary Copper Smelter, Concentrator, and Mine

The Phelps Dodge Corporation copper mining, concentrating and smelting facilities, collectively known as the Phelps Dodge "New Cornelia Branch," were the largest stationary sources in the Ajo nonattainment area.[50] Mining and refining of copper ores began in the early 1900s. Fugitive dust originating from tailings impoundments contributed the largest share of anthropogenic PM_{10} emissions in the nonattainment area.[51]

The Ajo mine ceased operation in 1984 and the smelter deactivated in April 1985. A resource reclamation and salvage program was initiated in January 1995 and completed in March 1996, effectively dismantling the smelter and copper ore concentrator structures at the facility.[52] ADEQ terminated the facility's permit in July 1996.[53]

The drying surfaces of tailings piles can become friable, easily crumbled or reduced to powder, thereby contributing to windblown particulate emissions. To minimize windblown emissions from the inactive tailings impoundments, Phelps Dodge engaged Terra Contracting to cover (or cap) more than 1900 acres of the tailings with 2-4" diameter crushed rock between May 1990 and October 1991. To prevent disturbance, access to roads and service areas around and on the tailings continues to be restricted (i.e., property is posted and fenced).

This source area is located directly across Ajo Well Road from the ambient PM_{10} monitor (*see* Figure 1).

[49] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.
[50] The Ajo property is now owned by Freeport McMoRan Copper & Gold Inc., the successor to Phelps Dodge Corporation.
[51] Tailings dams, or tailings impoundments, are earth-fill embankment dams used to store byproducts of mining operations after separating the mineral ore from other unused material. These areas are also sometimes referred to as tailings piles.
[52] More information on the closure of this facility can be found in *Final, Ajo Sulfur Dioxide Nonattainment Area, State Implementation and Maintenance Plan*, May 2002, and *Final, Arizona State Implementation Plan Revision, Maintenance Plan for the Ajo Sulfur Dioxide Planning Area (1971 NAAQS)*, February 2013.
[53] *See* letter from Nancy Wrona, ADEQ, to John Zamar, Phelps Dodge Corporation, New Cornelia Branch, July 9, 1996.

Minerals Research & Recovery

Minerals Research & Recovery Inc. was a slag reprocessing facility adjacent to the Ajo tailings piles. MRRI utilized byproducts of the copper smelting process (slag) to make products such as abrasives and grinding materials, roofing granules, and asphalt fillers.[54] The facility operated in the Ajo area since the 1980s and was permitted by the Pima County Department of Environmental Quality.

Sources of process emissions and fugitive dust at the Ajo facility included three main production areas; raw stockpile and waste storage areas, a primary crushing and screening plant, and a secondary crushing and screening plant. In addition, there was an access road to nearby highway 85 and haul roads to the stockpile areas. Although measures to control particulate emissions were implemented at the facility, including a dust control plan, a number of notices of violation and opportunity to correct were issued by the permitting authority during its period of operation (*see* Section 4.4.1).

The operating area of this facility was located approximately a half mile south of the ambient PM_{10} monitor (*see* Figure 1).

MRRI filed a notice of intent to terminate its air quality operating permit in October 2015.[55] Demolition of all facility structures was accomplished between July 1, 2015 and October 31, 2015. Pima County terminated the facility's permit in February 2016.[56]

To reduce future windblown fugitive emissions, mitigation measures were implemented including application of a slag dust cap on selected process areas.[57] Stabilization of the worksite was completed by the end of 2015. To prevent further disturbance, access to roads and service areas in the former process area are restricted (i.e., property is posted and fenced). No ambient exceedances have been recorded following completion of the stabilization project.

Other Sources

Additional emissions sources in the Ajo nonattainment area include paved and unpaved roads, construction, a landfill, and windblown dust from open areas. See Appendix A, *Ajo PM_{10} Emission Inventory Technical Support Document,* for more information on emissions sources in the Ajo area.

[54] The smelting of copper ore concentrates is a process designed, through the use of heat and introduction of silica fluxes, to separate copper from iron, sulfur, and other impurities in the ore. In the smelting furnace, much of the sulfur is eliminated as gaseous emissions. The introduced fluxes bind with the iron and impurities to help form two molten layers at the bottom of the furnace. The lighter, top layer is a slag comprised predominantly of iron oxides and silicon oxides. The mostly copper bottom layer is called matte. The slag is skimmed from the top of the matte for disposal at a slag dump. The cooled slag can later be processed into abrasives or used in the construction industry.

[55] *See Notice of Intent to Terminate Air Quality Operating Permit, Number 3783*, Minerals Research & Recovery Inc., October 29, 2015.

[56] *See* letter from Rupesh Patel, Pima County Department of Environmental Quality, to Michael Vick, Minerals Research & Recovery Inc., February 9, 2016.

[57] Physical stabilization of the area included application of a slag dust cap (coarse copper smelter slag material) at a minimum depth of six inches, watered to promote settling of any fine material.

4.2 Emissions Control Measures and Enforceability

4.2.1 Tailings and Slag Storage Area Rule Summary

Application of control measures at the Ajo tailings impoundment and slag processing/storage areas were completed in 1991 and 2015, respectively (*see* above). To meet redesignation requirements, however, individual emissions reduction measures should be converted into a legally enforceable vehicle and submitted to EPA for inclusion into the Arizona SIP. When approved by EPA the new area specific rule, Pima County Code *17.16.125. Inactive Mineral Tailings Impoundment and Slag Storage Area within the Ajo PM_{10} Planning Area*, will provide permanence and federal enforceability for those measures already implemented.[58]

Under this fugitive dust rule, owners or operators are subject to implement and maintain required PM_{10} control measures on applicable sources to meet visible emissions and stabilization requirements and ensure continued particulate matter emissions reductions in the Ajo PM_{10} planning area. The inactive tailings impoundment must be controlled to 20 percent opacity for fugitive emissions on the property. For both the tailings and slag areas owners or operators must also install and maintain signs and physical barriers such as fencing to prevent trespass and re-disturbance on the property.

4.2.2 Planned Rule Implementation Schedule

The Pima County Department of Environmental Quality posted a Notice of Proposed Rulemaking for public review and comment on October 26, 2018. The county rulemaking process is expected to be completed by the end of January 2019 with a rule effective date in February 2019. At that time ADEQ will adopt and submit the final rule to EPA for inclusion in the Arizona SIP. A copy of the proposed rule and other documentation are included in Appendix C.

4.2.3 Rule Enforceability

Regulations or control measures should meet EPA's criteria regarding the enforceability of SIPs and SIP revisions.[59]

4.2.3.1 Authority

Per A.R.S. 49-479(A), the Pima County Board of Supervisors has specific authority, subject to procedural requirements, to adopt and implement rules to control the atmospheric release of air contaminants originating within Pima County territorial limits. The County may adopt rules that are more stringent than ADEQ's as long as certain conditions are met such as the rule is necessary to address a peculiar local condition and there is credible evidence that the rule is either: (1) necessary to prevent significant threat to public health or the environment and the rule is technically and economically feasible, or (2) the rule is required under federal statute or regulation. ADEQ has no similar tailings rule, therefore the measure is more stringent than ADEQ's rules. This rule, however, is federally required per CAA section

[58] Various state and county rules that require PM_{10} emissions control are already in place in Pima County, however, not all are approved into the SIP or specifically address Ajo area sources in a manner required for redesignation.
[59] *See Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency*, Potter, J. C., Adams, T. L., Blake, F. S., Memorandum, U.S. EPA, September 23, 1987, and *Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency*, Alushin, M. S., Eckert, A. W., Seitz, J. S., Memorandum, U.S. EPA, September 23, 1987.

107(d)(3)(E)(iii), insofar as to ensure that ADEQ is able to submit a SIP on behalf of Pima County for the Ajo moderate PM_{10} nonattainment area, and that there are federally enforceable rules in place to control PM emissions for a significant source of fugitive dust.

Per A.R.S. § 49-473, the Board of Supervisors additionally has authority to authorize Pima County to carry out the necessary investigations, inspections, and enforcement of any rules adopted pursuant to prevailing statutory authority. Such authority includes those defining violations and processes for violation consequences, such as A.R.S. §§ 49-502, 510, 511, 513, and 514.

4.2.3.2 Rule Applicability

The rule applies to the owners or operators of the inactive mineral tailings impoundments and slag storage area to reduce fugitive dust emissions from such sources located within the Ajo PM_{10} planning area and activities upon such sources.

4.2.3.3 Exemptions or Additional Requirements

The 20 percent opacity standard does not apply during verified high wind events provided that the owner or operator has implemented and maintained prescribed control measures for the mineral tailings impoundment. High wind event is defined as an hourly average wind speed of 25 miles per hour or more or an instantaneous wind gust of 40 miles per hour or more as measured in the affected area by a listed meteorological monitoring station.

4.2.3.4 Alternative Practices

Alternative measures that are adequate to address applicable emissions control requirements in Pima County Code 17.16.125(C)(1)(e) and (C)(2)(b) must be approved by PDEQ and EPA Region IX.

4.2.3.5 Notice

The definitions and rule requirements are sufficiently clear so as to put the regulated community on notice. The applicability of the rule is limited to relatively few sources and ADEQ and Pima County have worked closely with industry representatives to ensure the rule is understandable and clear so that the regulated can comply with it.

4.2.3.6 Compliance Schedule

Per Pima County practice, the provisions of the rule shall take effect 31 days after adoption by the Pima County Board of Supervisors. The rule is expected to be considered for approval by the Board of Supervisors in January 2019 with an effective date in February 2019. From that point on, the regulated community must comply with the rule.

4.2.3.7 Records

Any person subject to the rule shall compile and retain records that provide evidence of: control measure application; visible emission observations; inspections; EPA Reference Method 9 or ASTM D7520-16 certifications; installation, calibration, certification, operation, and maintenance of any meteorological equipment or meteorological monitoring station data used for purposes of identifying high wind events.

The following records related to Digital Camera Opacity Technique shall also be maintained: ASTM D7520-16 certification documentation, data sheets, and all raw unaltered JPEGs used for opacity and certification determination, recorded in a form suitable and readily available for expeditious inspection and review;

and Standard operating procedures used to ensure that equipment is operated and maintained in accordance with manufacturer's specifications per Section 8.1 of ASTM D7520-16.

All records required by the rule are required to be maintained by the owner or operator for a minimum of 5 years.

4.2.3.8 Test Methods and Compliance

Compliance is determined by inspection and records review. Failure by any person to comply with the requirements of the rule is a violation and such person is subject to Pima County's authority to enforce, as listed above. In addition to recording compliance with rule provision, the owner or operator is also required to report within 24 hours any visible emissions in excess of the opacity limit established by the rule. It is up to the owners/operators within the Ajo nonattainment area to demonstrate compliance with this rule.

As a practical matter, continued maintenance of stabilization measures in the Ajo PM_{10} planning area is demonstrated through the required visible emission observations (EPA Reference Method 9 or ASTM D7520-16) to ensure opacity remains below 20% and access restriction to prevent re-disturbance of the area.

4.3 Emissions Reductions from Tailings and Slag Storage Area Rule

Emissions in the Ajo area have generally decreased over the past 25 years due mainly to the closure of significant stationary sources. The Ajo New Cornelia mine and smelter ceased operation in the mid-1980s. Capping of the tailings impoundments in 1991 led to a 90 percent reduction of windblown emissions from this source, which has continued through to the present day (*see* Table 4-1).

Table 4-1 Tailings Impoundment Emissions

Total Tailings Impoundment Emissions (tons per year)*							
Pre-Cap	**1992**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
112.00	11.00	15.12	15.34	17.44	6.10	6.97	7.76

* Emissions estimates are based on windblown emissions.

In addition to the capping of the tailings impoundments, the closure and stabilization of the slag reprocessing facility (MRRI) in 2014/2015 provided additional emissions reductions in the area (*see* Table 4-2).

Table 4-2 Slag Area Emissions

Total Slag Processing/Storage Area Emissions (tons per year)						
Emissions Type	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Activity-Based*	51.45	51.45	51.45	51.45	0	0
Windblown	5.45	5.53	6.29	2.20	2.51	0.20
Total	**56.90**	**56.98**	**57.74**	**53.65**	**2.51**	**0.20**

* Activity-based emissions are based on the permitted potential to emit (PTE) including fugitive emissions. Historically, actual operational emissions averaged approximately 18 tons per year (based on 2005-2007 data).

Overall, closure and capping of the Ajo tailings impoundments and the slag reprocessing area provided potential emissions reductions of more than 160 tons per year (tpy) and actual emissions reductions of approximately 127 tpy.[60] See the technical support documentation in Appendix A, Section A6, for more information on these sources.

4.4 Improvement in Air Quality

4.4.1 Long Term Trends

The following timeline provides a list of selected events related to (previously) permitted source operations in the Ajo area (tailings impoundments and slag reprocessing facility). Documentation of permit noncompliance, anecdotal reports of excess emissions from the community, facility closures, and stabilization projects provide insight into source emissions changes that likely impacted ambient air quality over the last several decades.

- **1984**
  - Ajo copper mine ended operations.
- **1986-1991**
  - Four Notice of Violations (**NOV**) issued for MRRI permit violations related to dust emissions.

[60] Actual emissions reductions are estimated as follows. Reduction in windblown emissions from the tailings impoundments is calculated as the difference between pre-1991 emissions (pre-capping) of 112 tpy and emissions for 2016 of 7.76 tpy (112 – 7.76 = 104.24 tpy reduction). Emissions reduction estimates for the slag area assumes average windblown emissions of 4.87 tpy (based on 2011-2014 data) and average activity based emissions of 18 tpy (based on available 2005-2007 data). Reduction in windblown and activity-based emissions from the slag area is based on the difference between pre-2015 emissions (pre-capping) of 22.87 tpy (4.87+18) and estimated emissions for 2016 of 0.20 tpy (22.87 – 0.20 = 22.67 tpy reduction). Emissions reductions for both sources are estimated at 126.91 tpy. *See also* Appendix A, Section A6.

- **1991**
  - 1900 acres of mine tailings impoundments capped with crushed rock (May 1990 – October 1991).
- **1999**
  - **NOV** (11/10/1999) resulting in consent decree/settlement agreement for MRRI baghouse/emissions violations. MRRI paid a penalty of $5,500 for the violations.
- **2000**
  - Public meeting (4/6/2000) hosted by Western Pima County Community Council. Discussion topics included Ajo air quality, particulate emissions, and MRRI permit compliance.
- **2000**
  - **NOV** (5/30/2000) resulting in consent decree/settlement agreement for MRRI excessive particle/dust emissions from multiple emissions units at facility. MRRI paid a penalty of $12,000 and an additional $13,819.59 in Supplemental Environmental Project (SEP) for the violations.
- **2005**
  - Ajo residents meet with MRRI (August 2005) to express concerns about dust emissions.
- **2005**
  - Opportunity to Correct (**OTC**) issued to MRRI (10/7/2005) for failure to apply dust mitigation measures.
- **2008**
  - **OTC** issued to MRRI (7/21/2008) for failure to inspect operations for fugitive emissions.
- **2010**
  - **OTC** issued to MRRI (August 2010) for failure to notify permitting authority of contracting third party to perform primary crushing and screening operations.
- **2010**
  - MRRI reportedly takes "Rainbird" sprinkler system (used to control dust) offline at waste stockpile haul road and raw stockpile areas (12/2/2010) resulting in potential changes to fugitive dust emissions which are subject to monitoring, recordkeeping, and reporting permit requirements.
- **2011**
  - Four exceedances of the PM_{10} NAAQS recorded at the Ajo ambient monitor (6/29/2011, 8/18/2011, 8/26/2011, and 8/27/2011).

- **2012**
  - Water tanks, booster pump, and pressure gauge reportedly taken offline at MRRI facility (7/10/2012) due to inoperability of "Rainbird" sprinkler system and location of material pile left by contracted primary crushing and screening operations.
- **2013**
  - Excessive dust complaints regarding MRRI operations received at Ajo public hearing (2/7/2013). One commenter reported "very fine," black dust kicked up by the wind impacting parts of the community.
- **2013**
  - Permitting authority responded (February 2013) to complaint of excessive dust from MRRI.
- **2013**
  - One exceedance of the PM_{10} NAAQS recorded at the Ajo ambient monitor (4/8/2013).
- **2013**
  - Dust complaint filed with permitting authority regarding MRRI (6/26/2013).
- **2013**
  - **OTC** issued to MRRI (8/19/2013) following full compliance evaluation and response to dust complaint.
    - Failure to utilize a "Rainbird" type water system to control dust on the waste stockpile haul road and raw stockpile area. Facility indicated it utilized a water truck and hoses as a replacement system.
    - Failure to apply for and receive a minor permit revision for discontinuation of "Rainbird" water distribution system.
    - Some times on Air Quality Checklist documentation not completed for "Applied water to all areas to adequately prevent or minimize visible emissions" for several days prior to (6/26/2013) dust complaint.
- **2014**
  - MRRI dust complaint received with accompanying photographs and video (2/19/2014).
- **2014**
  - **NOV** issued to MRRI (3/25/2014) following complaint investigation.
    - Failure to take reasonable precautions to control the generation of airborne particulate matter in the secondary crushing and screening plant area resulting in significant amounts of airborne dust and the diffusion of visible emissions beyond the property boundary line (allowed operations during repair of baghouse blower system).

- Failure to take reasonably necessary precautions to control the generation of airborne particulate matter from a fugitive source south of the secondary plant resulting in significant amounts of airborne dust and the diffusion of visible emissions beyond the property boundary line.
- Failure to maintain the previous water distribution system, including three 20,000 gallon tanks and failure to maintain the previous watering capacity (water truck and sprinkler capacity) to enable applications of adequate amounts of water to control windblown dust, from haul roads, earthmoving, and other activities or to stabilize storage piles and roadways to minimize visible emissions during high wind conditions.

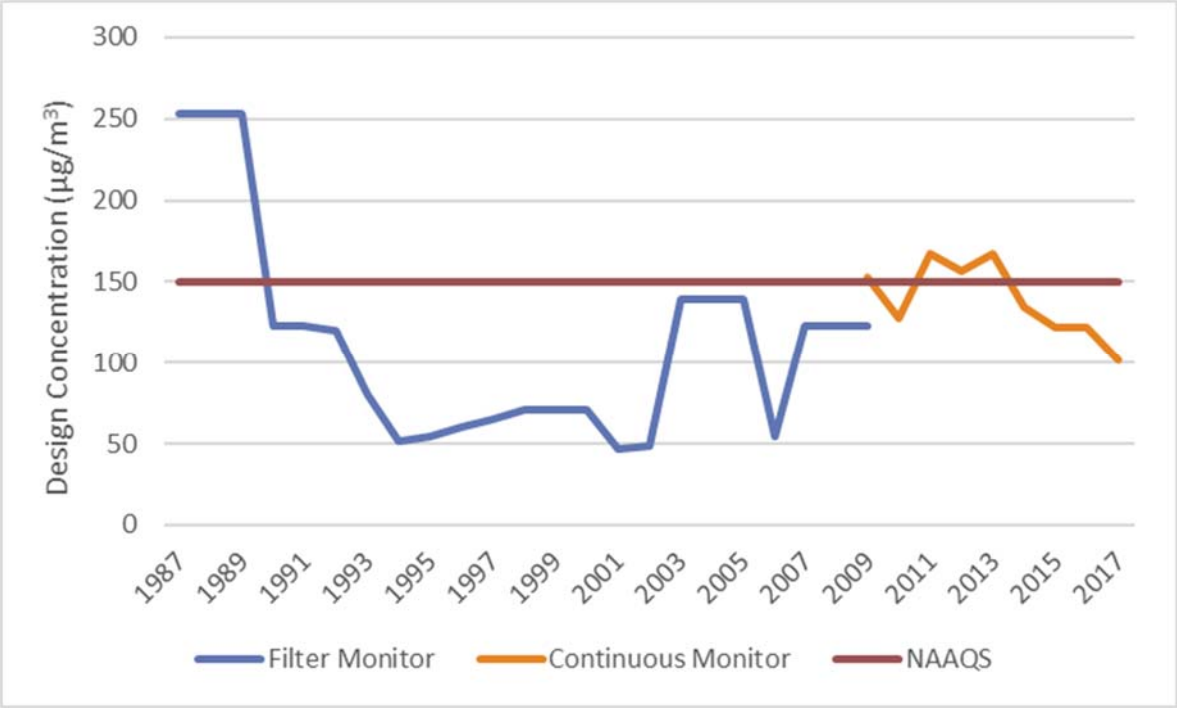
- **2015**
  - Demolition of all MRRI facility structures completed (7/1/2015 – 10/31/2015). Stabilization of worksite completed (December 2015).
- **2016**
  - Permit termination letter issued to MRRI (2/9/2016).

Figure 4-1 below presents Ajo area design concentrations from 1987 through 2017.[61] A comparison of events in the timeline above with the design concentrations in Figure 4-1 shows that installation of the cap on the Ajo mine tailings impoundments in 1990/1991 coincides with an approximately 50 percent decrease in ambient PM_{10} design concentrations. Concentrations remained below the NAAQS from 1990 through 2010. Discontinuation of the "Rainbird" sprinkler system used to control dust emissions from the waste stockpile haul road and raw stockpile areas at the MRRI slag reprocessing facility in December 2010 preceded four exceedances of the PM_{10} NAAQS at the Ajo ambient monitor in 2011 and an increase in design concentration values (Figure 4-1).

A March 2014 NOV found that MRRI failed to maintain its water distribution system and watering capacity to enable applications of adequate amounts of water to control windblown dust during high wind conditions. Ongoing compliance challenges at MRRI and documented dust complaints from the community indicate that emissions from this facility likely impacted air quality in the Ajo area.

[61] The design concentration is an estimated value for a particular monitoring or receptor site that is used to determine the adequacy of an area's control strategy. The design concentration value takes into account the *form* of the PM_{10} NAAQS (e.g., not to be exceeded more than once per year on average) but is compared to the *level* of the NAAQS to determine adequacy. Values at or below 150 µg/m^3 are needed to assure attainment. *See PM_{10} SIP Development Guideline*, U.S. EPA, June 1987 (Publication No. EPA-450/2-86-001), Chapter 6, for information on determining design concentrations. A design value, which differs from the design concentration, is a statistic that describes the air quality status of a given monitoring location relative to the *form* of the NAAQS and determines whether the area is attaining the NAAQS (*see* Sections 1.4 and 2.2).

Figure 4-1 Historic Design Concentrations[62]



4.4.2 Recent Improvements in Air Quality

No ambient exceedances or violations of the 24-hour PM_{10} standard have occurred in the Ajo area since the closure and stabilization of the MRRI work area in 2014/2015 (*see also* Figure 2-1). Additionally, daily and monthly average concentrations have been declining over the past several years. These recent trends are illustrated in Figures 4-2 and 4-3 below. See Appendix A, Section A4, for more information on ambient PM_{10} trends.

[62] *See also Appendix A, Ajo PM_{10} Emission Inventory Technical Support Document,* Section A6.

***Figure 4-2** Daily Average PM_{10} Concentrations – 2011-2017*

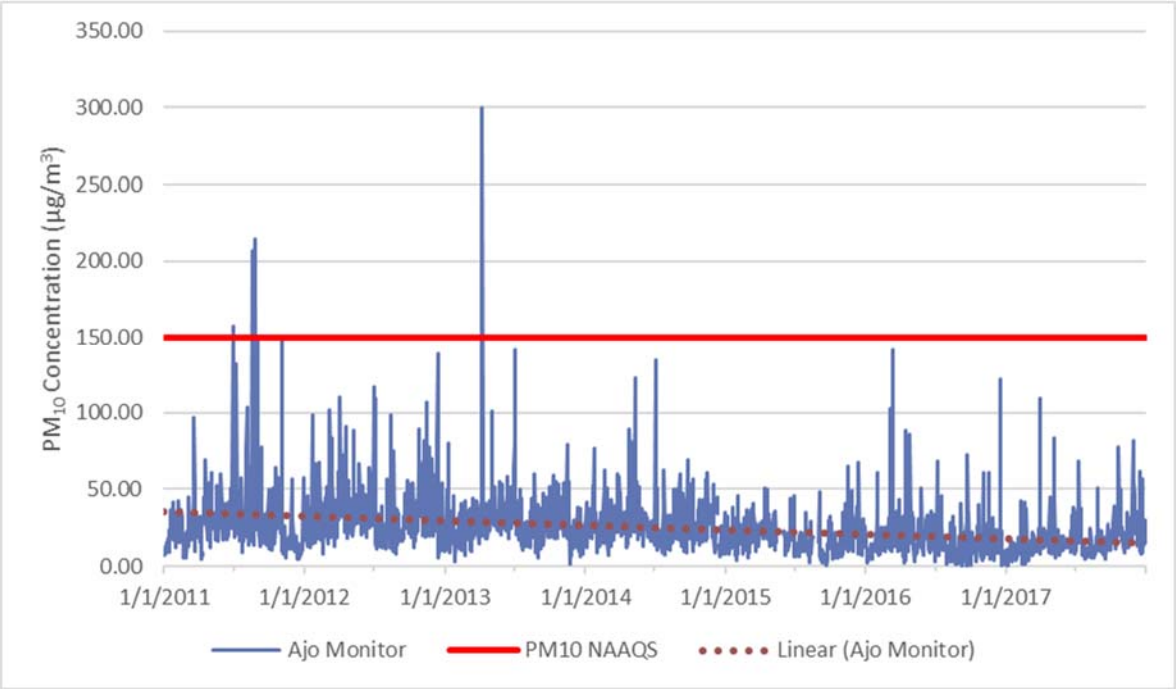
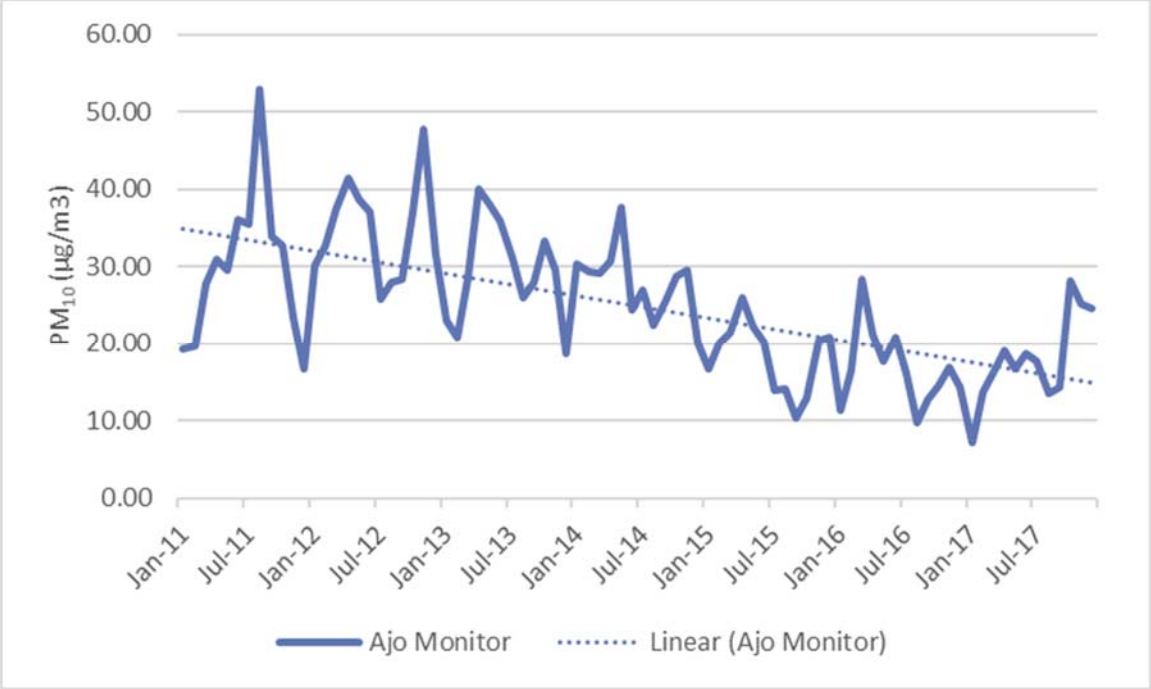


***Figure 4-3** Monthly Average PM_{10} Concentrations – 2011-2017*



5 Section 110 and Part D Requirements – CAA § 107(d)(3)(E)(v)

"For the purposes of redesignation, a State must meet all requirements of section 110 and Part D that were applicable prior to submittal of the complete redesignation request." [63]

5.1 CAA Section 110 – Implementation Plans

Infrastructure SIP

Clean Air Act Section 110(a)(1) requires states to submit SIPs within three years following the promulgation of new or revised NAAQS to provide for implementation, maintenance, and enforcement of such standards. Each of these SIPs must address certain basic elements or the "infrastructure" of its air quality management programs under CAA Section 110(a)(2)(A) through (M). These elements include, but are not limited to, provisions for establishment and operation of ambient monitoring, public and local agency participation in air quality planning, and operation of permitting programs. The provisions of Section 110(a)(2) are primarily general program requirements applicable to all areas of the state.[64] The timing of SIP submittals for control measures, attainment demonstrations, and other air quality planning obligations specific to nonattainment areas are subject to the provisions of CAA, Title I, Part D – "Plan Requirements for Nonattainment Areas" (*see* Section 5.2 below).

According to EPA policy, only those Section 110 elements that are linked with a particular nonattainment area's designation and classification are applicable requirements for purposes of redesignation. As an example, "CAA section 110(a)(2)(D) requires that SIPs contain certain measures to prevent sources in a state from significantly contributing to air quality problems in another state. However, the section 110(a)(2)(D) requirements for a state are not linked with a particular nonattainment area's designation and classification in that state."[65] As such, the "interstate transport" of emissions requirement is not a relevant measure to evaluate in a redesignation request.

On June 30, 2017, Arizona submitted a SIP revision to demonstrate that state and local air quality management programs meet the basic program elements required under CAA sections 110(a)(1) and (2) for implementing the 24-hour PM_{10} NAAQS. The plan is under review and awaiting action by EPA.

Nonattainment New Source Review/Prevention of Significant Deterioration

The June 30, 2017, submission included a description of state and local source permitting programs. Clean Air Act 110(a)(2)(C) requires provisions for the implementation of both Part C Prevention of Significant Deterioration (PSD) in attainment (and maintenance) areas and Part D nonattainment New Source Review (NNSR) in nonattainment areas.[66]

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[63] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.
[64] The requirements of CAA 110(a)(2) apply to attainment, nonattainment, and unclassifiable areas.
[65] *See* 73 FR 22312, April 25, 2008.
[66] The term New Source Review or NSR is sometime used to refer to both the nonattainment NSR and PSD permitting programs.

Arizona Revised Statutes Title 49, Chapter 3, Articles 1, 2, and 3 establish ADEQ and local agency authority for preconstruction review and permitting.[67] Under the air permits program, sources that emit regulated pollutants are required to obtain a permit before constructing, changing, replacing, or operating any equipment or process which may cause air pollution. This includes equipment designed to reduce air pollution. Permits are also required if an existing facility that causes air pollution transfers ownership, relocates, or otherwise changes operations.

Per the authority noted above, new sources and modifications to existing sources in Arizona are subject to state requirements for preconstruction review and permitting under Arizona Administrative Code (AAC), Title 18, Chapter 2, Articles 2, 3, 4, and 5 or relevant county rules. All new major sources and major modifications to existing major sources in Arizona are also subject to the nonattainment NSR provisions of these rules or PSD for attainment areas. Sources under Pima County jurisdiction are subject to the permitting program in Title 17 of the Pima County Code.

ADEQ submitted a revision to the SIP on October 29, 2012, to update its program to comply with all current federal NSR requirements, including NSR reform, with the exception of requirements pertaining to greenhouse gases (GHGs). ADEQ is currently administering the NSR requirements for GHGs under a delegation agreement with EPA. On November 2, 2015, EPA published a limited approval/limited disapproval (LA/LD) of the revised program.[68] To correct deficiencies identified by EPA in the LA/LD, ADEQ submitted revisions to its NSR program on April 28, 2017. On June 1, 2017, EPA proposed to approve the 2017 revisions to ADEQ's NSR program.[69] In the proposed action, EPA found that the 2017 submittal corrects a substantial portion of the deficiencies identified by EPA in the November 2, 2015, LA/LD. Final approval of the 2017 SIP revision was published on May 4, 2018.[70] In its final action EPA clarified that ADEQ has an approved PSD program, except for GHGs, under sections 160 through 165 of the CAA. ADEQ is currently working to address remaining issues related to its nonattainment NSR program. [71]

Pima County has a SIP-approved nonattainment NSR program and EPA delegation to administer the federal PSD program under 40 CFR 52.21.[72]

According to EPA policy, the lack of a fully approved Part D nonattainment NSR program may not necessarily prevent an area from being redesignated to attainment. In its proposed action to redesignate the San Joaquin Valley Air Basin (SJVAB) PM_{10} nonattainment area to attainment, EPA states that "a NSR program does not have to be approved prior to redesignation, provided that the area demonstrates maintenance of the standard without part D NSR in effect."[73] Further, "the requirements of the PSD program will apply once the area has been redesignated." EPA goes on to explain that, similar to Pima County, "EPA is the PSD permitting authority in the SJVAB under a Federal implementation plan."[74]

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[67] The division of jurisdiction between ADEQ and county air pollution control agencies in Arizona is governed by A.R.S. § 49-402(A) and (B). For more information regarding ADEQ and PDEQ jurisdiction for the nonattainment NSR and PSD programs see ADEQ's *State Implementation Plan Revision, New Source Review, Supplemental Information, July 2014* (submitted to EPA on July 2, 2014).
[68] *See* 80 FR 67319, November 2, 2015.
[69] *See* 82 FR 25213, June 1, 2017.
[70] *See* 83 FR 19631, May 4, 2018.
[71] *See* 81 FR 40525, June 22, 2016, and 83 FR 1212, January 10, 2018.
[72] *See* letter regarding "Status of NSR Authority in Maricopa and Pima Counties" from Ken Bigos, EPA Region IX, to Nancy Wrona, ADEQ, August 11, 1994.
[73] *See* 73 FR 22313, April 25, 2008. *See also* 61 FR 20469-20470, May 7, 1996, for additional discussion regarding redesignation in the absence of a fully approved Part D NSR program.
[74] *Ibid*.

"However, the SJVAPCD [San Joaquin Valley Air Pollution Control District] can implement the Federal PSD program through a delegation agreement with EPA or, assuming that the SJVAPCD makes necessary modifications to its PSD rules, under an EPA approved rule."[75]

The Ajo area demonstrates maintenance of the PM_{10} standards without relying on the nonattainment NSR program. Additionally, ADEQ implements an approved PSD program (and administers the federal GHG program) and Pima County administers the federal PSD program. As such, state and county implementation of approved or delegated PSD programs should not preclude redesignation of the Ajo area to attainment.

5.2 CAA Part D – Plan Requirements for Nonattainment Areas

5.2.1 Subpart 1 – Nonattainment Areas in General

Sections 5.2.1.1 through 5.2.1.10 outline general CAA requirements for nonattainment areas and the State's demonstrations to meet those requirements.

5.2.1.1 § 172(c)(1) – In General

"Such plan provisions shall provide for the implementation of all reasonably available control measures [RACM] 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 [RACT]) and shall provide for attainment of the national primary ambient air quality standards."

EPA determined that the area has attained the 24-hour PM_{10} NAAQS and suspended the requirements of this section (71 FR 6352, February 8, 2006).

5.2.1.2 § 172(c)(2) – RFP [Reasonable Further Progress]

"Such plan provisions shall require reasonable further progress" defined in CAA section 171(1) as "… annual incremental reductions in emissions … for the purpose of ensuring attainment of the applicable national ambient air quality standards by the applicable date."

EPA determined that the area has attained the 24-hour PM_{10} NAAQS and suspended the requirements of this section (71 FR 6352, February 8, 2006).

5.2.1.3 § 172(c)(3) – Inventory [Emissions]

"Such plan provisions shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met."

Emissions inventories and other documentation were submitted in the 1991 Ajo nonattainment area plan. The current SIP revision contains updated base-year inventories, including windblown emissions, for 2014 (most recent completed version of the National Emissions Inventory) and 2016 (most recent attainment

[75] *Ibid*.

inventory). The maintenance plan also includes projected emissions for 2021 (first year of maintenance period), 2026 (interim maintenance year), and 2031 (end of first maintenance period).

5.2.1.4 § 172(c)(4) – Identification and Quantification

"Such plan provisions shall expressly identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in accordance with Section 173(a)(1)(B), from the construction and operation of major new or modified stationary sources in each such area. The plan shall demonstrate to the satisfaction of the Administrator that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard by the applicable attainment date."

The permit program requirements of CAA Section 173(a)(1)(B) are applicable to sources located in a "targeted economic development zone" as determined by the Administrator under consultation with the Secretary of Housing and Urban Development. No such zones are currently known to exist within the Ajo PM_{10} planning area.

5.2.1.5 § 172(c)(5) – Permits for New and Modified Major Stationary Sources

"Such plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with section 173."

The ADEQ and PDEQ nonattainment NSR permitting programs are described in Section 5.1.

5.2.1.6 § 172(c)(6) – Other Measures

"Such plan provisions shall include enforceable emissions limitations, and such other control measures, means or techniques …, as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part."

Permanent and enforceable controls adopted and implemented in the Ajo PM_{10} planning area are described in Chapter 4 of this document.

5.2.1.7 § 172(c)(7) – Compliance with Section 110(a)(2)

"Such plan provisions shall also meet the applicable provisions of Section 110(a)(2)."

The requirements of CAA Section 110(a)(2) and the state's demonstration to meet those requirements are described in Section 5.1 of this plan.

5.2.1.8 § 172(c)(8) – Equivalent Techniques

"Upon application by any State, the Administrator may allow the use of equivalent modeling, emission inventory, and planning procedures, unless the Administrator determines that the proposed techniques are, in the aggregate, less effective than the methods specified by the Administrator."

Demonstrations to meet the requirements of Part D, Subpart 1, were submitted in the 1991 nonattainment area plan.[76] Nonattainment plan requirements and demonstrations to meet those requirements, however, are subsumed by the current SIP revision. ADEQ's intended emissions inventory

[76] *See Final State Implementation Plan for the Ajo PM_{10} Nonattainment Area*, November 1991.

methodologies (Inventory Preparation Plan) and technical approach (Technical Protocol) for this maintenance plan and redesignation request were submitted to and reviewed by EPA.

5.2.1.9 § 172(c)(9) – Contingency Measures

"Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator."

EPA determined that the area has attained the 24-hour PM_{10} NAAQS and suspended the requirements of this section (71 FR 6352, February 8, 2006).

5.2.1.10 § 176(c) – Transportation and General Conformity

Conformity requirements under CAA section 176(c) require states to establish criteria and procedures to ensure that federally supported projects "conform" to the air quality planning goals in the federally approved or applicable SIP. The requirement for a state "to determine conformity applies to transportation plans, programs and projects developed, funded or approved under Title 23 U.S.C. and the Federal Transit Act ("transportation conformity") as well as to other federally supported or funded projects ("general conformity")."[77] State conformity SIP revisions are required to be consistent with federal regulations regarding consultation, enforcement and enforceability.

According to EPA policy, conformity SIP requirements are not applicable for purposes of redesignation requests under CAA section 107(d) "because state conformity rules are still required after redesignation and federal conformity rules apply where state rules have not been approved."[78]

Arizona is currently revising its procedural and consultation requirements for transportation conformity under Arizona Administrative Code (A.A.C.), Title 18, Chapter 2, Article 14. Criteria for making determinations and other provisions for general conformity are located in the SIP approved rule A.A.C. R18-2-1438.[79]

5.2.2 Subpart 4 – Additional Provisions for Particulate Matter Nonattainment Areas

Sections 5.2.2.1 through 5.2.2.7 outline additional Part D requirements specific to PM_{10} nonattainment areas classified as moderate and the State's demonstrations to meet those requirements.

5.2.2.1 Section 188. Classifications and Attainment Dates

"Every area designated nonattainment for PM–10 pursuant to section 107(d) shall be classified at the time of such designation, by operation of law, as a moderate PM–10 nonattainment area (also referred to in this subpart as a ''Moderate Area'') at the time of such designation."

"For a Moderate Area, the attainment date shall be as expeditiously as practicable but no later than the end of the sixth calendar year after the area's designation as nonattainment, except that, for areas

[77] *See* 73 FR 22313, April 25, 2008.
[78] *Ibid*.
[79] *See* 64 FR 19916, April 23, 1999 for EPA approval of A.A.C. R18-2-1438 into the Arizona SIP.

designated nonattainment for PM–10 under section 107(d)(4), the attainment date shall not extend beyond December 31, 1994."

Following the CAA amendments of 1990, the Ajo area was designated nonattainment for PM_{10} by operation of law and classified as "moderate" under CAA, Title I, Part D.

EPA determined that the area had attained the NAAQS on February 8, 2006. See Section 1.5, *Regulatory Background*, and Chapter 2, *Attainment of the Standard*, for more information on designations and attainment in the Ajo area.

5.2.2.2 § 189(a)(1)(A) – Moderate Areas; Plan Provisions [Permit Program]

"For the purpose of meeting the requirements of section 172(c)(5), a permit program providing that permits meeting the requirements of section 173 are required for the construction and operation of new and modified major stationary sources of PM–10."

The State and Pima County permitting programs for nonattainment areas are described in Section 5.1.

5.2.2.3 § 189(a)(1)(B) –Moderate Areas; Plan Provisions [Attainment Demonstration]

"Either: (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable."

EPA determined that the area has attained the 24-hour PM_{10} NAAQS and suspended the requirements of this section (71 FR 6352, February 8, 2006).

5.2.2.4 § 189(a)(1)(C) – Moderate Areas; Plan Provisions [RACM]

"Provisions to assure that reasonably available control measures for the control of PM–10 shall be implemented no later than December 10, 1993, or 4 years after designation in the case of an area classified as moderate after the date of the enactment of the Clean Air Act Amendments of 1990 [November 15, 1990]."

EPA determined that the area has attained the 24-hour PM_{10} NAAQS and suspended the requirements of this section (71 FR 6352, February 8, 2006).

5.2.2.5 § 189(a)(2)(B) – Moderate Areas; Schedule for Plan Submissions

"A State shall submit the plan required under subparagraph (1) no later than the following:"

"18 months after the designation as nonattainment, for those areas designated nonattainment after the designations prescribed under section 107(d)(4)."

Under section 189(a)(2) of the 1990 CAA amendments, the state was required to submit a SIP revision for the Ajo nonattainment area by November 15, 1991. Arizona submitted *Final State Implementation Plan for the Ajo PM_{10} Nonattainment Area* on November 15, 1991. See also Section 1.5, *Regulatory Background*.

5.2.2.6 § 189(c) – Milestones

"Plan revisions demonstrating attainment submitted to the Administrator for approval under this subpart shall contain quantitative milestones which are to be achieved every 3 years until the area is

redesignated attainment and which demonstrate reasonable further progress, as defined in section 171(1), toward attainment by the applicable date."

EPA determined that the area has attained the 24-hour PM_{10} NAAQS and suspended the requirements of this section (71 FR 6352, February 8, 2006).

5.2.2.7 § 189(e) – PM-10 Precursors

"The control requirements applicable under plans in effect under this part for major stationary sources of PM–10 shall also apply to major stationary sources of PM–10 precursors, except where the Administrator determines that such sources do not contribute significantly to PM–10 levels which exceed the standard in the area. The Administrator shall issue guidelines regarding the application of the preceding sentence."

No major permitted sources are currently operating within the Ajo PM_{10} planning area.

6 Maintenance Plan – CAA § 107(d)(3)(E)(iv)

Redesignation requirements in CAA section 107 require states to develop a maintenance plan under CAA 175A to assure continued attainment after redesignation. The September 4, 1992, EPA Memorandum, *Procedures for Processing Requests to Redesignate Areas to Attainment* (1992 Guidance), recommends several core provisions to consider when developing maintenance plans. Those elements and ADEQ's demonstrations to meet those provisions are outlined in Sections 6.1 through 6.5 below.

6.1 Attainment Emissions Inventory

"The State should develop an attainment emissions inventory to identify the level of emissions in the area which is sufficient to attain the NAAQS. This inventory, … should include the emissions during the time period associated with the monitoring data showing attainment." "Where the State has made an adequate demonstration that air quality has improved as a result of the SIP … the attainment inventory will generally be the actual inventory at the time the area attained the standard."[80]

This SIP revision includes comprehensive base-year inventories for primary emissions of PM_{10}, including activity based and windblown emissions.[81] Base inventories are provided in Appendix A, *Ajo PM_{10} Emissions Inventory Technical Support Document*, for the following periods.

- 2011 represents the nonattainment inventory (the last year with multiple recorded exceedances of the PM_{10} NAAQS)
- 2014 is the most recent completed version of the National Emissions Inventory
- 2016 represents the attainment inventory (area monitor shows attainment of the NAAQS)[82]

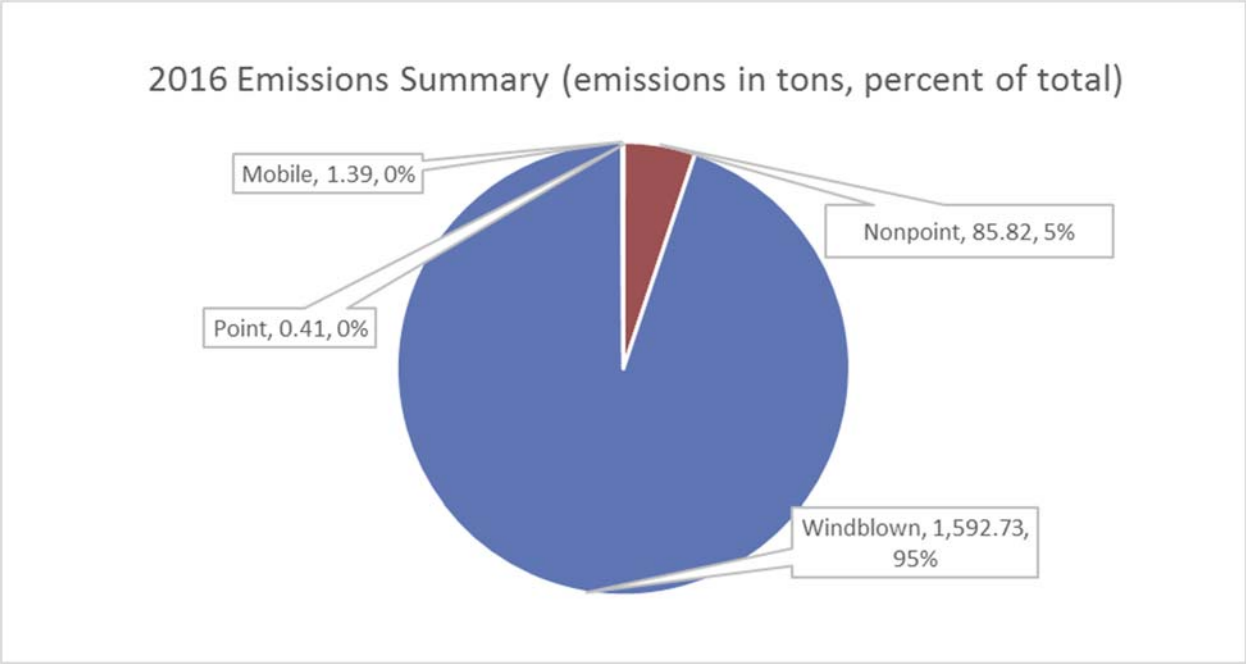
Figure 6-1 presents a summary of the 2016 attainment inventory.

[80] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.

[81] ADEQ did not include estimates of PM_{10} precursor compounds in the emission inventory for the Ajo area. No major sources of sulfur dioxide (SO_2), oxides of nitrogen (NOx), volatile organic compounds (VOCs), or ammonia are located in the area and other sources of these emissions are not expected to be significant contributors to elevated levels of PM_{10}. *See* Appendix A, Section A5.1, for analyses of precursor emissions.

[82] Although the Ajo area did not record any exceedances or violate the 24-hour standard in 2014, year 2016 was selected as the "attainment inventory" because it is from the most recent 3-year period, 2015-2017, showing compliance with the PM_{10} NAAQS. *See also* Section 2.3, *24-Hour PM_{10} NAAQS compliance*.

Figure 6-1 Attainment Emissions Inventory



The largest emissions category in the planning area is "windblown" at 95 percent of total emissions. The majority of windblown emissions emanate from "open areas and vacant land" (diffuse, widespread, and non-localized emissions sources) and "inactive properties" owned by Freeport McMoRan Inc. (i.e., closed smelting, mining, and tailings facility). These land use categories are comprised primarily of undisturbed native desert and mountainous terrain, and currently stabilized areas.[83] The second largest emissions category is nonpoint. Table 6-1 includes emissions estimates for 2011 and base years 2014 and 2016. Table 6-2 presents emissions estimates by source sector for these years.

Table 6-1 Emissions Estimates by Source Category (tons per year)

Source Category[84]	2011	2014	2016
Point*	51.86	51.86	0.41
Nonpoint**	101.24	85.33	85.82
Windblown	1,592.73	1,592.73	1,592.73
Mobile	1.53	1.38	1.39
Total	**1,747.35**	**1,731.29**	**1,680.35**

* Includes activity based emissions only. Windblown emissions from point sources is included in the windblown category.
** Re-entrained dust from paved and unpaved roads is included in the emissions estimates for nonpoint sources.

[83] *See* Appendix A, Sections A5 and A5.3.1.2 for description of land use categories, their associated disturbed/undisturbed proportions, and other information on the development of the windblown emissions inventories.
[84] For the purposes of this document, a point source is defined as a large, stationary (non-mobile), identifiable source of emissions. This definition includes major and minor permitted sources by state and local agencies, as well as other non-permitted sources such as airports, EGUs, and landfills. All fugitive (excluding windblown) and non-fugitive emissions attributable to a point source, as defined above, are included as that point source's inventory.

Table 6-2 ***Emissions Estimates by Source Sector (tons per year)***

Source	2011	2014	2016
Point Sources	51.86	51.86	0.41
Agriculture - Crops & Livestock Dust	0.16	0.11	0.11
Commercial Cooking	0.95	0.98	0.98
Dust - Construction Dust	63.83	42.80	43.05
Dust - Paved Road Dust	6.95	4.58	4.60
Dust - Unpaved Road Dust	24.89	28.20	28.37
Dust - Windblown	1,592.73	1,592.73	1,592.73
Fires - all	0.40	0.00	0.00
Fuel Combustion - all	3.68	3.71	3.73
Industrial Processes - all	0.38	0.58	0.58
Miscellaneous Non-Industrial NEC	0.00	0.17	0.17
Mobile - Aircraft	0.00	0.00	0.00
Mobile - Locomotives	0.00	0.00	0.00
Mobile - Non-Road Equipment - all	1.23	1.09	1.09
Mobile - On-Road - all	0.30	0.29	0.30
Solvent - Industrial Surface Coating & Solvent Use	0.00	0.00	0.00
Waste Disposal	0.00	4.20	4.22
Total	**1,747.35**	**1,731.29**	**1,680.35**

6.2 Maintenance Demonstration

"A State may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS." "In both instances, the demonstration should be for a period of 10 years following the redesignation."

"The projected inventory should consider future growth, including population and industry, should be consistent with the attainment inventory, and should document data inputs and assumptions." "Any assumptions concerning emission rates must reflect permanent, enforceable measures."[85]

This SIP revision demonstrates maintenance of the NAAQS by demonstrating that future emissions will remain near attainment period levels. Projections of base year inventories for all point, nonpoint, and mobile sources in the nonattainment area are included in Figure 6-2. Table 6-3 shows estimated emissions totals by source category. In addition to 2011, 2014, and 2016, inventories are provided for the following years.

- Projection year 2021 represents the first year of the maintenance period
- 2026 represents an interim maintenance year

[85] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.

- 2031 is the end of first maintenance period

These projections indicate that point source emissions in the area are estimated to remain well below attainment period levels due to permanent facility closure and implemented measures. Only slight growth is expected for nonpoint and mobile source emissions.

Figure 6-2 Ajo Base Year PM_{10} Emissions and Projections

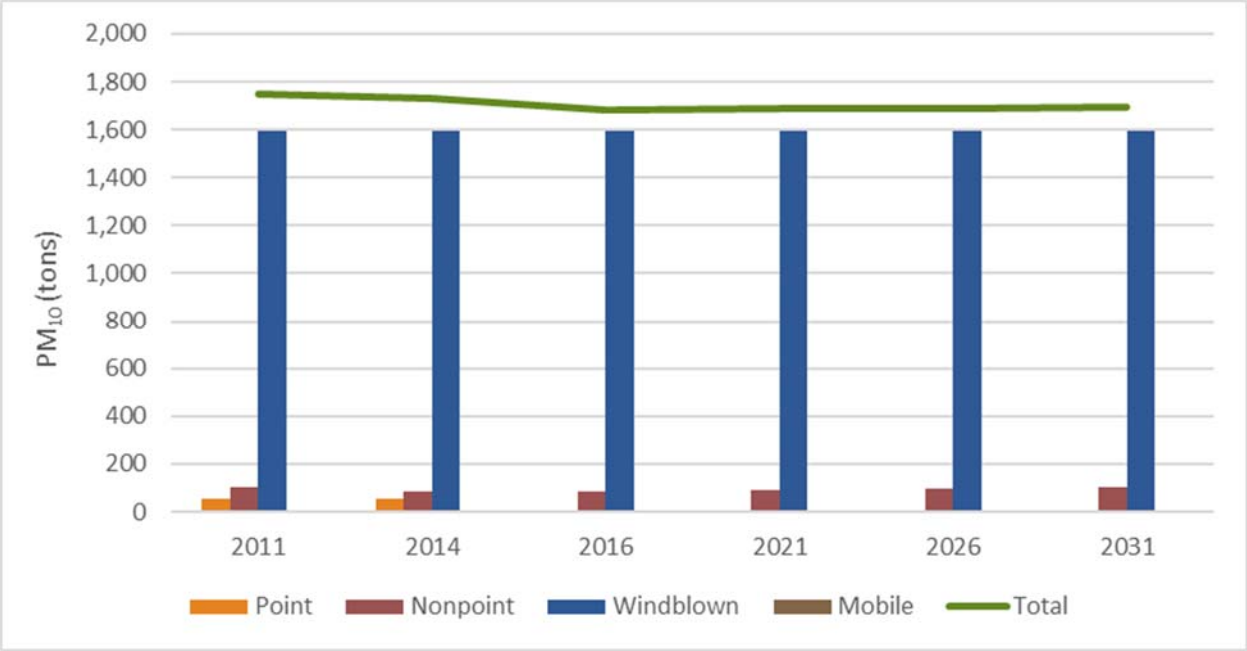


Table 6-3 Ajo PM_{10} Emissions Summary by Source Category (tons per year)

Source Category	2011	2014	2016	2021	2026	2031
Point*	51.86	51.86	0.41	0.41	0.41	0.41
Nonpoint**	101.24	85.33	85.82	91.17	95.98	100.56
Windblown	1,592.73	1,592.73	1,592.73	1,592.73	1,592.73	1,592.73
Mobile	1.53	1.38	1.39	1.42	1.50	1.56
Total	**1,747.35**	**1,731.29**	**1,680.35**	**1,685.73**	**1,690.61**	**1,695.26**

* Includes activity based emissions only. Windblown emissions from point sources is included in the windblown category.

** Re-entrained dust from paved and unpaved roads is included in the emissions estimates for nonpoint sources.

Closure and capping of the Ajo tailings impoundments and slag reprocessing facility provided permanent emissions reductions to the area (*see* Section 4.3, *Emissions Reductions from Tailings and Slag Storage*

Area Rule). These reductions are reflected in the projected future emissions estimates. Together, these facilities represented the largest anthropogenic source of emissions in the area.

Although the total emissions inventories are dominated by windblown emissions from large expanses of undisturbed land, historically, the tailings impoundments and slag reprocessing areas likely had significant impacts on elevated PM_{10} concentrations in the community (*see* Sections 4.1, *Sources of PM_{10}*, and 4.4, *Improvement in Air Quality*). These sources (tailings and slag areas) represented a *concentrated localized source of emissions*, whereas, other sources in the windblown category primarily represent a diffuse source of emissions spread across the entire nonattainment area. Both the tailings and slag areas are located adjacent to the ambient monitor and near the Ajo population center. The tailings impoundments were stabilized in 1991. The slag reprocessing facility, however, was still operating at the time of the most recent ambient exceedances in 2011 and 2013 (*see* Section 2.2, *Ambient PM_{10} Data Trends*). Winds during these recent events were generally from a southerly direction, placing the facility upwind of the town and ambient monitor. No exceedances have occurred since the closure and stabilization of the slag reprocessing area in 2014/2015.

Following redesignation, any new sources are subject to Prevention of Significant Deterioration (PSD) permitting procedures (*see* Section 5.1). PSD regulations were established to preserve air quality in areas where ambient concentrations are below the NAAQS and require stationary sources to undergo preconstruction review, utilizing best available control technology (BACT), before a facility is constructed, modified, or reconstructed.

In addition to the reductions in emissions from the closure of significant sources (i.e., smelter, mine, slag reprocessing facility), growth of the Ajo area is limited. The area is bounded on the West/Northwest by the Cabeza Prieta National Wildlife Refuge. The Barry M. Goldwater Air Force Range is less than one mile north and the Tohono O'odham Nation lies approximately five miles to the east. Organ Pipe National Monument is located ten miles to the south. This limits the available space for the Ajo area to grow.

State Route 85 passes through the center of Ajo, linking Mexican border areas to Interstate 8 in Gila Bend. While the Ajo area does get through traffic going to and from Mexico, this traffic is considerably less than that of the other two major border crossings in Arizona (Yuma and Nogales). Additionally, the Arizona Department of Transportation's traffic data does not show any major increase in traffic in the area over the past 10 years. See Appendix A, Sections A5 and A6, for more information on emissions projection methodologies.

Because projected nonpoint and mobile source emissions show slight growth during the maintenance period, an additional analysis was necessary to predict the impact of this growth on ambient PM_{10} concentrations. The increase in the inventory is less than one percent over the next 15 years, as shown in Table 6-4. In order to determine the effect this slight emissions increase will have on the ambient air in the area, the area's design concentration for 2017 was scaled up by the same percentage increase for the maintenance period inventory as projected from the attainment year (Table 6-4). The most recent design concentration of 102 $\mu g/m^3$ (for year 2017) was determined for the Ajo monitor using the "Table Look-Up" method described in the 1987 *PM_{10} SIP Development Guideline*.[86] The projected design concentrations for Ajo are less than 70 percent of the NAAQS, well within a margin of safety below the standard.

[86] *See PM_{10} SIP Development Guideline*, U.S. EPA, June 1987 (Publication No. EPA-450/2-86-001), Chapter 6; *Appendix A, Ajo PM_{10} Emission Inventory Technical Support Document,* Section A6; and Section 4.4.1 (footnote 61) of this document for more information on design concentrations.

Table 6-4 Scaled Up Design Concentrations

	2016	2021	2026	2031
Total Emissions	1,680.35	1,685.73	1,690.61	1,695.26
% Change from Attainment Year	0.00%	0.32%	0.61%	0.89%
Scaled Up 2017 Design Concentration (µg/m³)	102	102	103	103

In conclusion, maintenance of the 24-hour PM_{10} NAAQS is demonstrated as follows.

- The primary permitted point sources of emissions in the Ajo area have shut down, permits terminated, and their process areas stabilized (i.e., capping of the tailings impoundments and slag area)
- The Ajo area is expected to experience only slight growth in emissions from attainment inventory levels, less than one percent through year 2031
- Projected design concentrations demonstrate that the area will continue to maintain the NAAQS through the maintenance period

6.3 Ambient Air Quality Monitoring Network

"Once an area has been redesignated, the State should continue to operate an appropriate air quality monitoring network, in accordance with 40 CFR Part 58, to verify the attainment status of the area."[87]

ADEQ commits to continue operating a PM_{10} air quality monitoring network, as appropriate. Any changes to the network will be made in consultation with EPA.

6.4 Verification of Continued Attainment

"Each State should ensure that it has the legal authority to implement and enforce all measures necessary to attain and to maintain the NAAQS. Sections 110(a)(2)(B) and (F) of the Clean Air Act, as amended, and regulations promulgated at 40 CFR 51.110(k), suggest that one such measure is the acquisition of ambient and source emission data to demonstrate attainment and maintenance.

Regardless of whether the maintenance demonstration is based on a showing that future emission inventories will not exceed the attainment inventory or on modeling, the state submittal should indicate how the state will track the progress of the maintenance plan. This is necessary due to the fact that the emission projections made for the maintenance demonstration depend on assumptions of point and area source growth."[88]

Progress of the maintenance plan will be tracked, in part, through updates to reported emissions inventories and permit applications received for sources of PM_{10}. ADEQ commits to perform a comprehensive review of the factors and assumptions that were used in developing the attainment and

[87] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.
[88] *Ibid.*

projected inventories to determine whether significant change has occurred. The review will be performed for the interim projection year 2026 and may include the following elements.

- Permit applications and source reports (point sources, prescribed burns, construction)
- Population data
- Agricultural activity
- Wildfire/prescribed burn data
- Vehicle miles traveled

Arizona Revised Statutes Title 49, "The Environment," divides responsibility for meeting the requirements of the CAA among the state, county agencies, and regional planning organizations. Currently the state and three county agencies, including the Pima County Department of Environmental Quality, operate air quality control programs under direct or delegated authority.[89]

ADEQ has primary responsibility for air pollution control and abatement, and as such, is required to "maintain a state implementation plan that provides for implementation, maintenance and enforcement of National Ambient Air Quality Standards and protection of visibility as required by the Clean Air Act" for areas outside of tribal lands.[90] ADEQ is also responsible for coordinating, along with local officials, the development, adoption, and enforcement of control measures and permits where no local air quality control program exists. In addition, ADEQ has original jurisdiction for mobile and certain stationary sources including smelting of metal ores, coal-fired electrical generating stations, and portable sources but may delegate jurisdiction to a local agency as allowed under state law.[91]

Except for the sources noted above, the county agencies have original jurisdiction for the issuance, administration, and enforcement of permits.[92] The State may assert jurisdiction where the local non-tribal agency is unable to fulfill any function or duty as required. State law also provides direct county authority to adopt and enforce programs, rules, and ordinances for the prevention, control, and abatement of air pollution.[93]

ADEQ and PDEQ will maintain the necessary resources to actively enforce any violations of the provisions contained in this plan and will submit to EPA any changes to rules or emission limits applicable to planning area PM sources as a SIP revision.

6.5 Contingency Plan

"Section 175A of the Act also requires that a maintenance plan include contingency provisions, as necessary, to promptly correct any violation of the NAAQS that occurs after redesignation of the area." "For the purposes of section 175A, a State is not required to have fully adopted contingency measures that will take effect without further action by the State in order for the maintenance plan to be approved. However, the contingency plan is considered to be an enforceable part of the SIP and should

[89] *See* ADEQ's *1987 PM_{10} Infrastructure State Implementation Plan*, June 30, 2017, for more information on state and county authority to implement and enforce measures necessary to attain and to maintain the PM_{10} NAAQS.
[90] A.R.S. § 49-401 and 404.
[91] A.R.S. § 49-107 and 402.
[92] *Ibid.*
[93] A.R.S. Title 49, Chapter 3, Article 3.

ensure that the contingency measures are adopted expediently once they are triggered. The plan should clearly identify the measures to be adopted, a schedule and procedure for adoption and implementation, and a specific time limit for action by the State. As a necessary part of the plan, the State should also identify specific indicators, or triggers, which will be used to determine when the contingency measures need to be implemented."[94]

The following contingency provisions describe the steps to evaluate the need for additional reasonable measures to prevent future violations of the NAAQS. The type and scope of any new control measures will be determined following an evaluation of the ambient exceedances that caused the contingency plan to be triggered. Additionally, the State will continue to implement all measures which were contained in the state implementation plan for the area before redesignation of the area as an attainment area.

6.5.1 Contingency Plan Timeline

The timing of contingency plan provisions are outlined below.

- An exceedance of the 24-hour design value is the contingency plan trigger level (the 3-year average expected rate of exceedance/violation of the NAAQS)
- Within 60 days of triggering the contingency plan; begin analysis of the cause or causes of the exceedance
    - The analysis should include but is not limited to: review of the ambient monitoring network for instrument malfunction and validation of data, meteorological evaluation, exceptional event evaluation, and assessment of emissions sources contributing to elevated levels of PM_{10}
- Within 12 months of triggering the contingency plan; begin adoption of new rules/measures (if it is determined that the violation of the NAAQS is due to emissions sources within the nonattainment area and new measures are necessary)
- Within 18 months of triggering the contingency plan; complete adoption of new measures
- No later than 6 months after final adoption of new measures; compliance with new measures

6.5.2 Evaluation of New Measures

Once the contingency plan is triggered ADEQ will perform an analysis to determine the need for adoption and implementation of new measures. The evaluation may include the following steps.

- Determine which source/sources likely contributed to elevated concentrations of PM_{10} at ambient monitoring sites
    - This evaluation may include modeling, proportional analysis, or transport analysis
- For each significant source sector, compile a list of existing control measures

[94] *See Procedures for Processing Requests to Redesignate Areas to Attainment*, Calcagni, J., Memorandum, U.S. EPA, September 4, 1992.

- Verify emissions sources are in compliance with existing measures
- For exceedance days that do not qualify as an exceptional event; if necessary, develop new measures where no measures exist or existing measures should be strengthened. New measures should meet the following criteria
    - Measure is permanent and enforceable (e.g., meets EPA enforceability criteria such as clearly defined standards[95])
- For exceedance days that likely qualify as an exceptional event; prepare and submit the necessary documentation for a natural or exceptional event.[96]
    - An exceedance of the 24-hour design value for which the area meets the demonstration requirements for data exclusion under the exceptional events rule would not trigger the maintenance contingency plan.
    - If new measures are needed to satisfy requirements of the exceptional events rule, selected controls should meet the following criteria
        - Measure is permanent and enforceable (e.g., meets EPA enforceability criteria such as clearly defined standards)
        - Measure meets ”reasonable” level of control per exceptional event rule

6.5.3 Potential Contingency Measures

Contingency measures should concentrate on the significant source categories contributing to area PM_{10} emissions. Table 6-5 lists potential contingency measures that may be considered for implementation under the contingency plan.

Table 6-5 Potential PM_{10} Contingency Measures

Emissions Category	Potential Contingency Measure
Paved Roads	• Increase stabilization of unpaved shoulders • Increase stabilization of access points from unpaved roads
Unpaved Roads	• Increase stabilization of unpaved roads and shoulders • Post Speed limits to decrease vehicle speeds • Restrict access to decrease Average Daily Trips (ADT) and VMT
Unpaved parking	• Pave or stabilize unpaved parking areas
Disturbed open areas and lots	• Stabilize disturbed open areas • Restrict access to minimize disturbance

[95] *See Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency*, Potter, J. C., et al., Memorandum, U.S. EPA, September 23, 1987, and *Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency*, Alushin, M. S., et al., Memorandum, U.S. EPA, September 23, 1987.
[96] *See* the exceptional events definitions and rule at 40 CFR 50.1 and 50.14 and revisions to the rule, *Treatment of Data Influenced by Exceptional Events*, 81 FR 68216, October 3, 2016.

Emissions Category	Potential Contingency Measure
Material handling and storage	• Review/revise dust control measures for material handling and storage
Construction	• Review/revise dust control measures for construction activities

7 Motor Vehicle Emissions Budget for Transportation Conformity

7.1 Introduction

"Transportation conformity is required by the Clean Air Act section 176(c) (42 U.S.C. 7506(c)) to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a state air quality implementation plan (SIP). Conformity, to the purpose of the SIP, means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards."[97]

The conformity rules at 40 CFR 51.390 and 40 CFR 93 require SIPs to include maximum allowable emissions or a "budget" for on-road mobile sources determined to be significant under 40 CFR 93.109. Projected emissions from future transportation projects are compared to the approved budget to ensure they do not exceed levels demonstrated necessary to attain and maintain the NAAQS.

Motor vehicle emissions budgets (MVEBs) are needed only when there is a control strategy SIP for nonattainment areas or a maintenance demonstration. According to 40 CFR 93.101, a "*Control strategy implementation plan revision is the implementation plan which contains specific strategies for controlling the emissions of and reducing ambient levels of pollutants in order to satisfy CAA requirements for demonstrations of reasonable further progress and attainment …*" The rule defines motor vehicle emissions budget as "*… that portion of the total allowable [highway and transit] emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan … for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS …*"

Requirements to develop additional control strategies and to demonstrate reasonable further progress and attainment were suspended for the Ajo PM_{10} nonattainment area following EPA's clean data finding.[98] Redesignation to attainment requests, however, require the state to demonstrate continued maintenance of the NAAQS. Therefore, on-road mobile sources are evaluated to determine significance and the need to develop a conformity budget for primary PM_{10}.[99]

7.2 Procedural Overview

The following steps outline general procedures for evaluating motor vehicle emissions in the Ajo PM_{10} planning area for transportation conformity purposes.

[97] Source: *General Information for Transportation Conformity*, https://www.epa.gov/state-and-local-transportation/general-information-transportation-and-conformity (July 19, 2017).
[98] *See* 71 FR 6352, February 8, 2006.
[99] ADEQ did not include estimates of PM_{10} precursor compounds in the emission inventory for the Ajo area. Sources of SO_2, NOx, VOCs, or ammonia emissions are not expected to be significant contributors to elevated levels of PM_{10} in the area. *See* Appendix A, Section A5.1, for more information.

1. Determine the overall contribution of motor vehicle PM_{10} emissions in the Ajo PM_{10} nonattainment area.

    a. If motor vehicle emissions constitute a significant proportion of total PM_{10} emissions, develop a motor vehicle emission budget for the area.

    b. If motor vehicle emissions constitute an insignificant proportion of total PM_{10} emissions, include an explicit statement that no regional emissions analyses for PM_{10} or its precursors is necessary for attainment or maintenance and therefore is not necessary for conformity.

    c. Additionally, perform an analysis showing how future population growth affects the proportion of motor vehicle emissions in the Ajo PM_{10} area. Determine whether future motor vehicle emissions will contribute significantly to the PM_{10} issue in the area.

2. Verify through consultation with the Arizona Department of Transportation whether any major transportation projects are anticipated to occur in the Ajo PM_{10} area within the maintenance timeframe of this plan.

    a. If any major transportation projects are anticipated, evaluate their potential impact on PM_{10} emissions in the Ajo PM_{10} area and their potential effect on maintenance of the NAAQS.

7.3 Evaluation of On-Road Mobile Sources

According to federal transportation conformity rules an area is not required to satisfy a regional emissions analysis, showing noninterference with attainment and maintenance of the NAAQS, if EPA finds that the SIP demonstrates regional motor vehicle emissions are an insignificant contributor to the air quality problem for that pollutant/precursor and NAAQS.[100] Under such a finding, the SIP would not be required to explicitly establish a budget to be used in conformity determinations. In an evaluation to determine the significance of motor vehicle emissions the state should consider the following factors.[101]

- the current state of air quality as determined by monitoring data for that NAAQS
- the absence of SIP motor vehicle control measures
- the amount (percentage) of motor vehicle emissions relative to the total SIP inventory
- historical trends and future projections in the growth of motor vehicle emissions

[100] *See* 40 CFR 93.109(f), "*Areas with insignificant motor vehicle emissions*;" 40 CFR 118, "*Criteria and procedures: Motor vehicle emissions budget*;" and 40 CFR 93.119, "*Criteria and procedures: Interim emissions in areas without motor vehicle emissions budgets*."
[101] *See* 40 CFR 93.109(f).

7.3.1 Current State of Air Quality

The Ajo planning area is attaining the PM_{10} NAAQS and no exceedances of the 24-hour standard have occurred since 2013. Chapter 2 provides additional information on ambient monitoring data trends and current NAAQS compliance.

7.3.2 Absence of SIP Motor Vehicle Control Measures

The SIP does not rely on control of on-road emissions to demonstrate attainment and maintenance of the PM_{10} NAAQS. Attainment and maintenance is demonstrated by implementation of fugitive dust measures applicable to the Ajo mine tailings and slag storage areas. Chapters 4 and 6, and Appendix A provide details of the Ajo emissions control strategy.

7.3.3 Motor Vehicle Emissions Inventory and Projections

For an insignificancy determination the motor vehicle inventory should include PM_{10} estimates from vehicle exhaust, paved and unpaved road re-entrainment, and emissions from road construction. Once these PM_{10} emissions have been estimated their totals should be compared to total PM_{10} emissions for the area. In general, significance applies on the basis of the entire nonattainment or maintenance area rather than a portion of the area. Table 7-1 provides a comparison of Ajo planning area mobile emissions to the total inventory.[102]

Table 7-1 Transportation Related Emissions

Emission Sector	PM_{10} (tons)					
	2011	**2014**	**2016**	**2021**	**2026**	**2031**
On-road Mobile	0.30	0.29	0.30	0.26	0.27	0.28
Re-entrained Dust	31.84	32.78	32.97	35.03	36.88	38.63
Road Construction	0	0	0	0	0	0
Total Motor Vehicle Contribution	**32.14**	**33.07**	**33.27**	**35.29**	**37.15**	**38.91**
Percent of Total Inventory	1.84%	1.91%	1.98%	2.09%	2.20%	2.30%

- On-Road Mobile – Includes PM_{10} emissions from vehicle exhaust, tire wear, and brake wear. Obtained by summing the PM_{10} from the four on-road emission sectors (see Appendix A, Table A-48).
    - Diesel Heavy Duty Vehicles
    - Diesel Light Duty Vehicles
    - Non-Diesel Heavy Duty Vehicles
    - Non-Diesel Light Duty Vehicles
- Re-entrained Dust – Includes re-entrained PM_{10} from paved & unpaved roads. Obtained by summing the PM_{10} totals in the Dust - Paved Road Dust, and Dust - Unpaved Road Dust nonpoint emission sectors (see Appendix A, Table A-21).

[102] *See* Appendix A, Section A5.4.4 for complete evaluation of transportation conformity related emissions sources.

- Road Construction – No major road construction projects have occurred in the Ajo PM_{10} area and no major future projects are included in any current planning documents.[103]

The Ajo PM_{10} planning area is a geographically small nonattainment area with a small population. Area emissions totals are dominated by a few stationary sources. On-road mobile emissions comprise less than 2 percent of the 2014 and 2016 base-year inventories and less than 2.5 percent of projected maintenance period inventories. ADEQ does not reasonably expect that the area will experience enough motor vehicle emissions growth for a violation of the PM_{10} NAAQS to occur.

7.4 Conclusion for Transportation Conformity

Based on the data and findings, motor vehicle emissions constitute an insignificant portion of total PM_{10} emissions in the Ajo planning area. PM_{10} source categories are dominated by windblown emissions, with conformity related emissions comprising only 1.91% of the 2014 emissions inventory. With no new road construction or road projects anticipated to occur, ADEQ does not expect that mobile emissions will become a significant source of PM_{10} during the maintenance period.

Because conformity related motor vehicle emissions are an insignificant contributor to elevated levels of PM_{10}, no regional emissions analyses for PM_{10} or its precursors is necessary for the Ajo PM_{10} planning area and it is not necessary to establish a conformity related emissions budget in the Ajo PM_{10} SIP.

[103] Per review of Arizona Department of Transportation's five-year planning documents, https://www.azdot.gov/planning/transportation-programming/overview.

8 Conclusion

The 24-hour PM_{10} NAAQS were promulgated in 1987, replacing total suspended particulates as the indicator for the particulate matter air quality standards. The Ajo area was designated nonattainment for PM_{10} by operation of law following the CAA amendments of 1990. Since that time, stabilization of local mine tailings impoundments and a slag reprocessing area have resulted in no recorded exceedances of the PM_{10} NAAQS for 26 of the last 28 years. A new fugitive dust rule ensures that emissions reductions achieved by local sources will continue into the future. By complying with nonattainment and redesignation related regulatory requirements under the Clean Air Act and applicable guidance, this SIP revision provides an enforceable vehicle for the enclosed control strategy.

The analyses and data provided in this plan supersede previous submissions in 1988 and 1991 (*see* Chapter 3) and demonstrate that all nonattainment area and redesignation requirements have been met. The clean air quality record, enforceable control measures, and projections of future emissions all show that the area will continue to maintain the PM_{10} air quality standards through 2031.

With this submittal, ADEQ requests that EPA approve the enclosed maintenance plan and redesignate the Ajo nonattainment area to attainment for the 24-hour PM_{10} NAAQS. Additionally, because the NAAQS for total suspended particulates have been replaced, ADEQ is also requesting that EPA delete the TSP nonattainment designation for the Ajo area.

Appendix A: Ajo PM_{10} Emission Inventory Technical Support Document

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ADEQ
Arizona Department of Environmental Quality

Appendix A
Ajo PM_{10} Emission Inventory Technical Support Document

Air Quality Division
December 10, 2018 Draft

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A1 Introduction

A1.1 Purpose

The Arizona Department of Environmental Quality (ADEQ) prepared this technical support document (TSD) to support the State Implementation Plan revision for the Ajo PM_{10} Nonattainment Area (NAA). This SIP revision seeks to:

1. Show that the Ajo PM_{10} area is currently in attainment with the PM_{10} NAAQS.
2. Provide justification for the redesignation of the Ajo PM_{10} area to attainment.
3. Provide justification that the Ajo area will maintain compliance with the NAAQS.

To achieve these goals the SIP revision relies on emission inventories of PM_{10} for two distinct time periods: a base/attainment year and a maintenance period.

ADEQ utilized 2014 as the base year, 2016 as the attainment year and 2021-2031 as the maintenance period for this SIP revision. Additionally, 2011 is utilized as a pre-base year for informational purposes. Emission inventories were developed as outlined in Table A-1, all of which relied primarily on two data sources: EPA's National Emission Inventory (NEI) and ADEQ's internal point source database. Additional emissions data have been included to supplement the source categories of the NEI. These additional source categories, along with the calculation methodology, are included in Section A5.3.1.

Table A-1: Emission Inventory Outline

Inventory Year	Inventory Purpose	Data Source
2011	Pre-Base Year	2011 NEIv1 & ADEQ Internal Point Source Database
2014	Base Year	2014 NEIv1 & ADEQ Internal Point Source Database
2016	Attainment Year	Projected from base year
2021	Maintenance Demonstration	Projected from base year
2026	Maintenance Demonstration	Projected from base year
2031	Maintenance Demonstration	Projected from base year

A1.2 Sources of PM_{10} Emissions

Source categories included in the inventory are:

- Point Source Emissions
- Nonpoint Source Emissions
- Onroad Mobile Emissions
- Nonroad Mobile Emissions

ADEQ compiled a 2014 base year inventory containing actual PM_{10} emissions from the source categories listed above. A more detailed description of these sectors is provided in Section A5. Point source emissions were gathered from ADEQ's internal point source database while other

categories (nonpoint, onroad, and nonroad) are based primarily on 2014 NEIv1 data. One additional nonpoint source category – windblown dust from vacant land – has been included as it was not represented in the 2014 NEIv1 dataset.

A1.3 Base Year Determination

The base year for the Ajo PM_{10} SIP revision is 2014. The main factor that influenced choosing 2014 as the base year is that the 2014 NEIv1 represents the most current, accurate, and comprehensive inventory available at the time of inventory development. Additionally, 2011 is utilized as an additional informative pre-base inventory year. The 2011 inventory was developed utilizing the 2011 NEIv2 and the same methods as the 2014 inventory as described below.

A1.4 Population

The Ajo PM_{10} NAA has been codified in 40 CFR 81.303 and is comprised of the portions of Pima County bound by the townships and ranges listed in Table A-2 and represented geographically in Figure A-1. Population estimates for the entire Ajo PM_{10} NAA are also presented in Table A-2. The Ajo NAA encompasses the majority of the town of Ajo (as defined by the census CDP boundary), and is nearby to the town of Why, for which population data has been included in Table A-3 and which are represented graphically in Figure A-1.

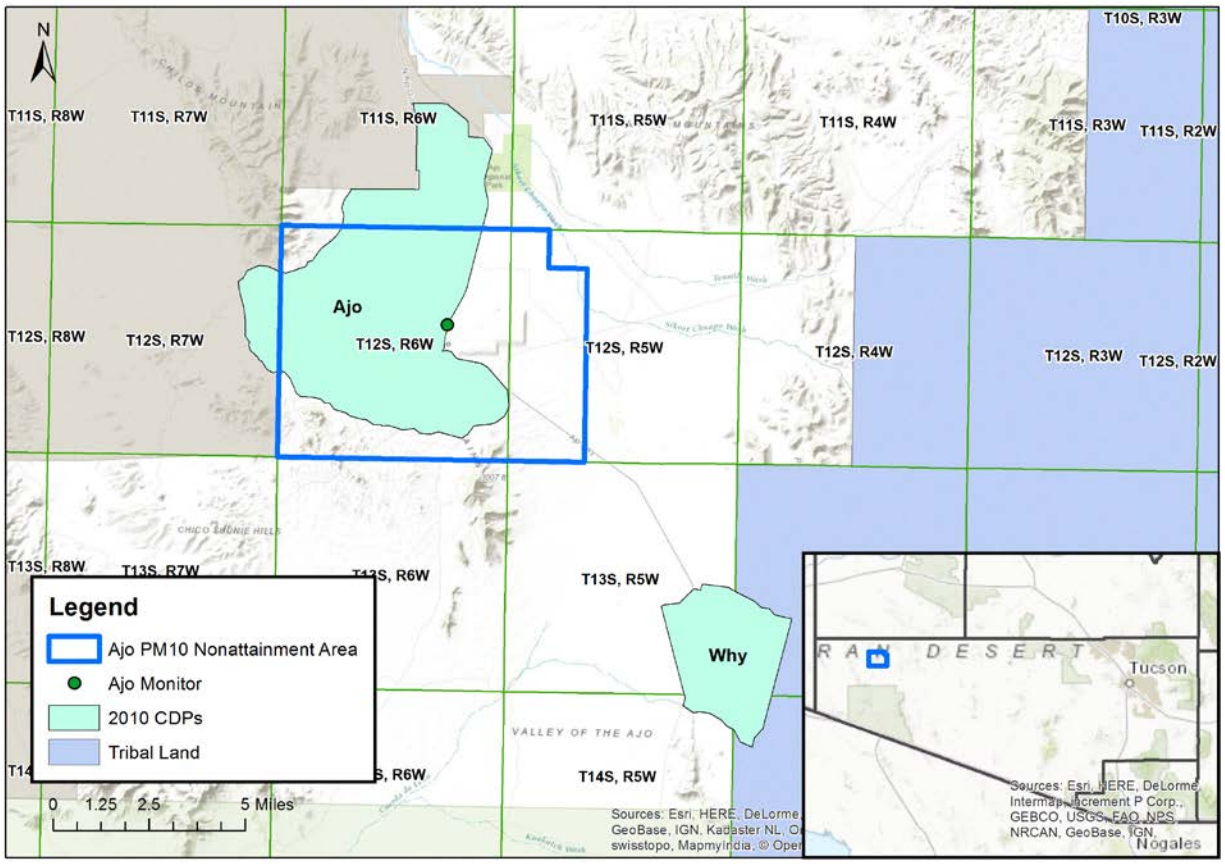
Pima County is one of four border counties in the southern part of Arizona; surrounded by Santa Cruz and Cochise Counties to the east, Maricopa and Pinal Counties to the north, Yuma County to the west, and Mexico to the south. The county seat of Pima County is Tucson, which is approximately 107 miles southeast from Phoenix. The incorporated communities of South Tucson, Marana, and Oro Valley also reside in Pima County, as well as the town of Sahuarita located on the Tohono O'odham Reservation. ADOA estimated the 2014 population of Pima County at 1,007,162 persons. Pima County had a 2010 population density of 106.7 persons per square mile, compared to 414.9 and 56.3 persons per square mile for Maricopa County and the state respectively[1].

[1] US Census Bureau. (January 6, 2014), *State and County QuickFacts.* U.S. Department of Commerce. Retrieved from: https://www.census.gov/quickfacts/fact/table/pimacountyarizona,AZ,US/PST045216 on September 13, 2017.

Table A-2: Geographic Location and Population

Ajo PM_{10} NAA[2]	
Land Area	47 mi^2
2014 Population	3,295
2021 Projected Population	3,521
2031 Projected Population	3,884
NAA Designated Area (40 CFR 81.303)	
Township T12S, R6W, and the following sections of Township T12S, R5W: a. Sections 6-8 b. Sections 17-20, and c. Sections 29-32	

Figure A-1: Ajo PM_{10} Township/Range



[2] ADOA provided the population projects for Pima County. ADOA's projection methodologies are presented in Exhibit AI1 of this TSD.

Table A-3: Towns Within and Near Ajo PM_{10} NAA

Location	2010 Population[3]
Town of Ajo	3,304
Town of Why	167

A1.5 Land Use

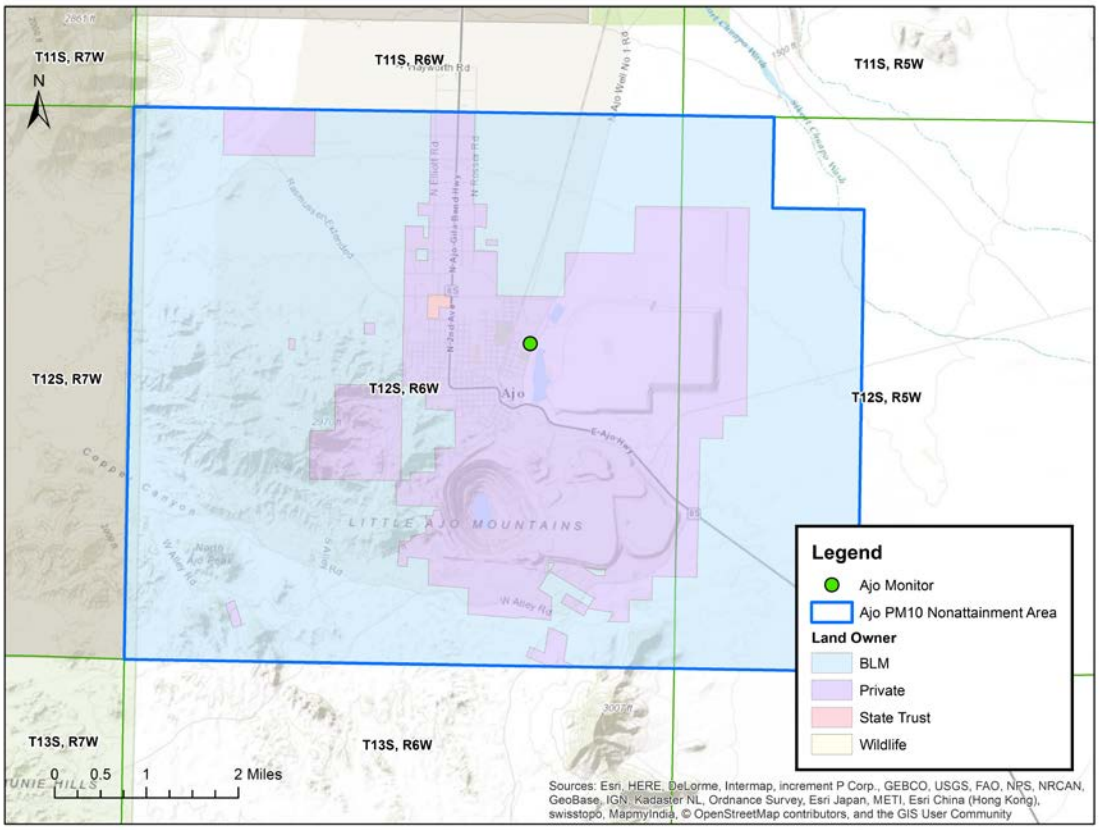
The Ajo PM_{10} NAA encompasses a small portion of Pima County that is approximately 47 square miles. The majority of the land within the PM_{10} NAA is owned and managed by either the Bureau of Land Management (67%). Privately owned land makes up the next largest percentage of the NAA (32%), which includes the inactive Freeport-McMoRan Ajo mine, the closed site of the smelter, and the tailings impoundment. A breakdown of the land owners in the PM_{10} NAA is presented in Table A-4 and Figure A-2.

Table A-4: Land Owners

Ajo PM_{10} NAA		
Land Owner	**Area (square miles)**	**Percentage**
Bureau of Land Mgmt.	31.77	67.54%
Private Land	15.20	32.32%
State Trust Land	0.05	0.11%
Cabeza Prieta National Wildlife Refuge	0.02	0.03%

[3] U.S. Census Bureau; Census 2010, Profile of General Population and Housing Characteristics: 2010; generated by Jessica Wood; using American FactFinder; <http://factfinder2.census.gov>; (September 13, 2017).

Figure A-2: Land Owners

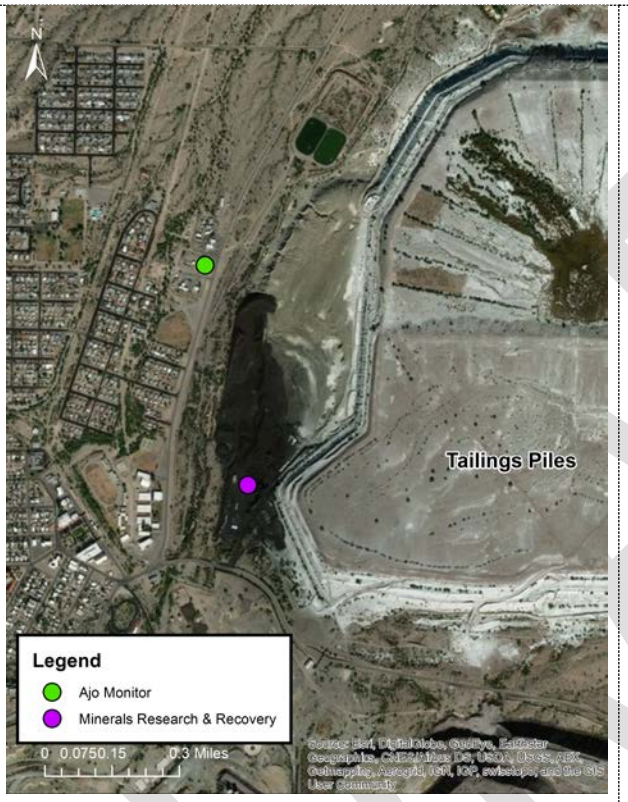


Note: The Cabeza Prieta National Wildlife Refuge portion of the NAA is a small narrow portion along the border between township T12S, R7W and T12S, R6W and cannot be seen at this scale on the map.

A2 Monitoring Network

This chapter presents a summary of the meteorological and ambient PM_{10} monitor located in the Ajo area. This monitoring station is presented in Figure A-3 and Table A-5. The Ajo area contains only one monitor maintained by ADEQ, which is the PM_{10} NAAQS compliance monitor. Therefore, this attainment and maintenance demonstration relies only on data collected by the Ajo monitor.

Figure A-3: Monitoring Location



Aerial view of monitor in relation to the Freeport-McMoRan tailing impoundments.

Ground level view of the monitoring site and equipment.

Table A-5: Ajo Monitor Description

Site Information			
AQS ID	04-019-0001	**Surrounding Area**	Residential/Commercial
Street Address	1211 Well Rd. Ajo, AZ 85321	**Groundcover**	Gravel
County	Pima	**Latitude**	32.3820
CBSA	Tucson	**Longitude**	-112.8575
Distance to roadway	109m	**Elevation**	515 m

Monitoring Information			
Pollutant	**PM_{10}**	**Wind**	**Temp/RH**
Basic monitoring objective	NAAQS Comparison	--	--
Site type(s)	Population Exposure	Population Exposure	Population Exposure
Monitor type(s)	SLAMS	--	--
Instrument manufacture and model	Thermo TEOM 1400AB	RM Young 5305 Anemometer	Vaisala HMP 155 Probe
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Monitor start date	02/11/1991	07/01/1969	02/11/2014

A3 Meteorological Trends

This section of the TSD examines the meteorological conditions of the Ajo area, specifically focusing on trends in wind speed and direction and the possible impact of these conditions on ambient PM_{10} concentrations.

Synoptic scale air flows and local topographically driven surface winds influence the speed and direction of air pollution transport throughout the Ajo area. To examine the meteorological trends in the Ajo area, ADEQ looked at both diurnal and seasonal average wind speed and direction. ADEQ first looked at diurnal average wind speed and wind direction. To perform this analysis ADEQ averaged wind speeds and directions for each hour of the day for the meteorological monitor in the Ajo area. These diurnal and seasonal average values are presented in Section A3.1 and Section A3.2, respectively.

A3.1 Diurnal Wind Speed & Direction

ADEQ averaged wind speed and wind direction data for 2011-2017 from the meteorological station in the Ajo area to create an average profile for the entire Ajo area. These average values were used as the basis for creating the diurnal profile presented in Figure A-4 and Table A-6. Based on this data, the Ajo area generally experiences lower wind speeds during the early morning hours. Around mid-morning wind speeds generally increase, peaking during mid-afternoon. Wind direction is generally from the south-southwest in the early morning, then around mid-morning winds tend to shift and come out of the west.

Figure A-4: Diurnal Average Wind Speed & Direction

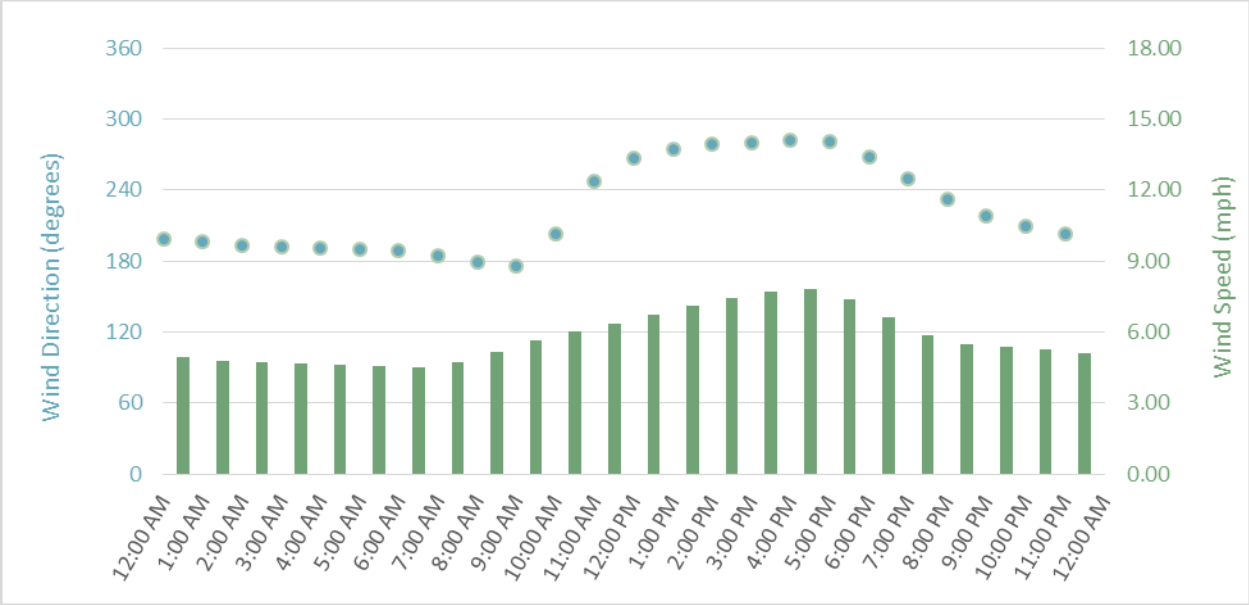


Table A-6: Diurnal Average Wind Speed & Direction

Hour	Wind Direction (Degrees)	Wind Speed (mph)	Hour	Wind Direction (Degrees)	Wind Speed (mph)
12:00 AM	198	4.93	**12:00 PM**	267	6.72
1:00 AM	196	4.79	**1:00 PM**	274	7.11
2:00 AM	194	4.72	**2:00 PM**	278	7.43
3:00 AM	192	4.67	**3:00 PM**	280	7.72
4:00 AM	191	4.61	**4:00 PM**	282	7.79
5:00 AM	190	4.53	**5:00 PM**	281	7.37
6:00 AM	189	4.53	**6:00 PM**	268	6.60
7:00 AM	185	4.74	**7:00 PM**	250	5.87
8:00 AM	179	5.16	**8:00 PM**	232	5.49
9:00 AM	175	5.64	**9:00 PM**	219	5.39
10:00 AM	203	6.00	**10:00 PM**	210	5.24
11:00 AM	248	6.36	**11:00 PM**	203	5.08

A3.2 Monthly Wind Speed & Direction

ADEQ averaged wind speed and wind direction data for 2011-2017 from the meteorological station in the Ajo area to create an average profile for the entire Ajo area. These average values were used as the basis for creating the monthly profile presented in Figure A-5 and Table A-7. When examining monthly average wind speed and direction there does seem to be a seasonal correlation, with stronger southerly winds in the summer and lighter winds out of the west during the winter.

Figure A-5: Monthly Average Wind Speed & Direction

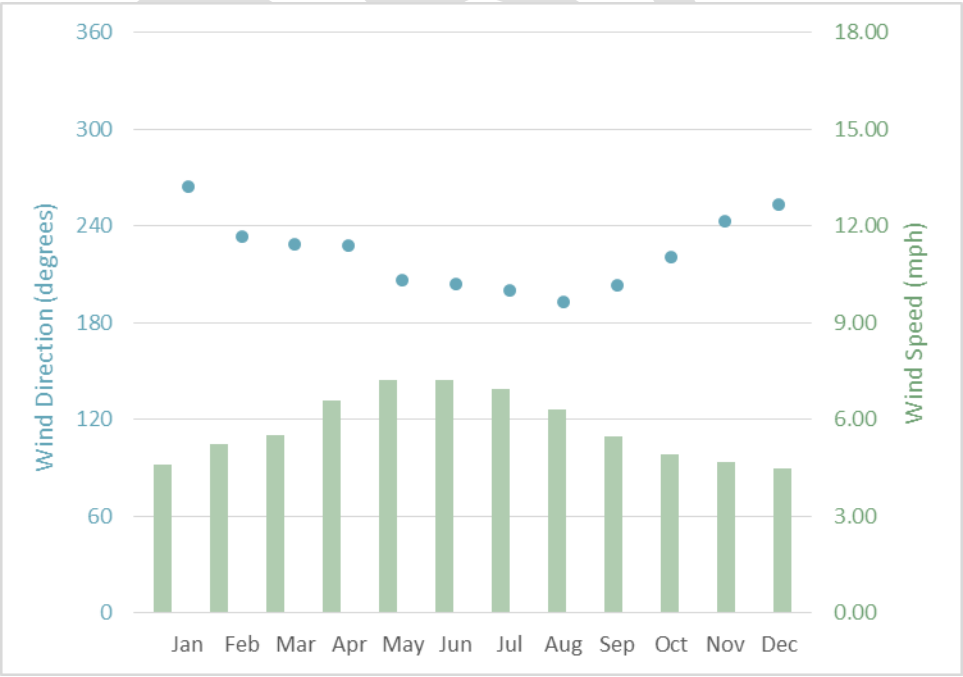


Table A-7: Monthly Average Wind Speed & Direction

Month	Wind Direction (Degrees)	Wind Speed (mph)
Jan	264	4.60
Feb	234	5.22
Mar	229	5.51
Apr	228	6.59
May	207	7.24
Jun	204	7.24
Jul	200	6.96
Aug	193	6.30
Sep	203	5.48
Oct	221	4.90
Nov	243	4.70
Dec	254	4.48

A4 Ambient PM_{10} Trends

This section of the TSD examines ambient PM_{10} concentrations in the Ajo area, specifically focusing on factors that contribute to higher concentrations. To examine the PM_{10} concentration trends in the Ajo area, ADEQ looked at daily, diurnal, and seasonal averages.

A4.1 PM_{10} Concentrations

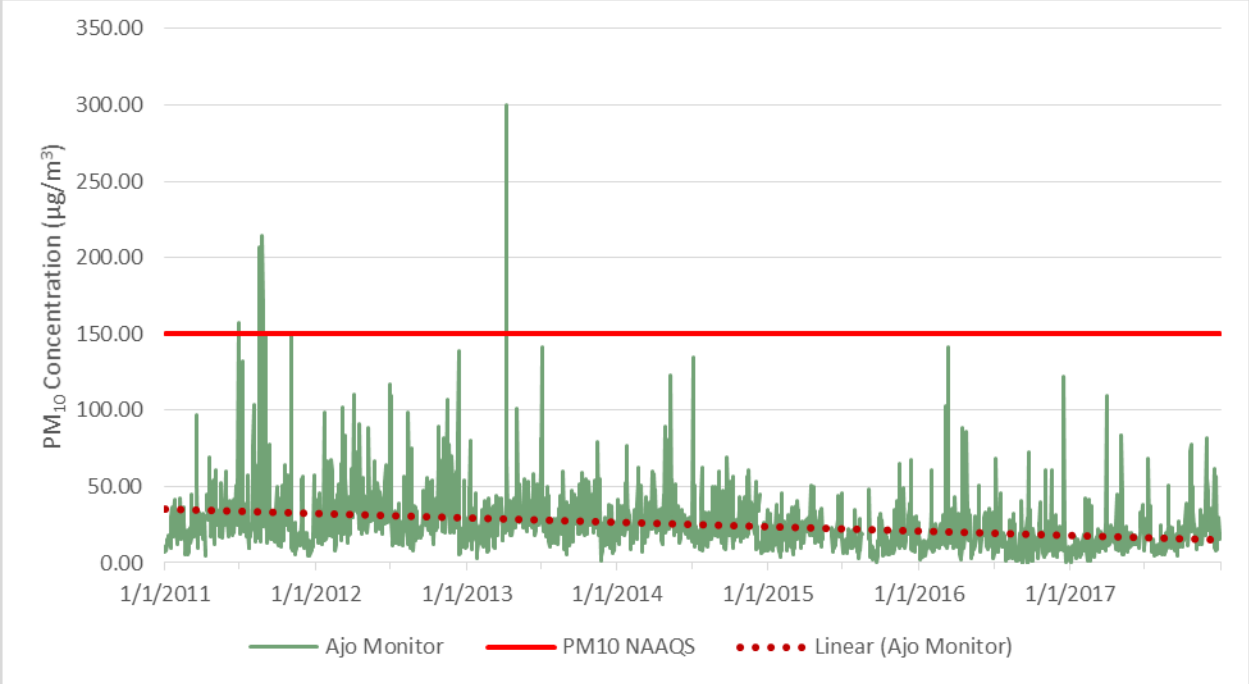
Figure A-7 shows these diurnal average concentrations for the monitor in the Ajo area that collects PM_{10} data. The monthly averages were calculated in a similar manner; PM_{10} concentrations were averaged for every month of the years and are presented in Figure A-8. As with the meteorological analysis, ADEQ relied on all available data from the Ajo monitor to prepare these graphs.

The following are ADEQ's comments and observations based on the analysis of this section:

- The data in the figures and tables below are based on the ADEQ continuous monitor's data from 2011 through 2017.
- There were a handful of exceedances that occurred between 2011 and 2013 (Figure A-6), which are further analyzed in Section A4.3 below.
- PM_{10} concentrations appear to spike during the early morning hours at the Ajo monitor (Figure A-7); a time period when inversion conditions are strongest and emission related activities begin to increase.
- No clear correlation exists between season and PM_{10} concentration (Figure A-8).
- Monthly average concentrations have been declining over the past few years, most likely from the closure of Minerals Research & Recovery Inc. and the stabilization of the slag area in 2015 (Figure A-9).

A4.1.1 Daily Average PM_{10}

Figure A-6: Daily Average PM_{10} – Ajo



A4.1.2 Diurnal PM_{10} Concentrations

Figure A-7: Diurnal Average PM_{10} Concentrations

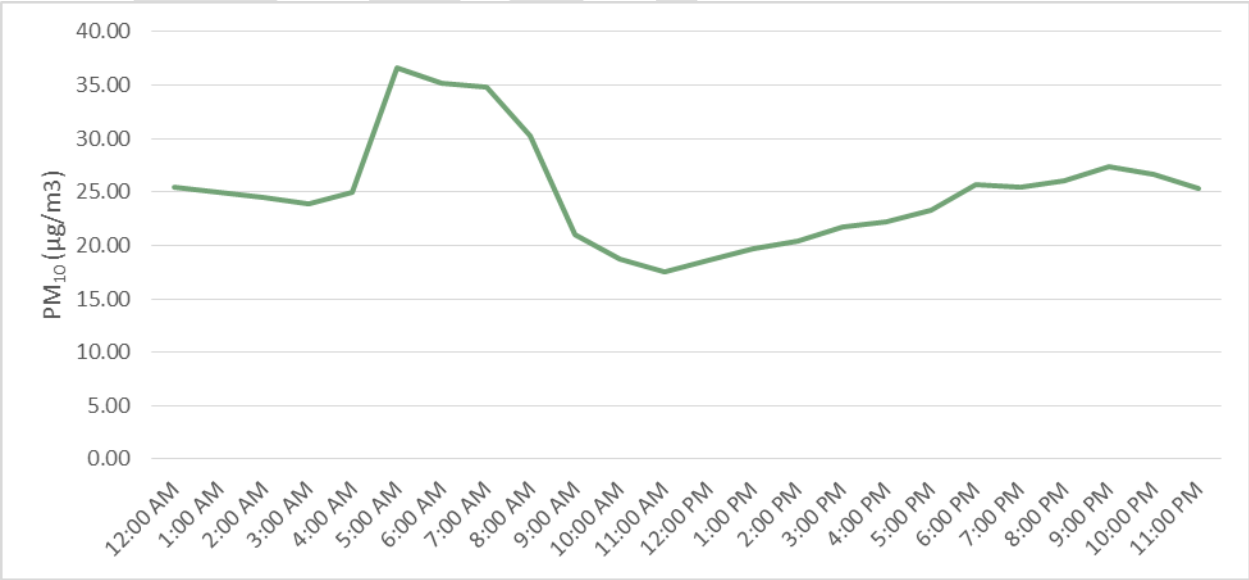


Table A-8: Diurnal Average PM_{10} Concentrations

Hour	Average PM_{10} ($\mu g/m^3$)	Hour	Average PM_{10} ($\mu g/m^3$)
12:00 AM	25.44	**12:00 PM**	18.66
1:00 AM	25.02	**1:00 PM**	19.72
2:00 AM	24.53	**2:00 PM**	20.38
3:00 AM	23.88	**3:00 PM**	21.75
4:00 AM	24.93	**4:00 PM**	22.23
5:00 AM	36.66	**5:00 PM**	23.27
6:00 AM	35.19	**6:00 PM**	25.70
7:00 AM	34.79	**7:00 PM**	25.40
8:00 AM	30.25	**8:00 PM**	26.09
9:00 AM	21.03	**9:00 PM**	27.35
10:00 AM	18.70	**10:00 PM**	26.65
11:00 AM	17.49	**11:00 PM**	25.36

A4.1.3 Seasonal PM_{10} Concentrations

Figure A-8: Seasonal Average PM_{10} Concentrations

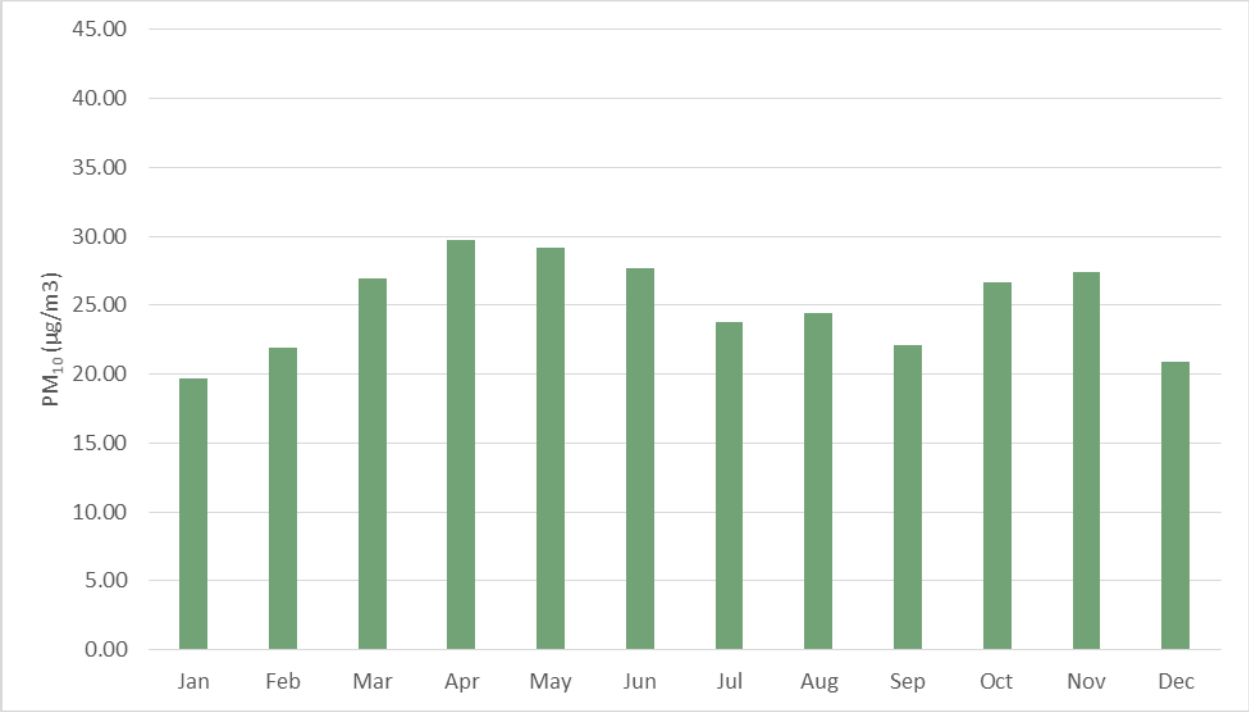


Table A-9: Seasonal Average PM_{10} Concentrations

Month	Average PM_{10} ($\mu g/m^3$)
Jan	19.73
Feb	21.92
Mar	26.98
Apr	29.75
May	29.13
Jun	27.68
Jul	23.77
Aug	24.42
Sep	22.14
Oct	26.63
Nov	27.44
Dec	20.88

A4.1.4 Monthly PM_{10} Concentrations

Figure A-9: Monthly Average PM_{10} Concentrations

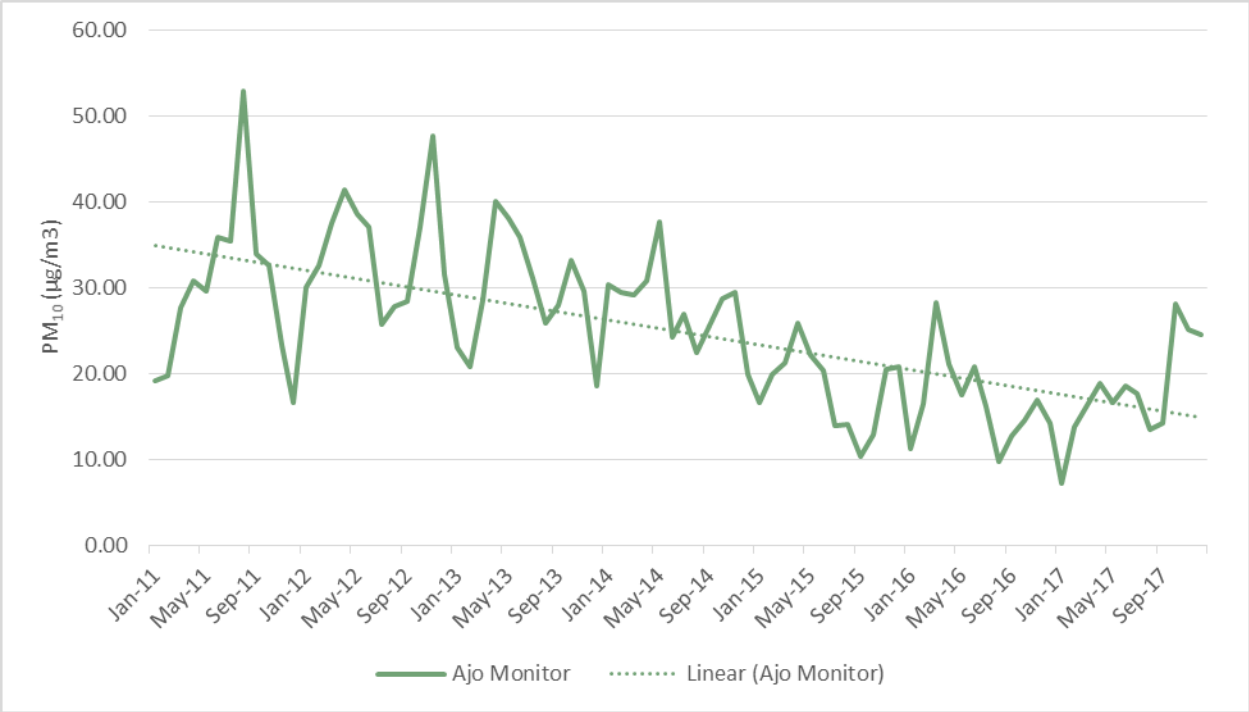


Table A-10: Monthly Average PM_{10} Concentrations

Date	Average PM_{10} ($\mu g/m^3$)	Date	Average PM_{10} ($\mu g/m^3$)
Jan-11	19.22	Jul-14	26.92
Feb-11	19.74	Aug-14	22.51
Mar-11	27.75	Sep-14	25.61
Apr-11	30.87	Oct-14	28.74
May-11	29.65	Nov-14	29.52
Jun-11	36.01	Dec-14	20.02
Jul-11	35.52	Jan-15	16.67
Aug-11	52.91	Feb-15	19.96
Sep-11	33.96	Mar-15	21.35
Oct-11	32.64	Apr-15	25.94
Nov-11	23.41	May-15	22.14
Dec-11	16.69	Jun-15	20.33
Jan-12	30.07	Jul-15	13.91
Feb-12	32.66	Aug-15	14.15
Mar-12	37.58	Sep-15	10.41
Apr-12	41.53	Oct-15	12.90
May-12	42.52	Nov-15	20.53
Jun-12	37.18	Dec-15	20.85
Jul-12	25.74	Jan-16	11.27
Aug-12	27.91	Feb-16	16.49
Sep-12	28.43	Mar-16	28.34
Oct-12	37.08	Apr-16	21.18
Nov-12	47.75	May-16	17.59
Dec-12	31.63	Jun-16	20.91
Jan-13	23.02	Jul-16	16.16
Feb-13	20.84	Aug-16	9.78
Mar-13	28.60	Sep-16	12.78
Apr-13	40.08	Oct-16	14.52
May-13	38.17	Nov-16	16.96
Jun-13	35.98	Dec-16	14.31
Jul-13	31.20	Jan-17	7.25
Aug-13	25.98	Feb-17	13.78

Date	Average PM_{10} ($\mu g/m^3$)	Date	Average PM_{10} ($\mu g/m^3$)
Sep-13	28.01	**Mar-17**	16.37
Oct-13	33.25	**Apr-17**	18.98
Nov-13	29.64	**May-17**	16.62
Dec-13	18.67	**Jun-17**	18.64
Jan-14	30.45	**Jul-17**	17.66
Feb-14	29.45	**Aug-17**	13.46
Mar-14	29.21	**Sep-17**	14.32
Apr-14	30.80	**Oct-17**	28.15
May-14	37.69	**Nov-17**	25.20
Jun-14	24.31	**Dec-17**	24.62

A4.2 PM_{10} & Wind Speed

To help determine the sources contributing to PM_{10} in the Ajo area, ADEQ examined correlations between wind speed and monitored PM_{10} concentrations. Non-anthropogenic sources of PM_{10} generally contribute to ambient concentrations during high-wind conditions while anthropogenic sources are expected to occur regardless of wind conditions. The following figures graph wind speeds and their corresponding PM_{10} concentration as recorded at the monitoring site in the Ajo area.

The following are ADEQ's comments and observations on these figures:

- The data in the figures and tables below are based on the ADEQ continuous monitor's data from 2011 through 2017.
- Ajo data is expressed as 1-hr averages.
- Removed wind speed and PM_{10} data unless both data points were valid numbers, including all instances of "NAN", "BA", and negative values.
- Grouped wind speed and wind direction values into three bins based on PM_{10} concentration: 0-75 $\mu g/m^3$, 75-150 $\mu g/m^3$, and 150+ $\mu g/m^3$.
- Used a polar plot to graph the wind speeds and wind directions of each binned group.
- Overall mid to high observed PM_{10} concentrations (75 – 150+ $\mu g/m^3$) only account for 5.21% of all observed PM_{10} concentrations, indicating that an exceedance is very unlikely (see Table A-12).
- The majority of observed PM_{10} concentrations above 150 $\mu g/m^3$ are observed during low to mid wind (0-10 mph) conditions, with winds from the south (see Figure A-10). Winds from the south would have blown straight over the slag re-processing area during

its operation, contributing to the exceedances. Additionally, the majority of observed PM_{10} concentrations above 150 µg/m^3 occurred from 2011-2013 when the slag re-processing facility was operating[4].

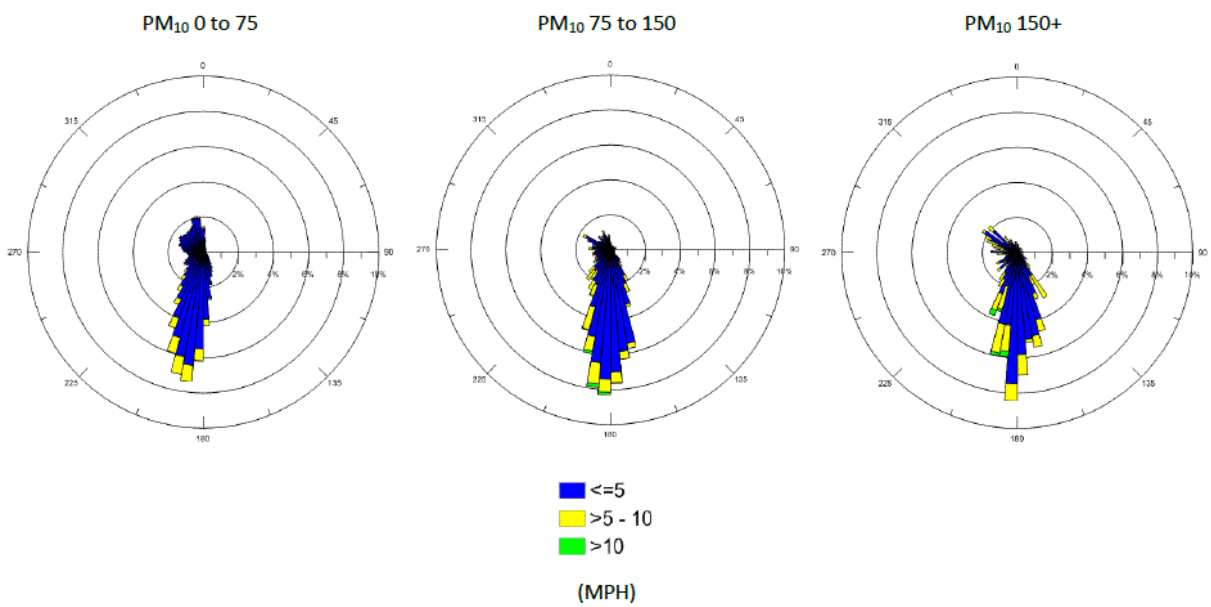
Table A-11: Observation Count by Wind Speed and PM_{10} Bin

	Wind Speed (mph)		
PM_{10} Bin	**0-5**	**5-10**	**10+**
0-75 µg/m^3	51,428	4,246	6
75-150 µg/m^3	1,825	296	15
150+ µg/m^3	501	137	11

Table A-12: Observations by PM_{10} Bin

	Count	Percent
0-75 µg/m^3	55,680	95.24%
75-150 µg/m^3	2,136	3.65%
150+ µg/m^3	649	1.11%

Figure A-10: Wind Roses



[4] The slag re-processing facility ceased operations in 2014 and completed stabilization in 2015.

A4.3 Exceedance Days

In order to better understand the nature of the exceedance events, ADEQ examined average and maximum wind speed data for exceedance days (Table A-13). ADEQ examined the meteorological data available from the Ajo site on exceedance days and created the wind rose graph shown in Figure A-11. This graph shows that during the exceedance days examined (1/1/2011-12/30/2017), high winds were predominantly from the south-southwest. The slag reprocessing facility that was in operation during the time is located across the road and to the south of the Ajo monitor (see Figure A-12). Additionally, there are two types of weather patterns associated with these exceedances, a low-pressure system/trough or an active monsoon pattern. The low-pressure system/trough causes strong winds ahead of the frontal passage, increasing windblown dust emissions, while the monsoon pattern creates strong wind outflows that increase windblown dust emissions.

Table A-13: Wind Speed & Direction, Exceedance Days

Date	24-hr Average (µg/m^3)	Avg Wind Speed (mph)	Max Wind Speed (mph)	Avg Wind Direction (degrees)	Weather Pattern
06/29/2011	157	12.44	27.72	194	Pre-Frontal
08/18/2011	206	8.85	32.84	185	Monsoon
08/26/2011	213	5.52	28.23	179	Monsoon
08/27/2011	167	7.22	46.17	214	Monsoon
04/08/2013	299	16.64	44.58	209	Pre-Frontal

Figure A-11: Ajo Wind Rose, Exceedance Days 2011-2017

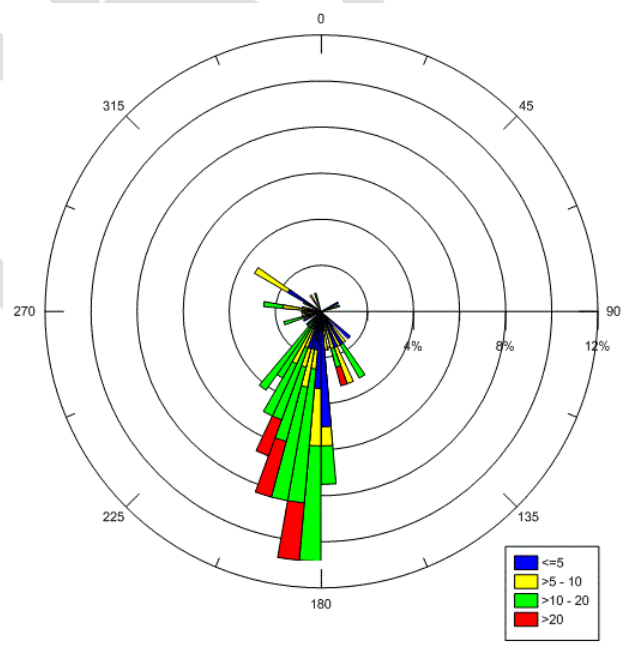
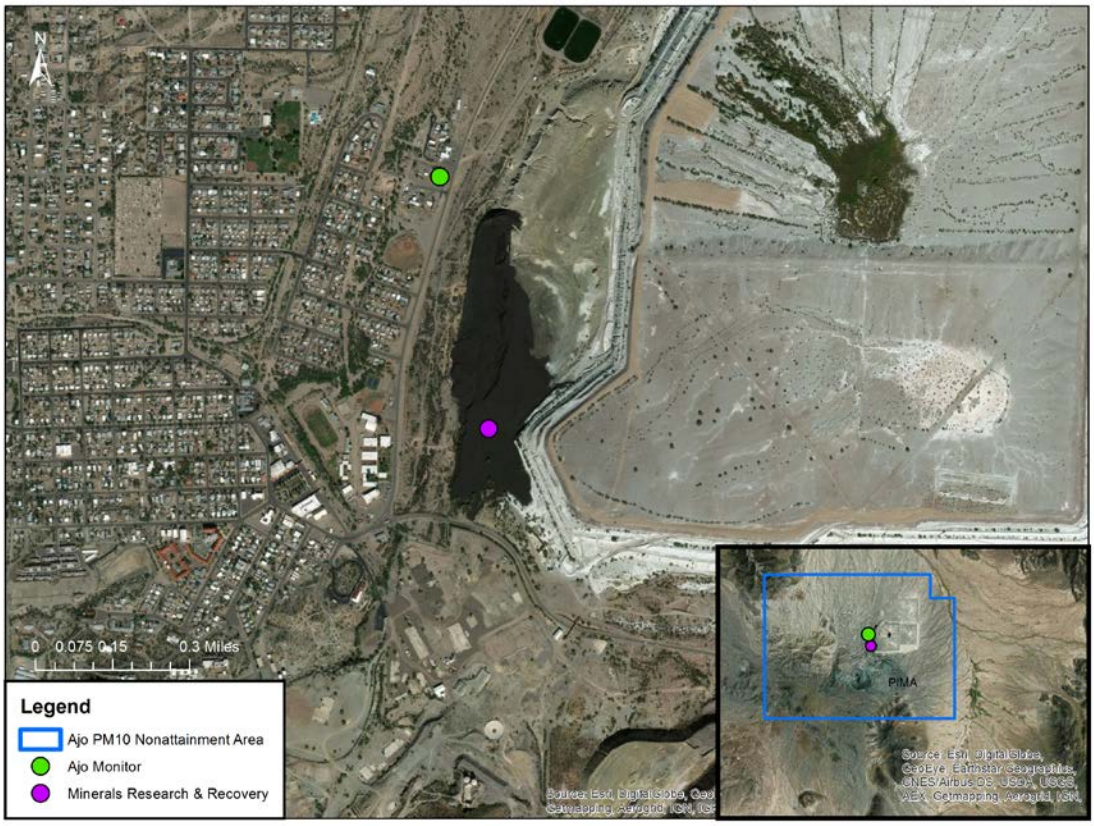


Figure A-12: Monitor Location in Relation to Slag Reprocessing Facility



A5 Emission Inventory

A summary of the Ajo PM_{10} emission inventory is provided below in Figure A-13 and Table A-14. This summary details the annual PM_{10} totals (in tons) for 2011, the base year 2014, and provides projected future emissions for years 2016, 2021, 2026, and 2031. For ease of review this summary provides emissions for only four, high-level categories: point[5], nonpoint, windblown, and mobile. Further sections of this TSD provide greater levels of detail for each of these categories.

Figure A-13: Ajo PM_{10} Emission Summary

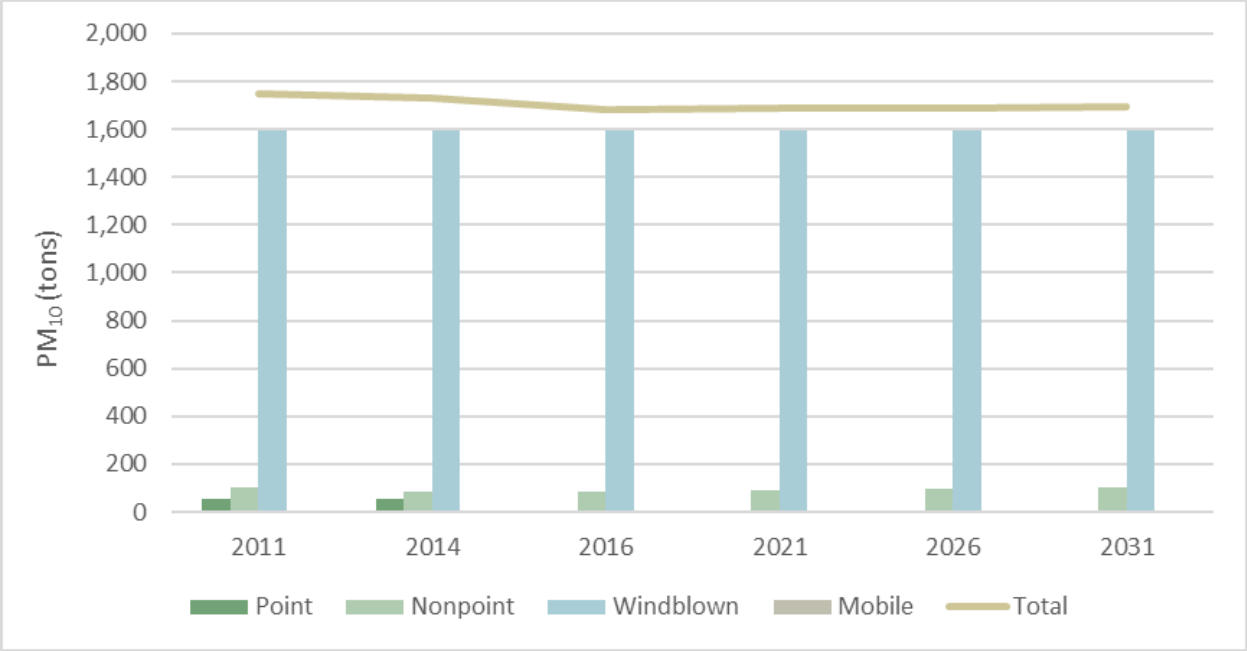


Table A-14: Emission Summary

Source	2011	2014	2016	2021	2026	2031
Point	51.86	51.86	0.41	0.41	0.41	0.41
Nonpoint	101.24	85.33	85.82	91.17	95.98	100.56
Windblown	1,592.73	1,592.73	1,592.73	1,592.73	1,592.73	1,592.73
Mobile	1.53	1.38	1.39	1.42	1.50	1.56
Total	**1,747.35**	**1,731.29**	**1,680.35**	**1,685.73**	**1,690.61**	**1,695.26**

[5] For the purposes of this document, a point source is defined as a large, stationary (non-mobile), identifiable source of emissions. This definition includes major and minor permitted sources by state and local agencies, as well as other non-permitted sources such as airports, EGUs, and landfills. All fugitive (excluding windblown) and non-fugitive emissions attributable to a point source, as defined above, are included as that point source's inventory.

A5.1 Precursor Compounds

ADEQ did not include estimates of PM_{10} precursor compounds in the emission inventory for the Ajo area. The Ajo area does not include any major sources of SO_2, NO_x, VOCs, or ammonia, and other sources of these emissions are not expected to be significant. Additionally, there are no major sources of condensable PM in the area, so condensable PM will not be included in the emission inventory.

A5.1.1 NO_x

To estimate NO_x emissions in the Ajo PM_{10} NAA, ADEQ examined NO_x emissions for Pima County from the 2014 NEIv1 (see Figure A-14). Mobile NO_x accounts for much of the Pima County NO_x inventory. However, the Ajo area has a very small population (0.3% of Pima County's population) and minor thru traffic on State Route 85. Therefore, ADEQ expects there to be very limited NO_x associated with mobile sources in the Ajo area.

ADEQ also examined fire data and based on the event-level fire data in 2014 (see A5.3.1.3), ADEQ estimates that the NO_x total due to fires is zero since there were no fires in the NAA. Even fires within 25 miles of the Ajo area only produced 0.10 tons of NO_x, which is negligible.

The NO_x contributions from the remaining sources (fuel combustion, industrial processes, biogenic, waste disposal, and miscellaneous) in the Ajo area are likewise expected to represent but a fraction of the Pima County totals, and as such aren't expected to provide significant amounts of NO_x to the ambient air. These minimal amounts of NO_x emissions in the Ajo area will not lead to a significant increase in PM_{10} formation.

Figure A-14: 2014NEI NO_x Pima County

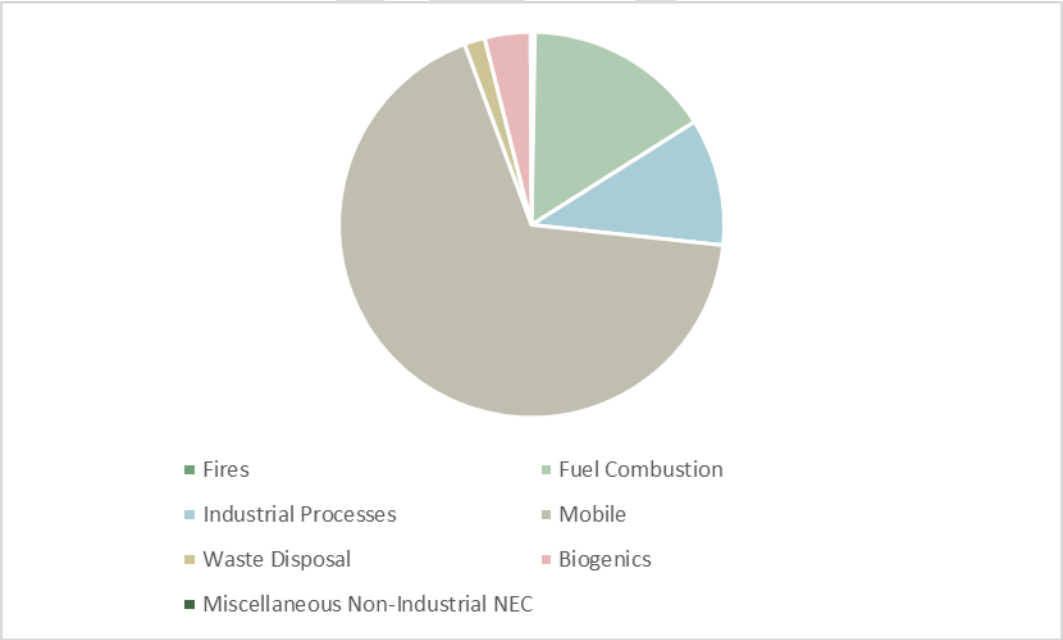


Table A-15: Pima County NO_x Emissions

Source	Pima County (tons)	NAA Estimate (tons)
Mobile	13,982.27	18.62
Fires	57.20	0.00
Biogenic	795.35	4.07
Industrial Processes	2,201.80	7.20
Fuel Combustion	3,256.62	10.65
Waste Disposal	358.23	1.17
Miscellaneous Non-Industrial NEC	15.83	0.05

Estimate Methodologies

- *Mobile* – NEI/NAA ratio of 750.87. Calculated by comparing mobile emissions in NEI to NAA-specific mobile estimates from MOVES.
- *Fires* – Sum of event-level fire data from NEI for NAA.
- *Biogenic* – Pima County/NAA land area ratio of 195.23.
- *All other categories* – Pima County/NAA population ratio (2014) of 305.67.

A5.1.2 SO_2

To estimate SO_2 emissions in the Ajo PM_{10} area, ADEQ examined SO_2 emissions for Pima County from the 2014NEIv1 (see Figure A-15). Fuel combustion SO_2 accounts for much of the Pima county SO_2 inventory. However, the Ajo area has a very small population, and therefore, ADEQ expects there to be very limited SO_2 associated with fuel combustion in the Ajo area.

ADEQ also examined fire data and based on the event-level fire data in 2014 (see A5.3.1.3), ADEQ estimates that the SO_2 total due to fires is zero since there were no fires in the NAA. Even fires within 25 miles of the Ajo area only produced 0.04 tons of SO_2, which is negligible.

The SO_2 contributions from the remaining sources (industrial processes, mobile, and waste disposal) in the Ajo area are likewise expected to represent but a fraction of the Pima County totals, and as such aren't expected to provide significant amounts of SO_2 to the ambient air. These minimal amounts of SO_2 emissions in the Ajo area will not lead to a significant increase in PM_{10} formation.

Figure A-15: 2014NEI SO_2 Pima County

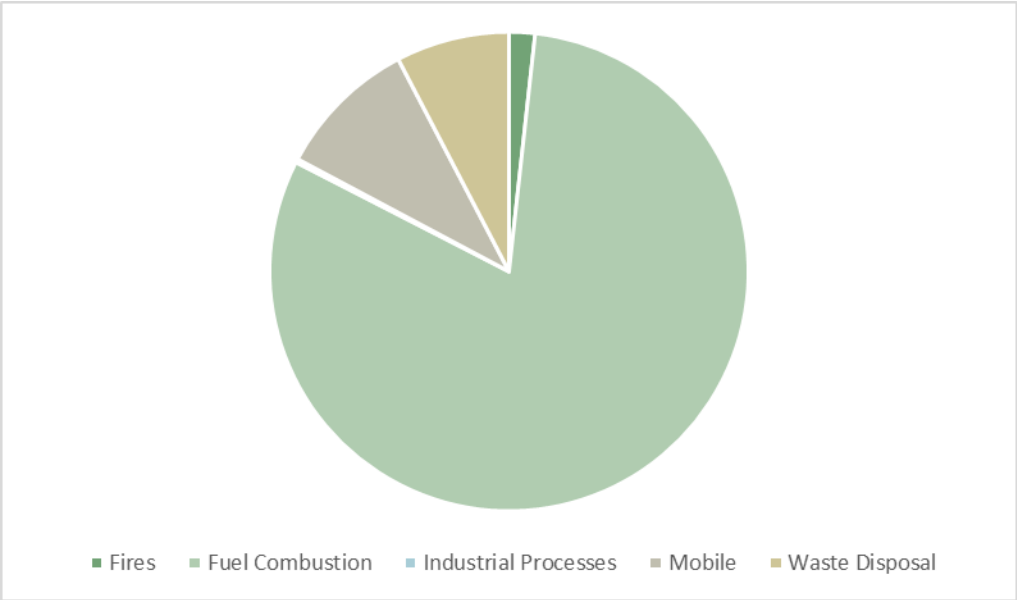


Table A-16: Pima County SO_2 Emissions

Source	Pima County (tons)	NAA Estimate (tons)
Mobile	143.85	0.19
Fires	26.28	0.00
Industrial Processes	3.64	0.01
Fuel Combustion	1,215.45	3.98
Waste Disposal	115.27	0.38

Estimate Methodologies

- *Mobile* – NEI/NAA ratio of 750.87. Calculated by comparing mobile emissions in NEI to NAA-specific mobile estimates from MOVES.
- *Fires* – Sum of event-level fire data from NEI for NAA.
- *All other categories* – Pima County/NAA population ratio (2014) of 305.67.

A5.1.3 Ammonia

To estimate ammonia emissions in the Ajo PM_{10} area, ADEQ examined ammonia emissions for Pima County from the 2014NEIv1 (see Figure A-16). Agricultural ammonia accounts for much of the Pima county ammonia inventory. However, the Ajo area has very limited agricultural activity, with only 6.40 acres (0.02% of the NAA) devoted to cropland (see Table A-45). Therefore, ADEQ expects there to be very limited ammonia associated with agriculture in the Ajo area.

ADEQ also examined fire data and based on the event-level fire data in 2014 (see A5.3.1.3), ADEQ estimates that the ammonia total due to fires is zero since there were no fires in the NAA. Even fires within 25 miles of the Ajo area only produced 0.06 tons of ammonia, which is negligible.

The ammonia contributions from the remaining sources (fuel combustion, industrial processes, mobile, and waste disposal) in the Ajo area are likewise expected to represent but a fraction of the Pima County totals, and as such aren't expected to provide significant amounts of ammonia to the ambient air. These minimal amounts of ammonia emissions in the Ajo area will not lead to a significant increase in PM_{10} formation.

Figure A-16: 2014NEI Ammonia Pima County

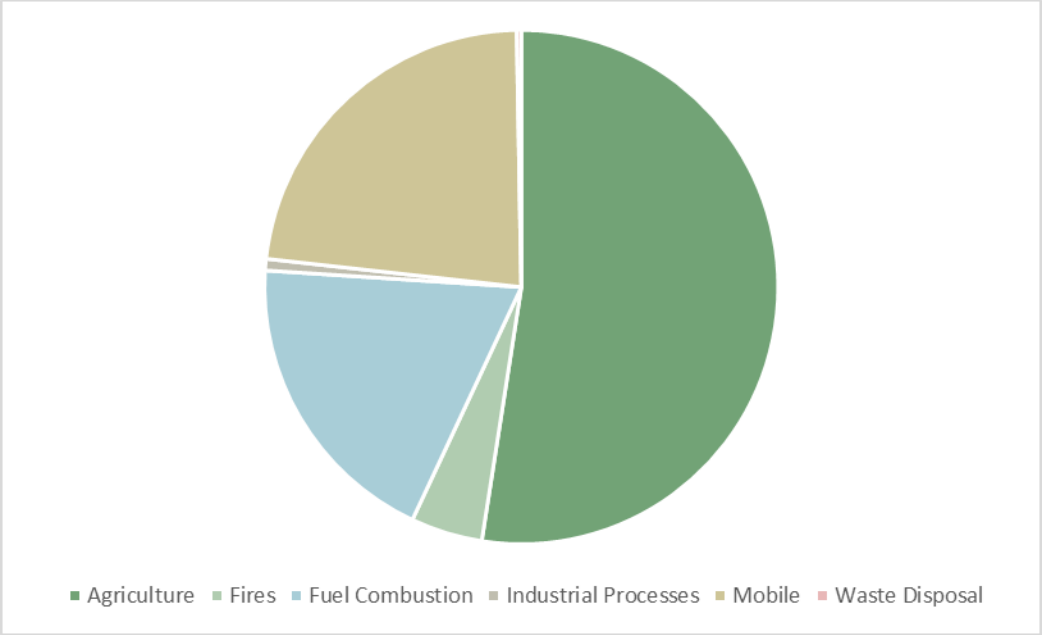


Table A-17: Pima County Ammonia Emissions

Source	Pima County (tons)	NAA Estimate (tons)
Agriculture	506.95	0.09
Fires	43.59	0.00
Fuel Combustion	184.07	0.60
Industrial Processes	7.00	0.02
Mobile	221.89	0.30
Waste Disposal	2.71	0.01

Estimate Methodologies

- Agriculture – Pima County/NAA cropland ratio of 5,436.36.
- *Mobile* – NEI/NAA ratio of 750.87. Calculated by comparing mobile emissions in NEI to NAA-specific mobile estimates from MOVES.
- *Fires* – Sum of event-level fire data from NEI for NAA.

- *All other categories* – Pima County/NAA population ratio (2014) of 305.67.

A5.1.4 VOCs

To estimate VOC emissions in the Ajo PM_{10} NAA, ADEQ examined VOC emissions for Pima County from the 2014 NEIv1 (see Figure A-17). Biogenic VOC accounts for much of the Pima County VOC inventory, and come from the natural vegetation of the area.

After biogenic emissions, Solvent VOC accounts for much of the Pima County VOC inventory. However, the Ajo area has a very small population (0.3% of Pima County's population) and no major industries that utilize solvents. Therefore, ADEQ expects there to be very limited VOC associated with solvent sources in the Ajo area.

ADEQ also examined fire data and based on the event-level fire data in 2014 (see A5.3.1.3), ADEQ estimates that the VOC total due to fires is zero since there were no fires in the NAA. Even fires within 25 miles of the Ajo area only produced 0.85 tons of VOC, which is negligible.

The VOC contributions from the remaining sources (mobile, fuel combustion, gas stations, and waste disposal) in the Ajo area are likewise expected to represent but a fraction of the Pima County totals, and as such aren't expected to provide significant amounts of VOC to the ambient air. These minimal amounts of VOC emissions in the Ajo area will not lead to a significant increase in PM_{10} formation.

Figure A-17: 2014NEI VOCs Pima County

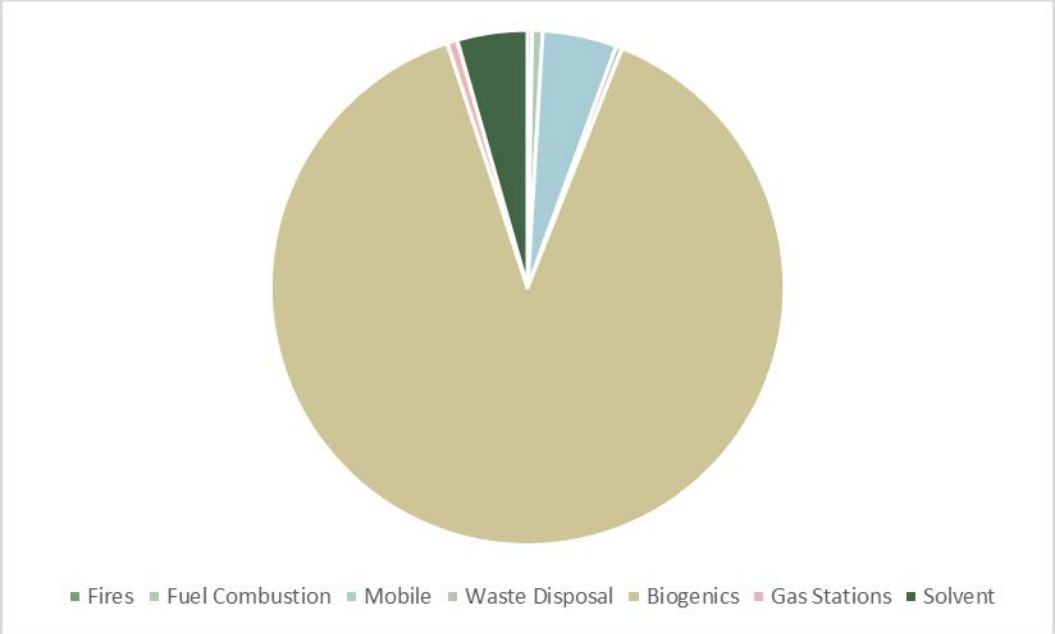


Table A-18: Pima County VOC Emissions

Source	Pima County (tons)	NAA Estimate (tons)
Biogenics	194,918.00	998.41
Fires	626.66	0.00
Fuel Combustion	1,448.39	4.74
Solvent	9,705.47	31.75
Mobile	10,255.83	13.66
Waste Disposal	815.93	2.67
Gas Stations	1,401.15	4.58

Estimate Methodologies

- Biogenics – Pima County/NAA land ratio of 195.23.
- *Mobile* – NEI/NAA ratio of 750.87. Calculated by comparing mobile emissions in NEI to NAA-specific mobile estimates from MOVES.
- *Fires* – Sum of event-level fire data from NEI for NAA.
- *All other categories* – Pima County/NAA population ratio (2014) of 305.67.

A5.2 Point Source Inventory

Pima County Department of Environmental Quality (PCDEQ) has jurisdiction over permitting air quality matters in the Ajo PM_{10} area. There are only two sources currently permitted in the area by PCDEQ, both of which are facilities permitted to operate diesel fired emergency generators and detailed in Table A-19. These three permitted sources do not have any actual emissions reported. In addition to the three permitted emergency generators, there is also a landfill in the Ajo area. This landfill is not permitted and does not report emissions because it falls below the permitting threshold for Pima County. Emissions for the Ajo landfill were estimated by scaling down emissions from a larger permitted facility in Pima County, based on waste acceptance rates for each facility (Table A-20).

Table A-19: Permitted Point Sources

Facility	Equipment	Permitting Agency	ATO #
Freeport-McMoRan – Childs Well Field	Emergency Generator	PCDEQ	6120-01
U.S. Department of Homeland Security – Custom and Border Protection Housing	Emergency Generator 1	PCDEQ	6162-1
	Emergency Generator 2	PCDEQ	6162-2

Table A-20: Landfill Emissions

Landfill	Waste Acceptance Rate (tpy)	PM10 Emissions PTE (tpy)
Los Reales Landfill	551,920	72.44
Marana Landfill	328,500	57.02
Ajo Landfill	2,701	Not permitted
Ajo/Los Reales	0.005	0.36
Ajo/Marana	0.008	0.47
Average Estimated PM10 Emissions for Ajo Landfill		0.41

A5.2.1 Historic Point Sources

While there are no point sources currently permitted in the Ajo PM_{10} area, there have been a few significant sources in the past (see Figure A-18).

Open pit copper mining had been previously conducted for more than 60 years at the Phelps Dodge (now Freeport-McMoRan) New Cornelia mine in Ajo, Arizona. The mine stopped production in the mid to late 1980s, with the smelter ceasing as well. The smelter buildings were then dismantled in the 1990s.

After the mine and smelter closed, the tailings impoundment became the main source of emissions in the Ajo area. The tailings impoundment is about 1,900 acres total, with about 820 acres of it vegetated. Between May 1990 and October 1991 the tailings impoundment was armored with crushed rock, covering about 85% of the total area, leading to a 90% emissions

reduction. ADEQ had a 1991 inventory created that illustrated this reduction of emissions (see Table A-21).

Table A-21: 1991 ADEQ Ajo Windblown Emission Inventory

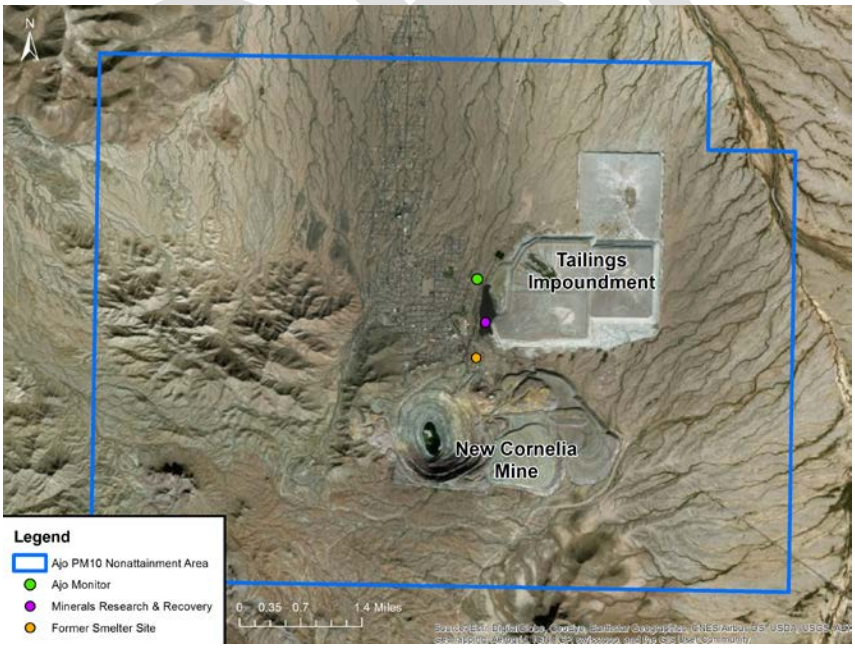
	Pre-Capping Emissions (tpy)	Post-Capping Emissions (tpy)
Tailings Impoundment	112	11

Minerals Research and Recovery, Inc. (MRRI) began reprocessing the old mine's slag pile to manufacture roofing granules and abrasives in the late 1990s after the mine shut down operation. The permit for this operation was renewed in 2006, allowing the operation a PTE of 51.45 tpy. While reported actual emissions for the source in 2005-2007 were much less than the allowed PTE (see Table A-22), the source had numerous Notices of Violations from Pima County between 1997 and 2014. No emissions data was available for the years after 2007, though the facility was still operating through 2014. Because of this ADEQ will use the 2006 PTE as the 2014 base year emissions. The community in Ajo also had numerous dust complaints during this time against MRRI[6]. This source ceased operations in 2015 and stabilization of the site was completed in 2015.

Table A-22: MRRI Activity Based Emissions Data including Fugitives

	2006 PTE	2005 Actual Emissions (tons)	2006 Actual Emissions (tons)	2007 Actual Emissions (tons)
MRRI	51.45	22.43	16.75	15.40

Figure A-18: Historic Significant Sources in Ajo



[6] Further details of these dust complaints can be found in Section 4.4.1 of the SIP document.

A5.3 Nonpoint Source Inventory

Table A-23: Emission Totals - Nonpoint

Emission Sector	PM_{10} (tons)					
	2011	2014	2016	2021	2026	2031
Agriculture - Crops & Livestock Dust	0.16	0.11	0.11	0.11	0.11	0.11
Commercial Cooking	0.95	0.98	0.98	1.04	1.10	1.15
Dust - Construction Dust	63.83	42.80	43.05	45.74	48.16	50.46
Dust - Paved Road Dust	6.95	4.58	4.60	4.89	5.15	5.39
Dust - Unpaved Road Dust	24.89	28.20	28.37	30.14	31.73	33.24
Dust – Windblown from Vacant Land[7]	1,592.73	1,592.73	1,592.73	1,592.73	1,592.73	1,592.73
Fires - Agricultural Field Burning	0.00	0.00	0.00	0.00	0.00	0.00
Fires - Prescribed Fires	0.40	0.00	0.00	0.00	0.00	0.00
Fires – Wildfires	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Comm/Institutional - Biomass	0.17	0.05	0.05	0.05	0.05	0.05
Fuel Comb - Comm/Institutional - Coal	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Comm/Institutional - Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Comm/Institutional - Oil	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Electric Generation - Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Electric Generation - Oil	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Industrial Boilers, ICEs - Biomass	0.00	0.02	0.02	0.02	0.02	0.02
Fuel Comb - Industrial Boilers, ICEs - Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Industrial Boilers, ICEs - Oil	0.00	0.16	0.16	0.17	0.18	0.19
Fuel Comb - Industrial Boilers, ICEs - Other	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Residential - Natural Gas	0.01	0.01	0.01	0.01	0.01	0.01
Fuel Comb - Residential – Oil	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Residential - Other	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Comb - Residential - Wood	3.50	3.46	3.48	3.70	3.90	4.08
Industrial Processes - Chemical Manuf	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Processes – Mining[8]	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Processes - NEC	0.00	0.03	0.03	0.03	0.04	0.04
Industrial Processes - Non-ferrous Metals	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Processes - Oil & Gas Production	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Processes - Pulp & Paper	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Processes - Storage and Transfer	0.37	0.54	0.55	0.58	0.61	0.64
Miscellaneous Non-Industrial NEC	0.00	0.17	0.17	0.18	0.19	0.20
Solvent - Industrial Surface Coating & Solvent Use	0.00	0.00	0.00	0.00	0.00	0.00
Waste Disposal	0.00	4.20	4.22	4.49	4.72	4.95
Total	**1,693.96**	**1,678.05**	**1,678.54**	**1,683.90**	**1,688.71**	**1,693.28**

[7] All windblown emissions were averaged from 2011-2016; this is to account for the variability in meteorology from year to year.

[8] The mine is no longer in operation, and does not have any activity (including overburden removal, drilling and blasting, and loading and unloading activities) occurring at the site. Windblown emissions from the mine, slag dump, and tailings are included in the windblown category under non-developed land other.

A5.3.1 Emission Calculation Methodology

The calculation methodologies ADEQ used to develop the nonpoint emission inventory are summarized in Table A-24 below. The majority of the emission sectors rely on 2014 NEIv1 data as the basis for the emission totals, which are used in conjunction with allocation and projection factors to establish the nonpoint inventory for the Ajo PM_{10} NAA. The two exceptions to this are Industrial Processes – Mining, which is assumed to be zero due to the inactive mine, and Dust – Windblown from Vacant Land, which will rely on bottom-up emission calculations.

Table A-24: Calculation Methods

Emission Sector	Calculation Method
Agriculture - Crops & Livestock Dust	2014 NEIv1
Commercial Cooking	2014 NEIv1
Dust - Construction Dust	2014 NEIv1
Dust - Paved Road Dust	2014 NEIv1
Dust - Unpaved Road Dust	2014 NEIv1
Dust – Windblown from Vacant Land	See A5.3.1.2
Fires - Agricultural Field Burning	2014 NEIv1 – See A5.3.1.3
Fires - Prescribed Fires	2014 NEIv1 – See A5.3.1.3
Fires – Wildfires	2014 NEIv1 – See A5.3.1.3
Fuel Comb - Comm/Institutional - Biomass	2014 NEIv1
Fuel Comb - Comm/Institutional - Coal	2014 NEIv1
Fuel Comb - Comm/Institutional - Natural Gas	2014 NEIv1
Fuel Comb - Comm/Institutional - Oil	2014 NEIv1
Fuel Comb - Electric Generation - Natural Gas	2014 NEIv1
Fuel Comb - Electric Generation - Oil	2014 NEIv1
Fuel Comb - Industrial Boilers, ICEs - Biomass	2014 NEIv1
Fuel Comb - Industrial Boilers, ICEs - Natural Gas	2014 NEIv1
Fuel Comb - Industrial Boilers, ICEs - Oil	2014 NEIv1
Fuel Comb - Industrial Boilers, ICEs - Other	2014 NEIv1
Fuel Comb - Residential - Natural Gas	2014 NEIv1
Fuel Comb - Residential – Oil	2014 NEIv1
Fuel Comb - Residential - Other	2014 NEIv1
Fuel Comb - Residential - Wood	2014 NEIv1
Industrial Processes - Chemical Manuf	2014 NEIv1
Industrial Processes – Mining*	N/A - See A5.3.1.1*
Industrial Processes - NEC	2014 NEIv1
Industrial Processes - Non-ferrous Metals	2014 NEIv1
Industrial Processes - Oil & Gas Production	2014 NEIv1
Industrial Processes - Pulp & Paper	2014 NEIv1
Industrial Processes - Storage and Transfer	2014 NEIv1
Miscellaneous Non-Industrial NEC	2014 NEIv1
Solvent - Industrial Surface Coating & Solvent Use	2014 NEIv1
Waste Disposal	2014 NEIv1

* *Indicates allocation methodology change from Inventory Preparation Plan*

A5.3.1.1 Point/Nonpoint Reconciliation

To account for overlap between the point and nonpoint datasets, ADEQ reconciled the emission totals in the Industrial Processes – Mining nonpoint sector. After reviewing the datasets used to compile the 2014 NEIv1, ADEQ determined that this sector relies on the 2011EPA_NP_Ovrlp dataset, indicating that the emission totals overlap with point emissions. All mining emissions in the Ajo PM_{10} nonattainment area would be attributable to point sources, including the Freeport-McMoRan Ajo mine and smelter, if they were both still operating. Since the closed Freeport-McMoRan facilities account for the only mining operations in the Ajo nonattainment area ADEQ assumed that the Industrial Processes – Mining nonpoint sector has zero emissions.

A5.3.1.2 Dust – Windblown from Vacant Land

Windblown dust from vacant land is not a source category that is included in the 2014 NEI dataset. During discussions between ADEQ and EPA Region 9, it was decided that this category should be added as it is likely that this source category constitutes a significant proportion of the overall PM_{10} inventory. While emission factors are well established for windblown dust from vacant land, no clear methodology exists for estimating these emissions from an entire planning area. ADEQ leveraged the windblown methodology created for the 2015 West Pinal Moderate PM_{10} Nonattainment Area SIP (henceforward referred to as the West Pinal PM_{10} SIP) and re-used portions of that methodology where appropriate.

Summary of windblown dust emission calculation methodology:

1. Establish land use categories
2. Define how many wind events occur per year
3. Establish windblown PM_{10} emission factors
4. Establish adjustment factors
5. Calculate emissions

Establish land use categories

Because soil stability is an important factor in windblown dust calculations, it is important to establish land use categories so that appropriate disturbed/undisturbed proportions can be estimated. The West Pinal PM_{10} SIP established 12 land use categories, including developed rural lands, cleared areas, residential construction, and dairies. ADEQ decided to establish a similar list of land use categories that were more appropriate to the Ajo PM_{10} area. These land use categories, along with their associated disturbed/undisturbed proportions and total land areas, are listed in Table A-25.

Table A-25: Land Use Categories

Land Category	Land Use Description	Land Area (mi^2)	Disturbed	Undisturbed
Developed Rural Lands (low density residential)	Unpaved Roads/Alleys	0.04	96%	4%
	Unpaved Parking Areas	0.00	96%	4%
	Disturbed Open Areas	0.04	90%	10%
	Other	3.44	10%	90%
Non-Developed Lands	Unpaved Roads	0.04	96%	4%
	Vacant Land & Open Areas	33.29	15%	85%
	Agriculture	0.01	18%	16%
	Other (Freeport-McMoRan)	9.76	10%	90%

Developed Rural Lands (low density residential) - Land area for this category was defined as the CDP boundary of Ajo. ADEQ assumed all land within these city boundaries are rural, low density residential. ADEQ used ArcGIS and aerial photography to categorize areas within the town of Ajo as either an unpaved road/alley, unpaved parking area, disturbed open area, or other. Descriptions of these areas are provided below.

Unpaved Roads/Alleys – A roadway or path that appeared to be well-established for the use of motor vehicles. Driveways on private residential property were not included.

Unpaved Parking Areas – Open areas that appeared to be used primarily for vehicle parking. These included unpaved areas outside of commercial establishments and recreational facilities.

Disturbed Open Areas – Open areas that appeared to be disturbed from its native state, however there was no clear indication it was being actively used for vehicle parking. Areas that were disturbed due to vehicle use (i.e. ATV or other off-road activity) were included in this category.

Other – Catch-all category for anything not explicitly categorized. Includes mainly undisturbed native desert areas and developed residential and commercial properties.

Non-Developed Lands – Land area for this category was defined as any land outside the CDP boundary of Ajo. The majority of this land is comprised of undisturbed, native desert and mountainous terrain. ADEQ used the four categories listed below to define windblown emissions from these undeveloped lands.

Unpaved Roads – ADEQ used ArcGIS to determine unpaved road area for the Ajo area, using aerial photography to categorize roads as either paved or unpaved.

Vacant Land & Open Areas – ADEQ assumed that all land was considered "vacant land" if not otherwise categorized. Additionally, un-developed portions of the Ajo CDP were included in this category, and not in developed rural lands, based on aerial photography. Since the West Pinal PM_{10} SIP did not include a "vacant land" category, ADEQ used the disturbed/undisturbed ratio of the "cleared areas" category.

Agriculture – ADEQ relied on CropScape[9] data to determine cropland area. The disturbed/undisturbed percentages do not sum to 100% as it takes into account crop planting, growth, and harvest schedules. More details on how these values were calculated can be found in the West Pinal PM_{10} SIP (Arizona Department of Environmental Quality, 2015).

Other – Catch-all category for the inactive properties owned by Freeport-McMoRan. This includes the mine and smelter site, the tailing impoundment, and the slag dump.

Define Wind Events

Windblown emissions are an intermittent occurrence, only occurring during periods when winds are strong enough to entrain dust into the ambient air. For the purposes of calculating windblown emissions ADEQ defined a wind event as a period of 3 or more consecutive hours of winds exceeding 12 mph. Using wind speed data collected at the Ajo monitor, ADEQ calculated the wind event information provided in Table A-26.

Table A-26: Wind Events

Year	# Wind Events	Total High Wind (hrs)	Total High Wind (s)
2011	68	524	1,958,400
2012	56	428	1,612,800
2013	66	537	2,138,400
2014	44	248	950,400
2015	53	309	1,144,800
2016	45	303	1,134,000

Establish PM_{10} Emission Factors

Once ADEQ had established land use categories and wind event duration, it was necessary to determine emission factors to associate with both. The West Pinal PM_{10} SIP established PM_{10} emission factors for both disturbed and undisturbed areas. These factors were developed using data from two monitors in the West Pinal planning area, Pinal County Housing Complex (PCH) and Stanfield (STF). These locations are approximately 60-80 miles from the Ajo PM_{10} area (see Figure A-19), and represent the best windblown emission rate data available. Both disturbed and undisturbed emission rates were available for each monitoring location for each wind speed bin. For use in the context of Ajo PM_{10}, ADEQ took the conservative measure of using the maximum emission factor for each wind speed bin. These emission factors are presented in Table A-27.

[9] https://nassgeodata.gmu.edu/CropScape/

Figure A-19: Pinal County Monitors

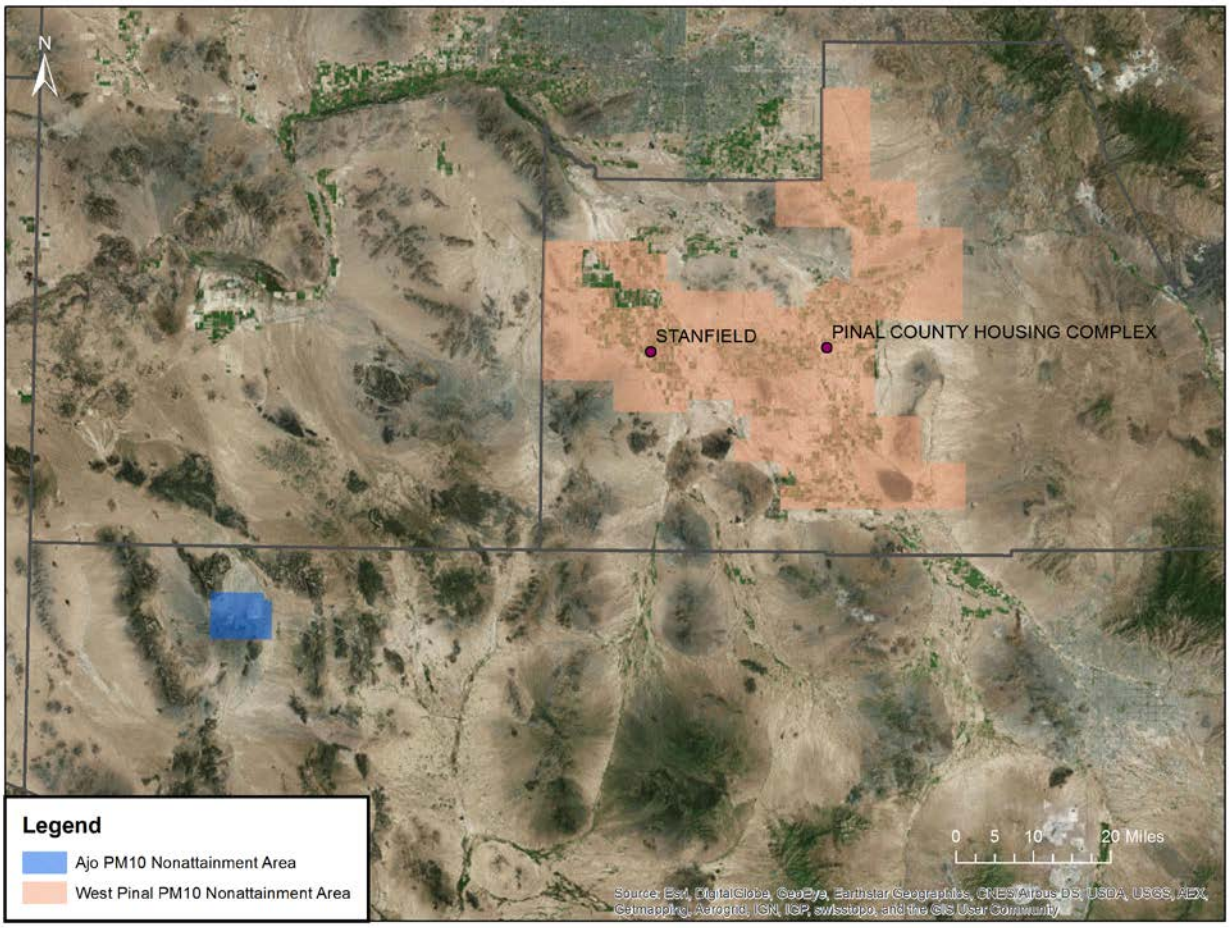


Table A-27: High Wind Emission Factors

Windspeed Bins (mph)	Disturbed EF (g/m2*s)	Undisturbed EF (g/m2*s)	Windspeed Bins (mph)	Disturbed EF (g/m2*s)	Undisturbed EF (g/m2*s)
12	3.06E-05	6.17E-06	22	4.27E-04	6.38E-05
13	4.89E-05	9.86E-06	23	5.05E-04	7.55E-05
14	6.58E-05	1.33E-05	24	6.04E-04	9.03E-05
15	1.04E-04	1.80E-05	25	7.18E-04	9.54E-05
16	1.15E-04	1.99E-05	26	8.87E-04	1.18E-04
17	1.48E-04	2.57E-05	27	9.92E-04	1.32E-04
18	1.84E-04	3.19E-05	28	1.16E-03	1.54E-04
19	2.35E-04	4.07E-05	29	1.34E-03	1.78E-04
20	2.71E-04	4.05E-05	30	1.54E-03	1.86E-04
21	3.45E-04	5.15E-05			

Establish Adjustment Factors

To calculate annual windblown emissions, this methodology employs the use of a year-specific emission factor for disturbed areas and one for undisturbed areas. The formula for calculating windblown PM_{10} emissions is provided below:

$$PM10 = EF\left(\frac{g}{m^2 s}\right) * Wind\ Event\ Duration\ (s) * Effective\ Area\ (m^2)$$

Where:

- ***PM10*** *= total PM10 emissions in grams*
- ***EF*** *= the adjusted emission factor (one for disturbed area and another for undisturbed areas)*
- ***Wind Event Duration*** *= the total duration, in seconds, of high winds during a given year*
- ***Effective Area*** *= the adjusted land area in square meters (one for disturbed areas and another for undisturbed areas).*

Adjusted Emission Factors

To simplify the emission calculations, ADEQ employed the use of annual total wind event duration. This yields a single value which would need to be associated with a single emission factor in order to produce a viable emission total. However, an issue arises when trying to associate a single emission factor when emission factors are defined based on wind speed bin (see Table A-27); since wind events encompass a range of wind speeds it is inappropriate to assign a single emission factor to an entire event, let alone for an entire year's worth of events.

To resolve this issue, ADEQ employed the use of weighted average emission factors based on the annual distribution of wind speeds. An adjustment curve based on the work done in the West Pinal PM_{10} SIP was also applied to emission factors in an attempt to account for the temporal variability in particulate emissions during sustained high wind events. These adjusted emission factors (EFs) are presented below in Table A-28 through Table A-33.

Table A-28: Adjusted Emission Factors - 2011

Wind Speed Bin (mph)	2011			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
12	138	26%	3.1E-05	6.2E-06
13	103	20%	4.9E-05	9.9E-06
14	109	21%	6.6E-05	1.3E-05
15	56	11%	1.0E-04	1.8E-05
16	26	5%	1.1E-04	2.0E-05
17	29	6%	1.5E-04	2.6E-05
18	17	3%	1.8E-04	3.2E-05
19	19	4%	2.4E-04	4.1E-05
20	12	2%	2.7E-04	4.1E-05

Wind Speed Bin (mph)	2011			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
21	2	0%	3.4E-04	5.2E-05
22	4	1%	4.3E-04	6.4E-05
23	3	1%	5.1E-04	7.6E-05
24	2	0%	6.0E-04	9.0E-05
25	4	1%	7.2E-04	9.5E-05
26	0	0%	8.9E-04	1.2E-04
27	0	0%	9.9E-04	1.3E-04
28	0	0%	1.2E-03	1.5E-04
29	0	0%	1.3E-03	1.8E-04
30	0	0%	1.5E-03	1.9E-04
		Adjusted EFs	5.17E-05	9.12E-06

Table A-29: Adjusted Emission Factors - 2012

Wind Speed Bin (mph)	2012			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
12	92	21%	3.1E-05	6.2E-06
13	72	17%	4.9E-05	9.9E-06
14	80	19%	6.6E-05	1.3E-05
15	36	8%	1.0E-04	1.8E-05
16	42	10%	1.1E-04	2.0E-05
17	34	8%	1.5E-04	2.6E-05
18	24	6%	1.8E-04	3.2E-05
19	19	4%	2.4E-04	4.1E-05
20	7	2%	2.7E-04	4.1E-05
21	9	2%	3.4E-04	5.2E-05
22	8	2%	4.3E-04	6.4E-05
23	1	0%	5.1E-04	7.6E-05
24	3	1%	6.0E-04	9.0E-05
25	0	0%	7.2E-04	9.5E-05
26	0	0%	8.9E-04	1.2E-04
27	1	0%	9.9E-04	1.3E-04
28	0	0%	1.2E-03	1.5E-04
29	0	0%	1.3E-03	1.8E-04
30	0	0%	1.5E-03	1.9E-04
		Adjusted EFs	6.58E-05	1.15E-05

Table A-30: Adjusted Emission Factors - 2013

Wind Speed Bin (mph)	2013			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
12	123	23%	3.1E-05	6.2E-06
13	88	16%	4.9E-05	9.9E-06
14	107	20%	6.6E-05	1.3E-05
15	67	12%	1.0E-04	1.8E-05
16	39	7%	1.1E-04	2.0E-05
17	43	8%	1.5E-04	2.6E-05
18	22	4%	1.8E-04	3.2E-05
19	22	4%	2.4E-04	4.1E-05
20	8	1%	2.7E-04	4.1E-05
21	8	1%	3.4E-04	5.2E-05
22	2	0%	4.3E-04	6.4E-05
23	5	1%	5.1E-04	7.6E-05
24	1	0%	6.0E-04	9.0E-05
25	2	0%	7.2E-04	9.5E-05
26	0	0%	8.9E-04	1.2E-04
27	0	0%	9.9E-04	1.3E-04
28	0	0%	1.2E-03	1.5E-04
29	0	0%	1.3E-03	1.8E-04
30	0	0%	1.5E-03	1.9E-04
		Adjusted EFs	5.47E-05	9.65E-06

Table A-31: Adjusted Emission Factors - 2014

Wind Speed Bin (mph)	2014			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
12	83	33%	3.1E-05	6.2E-06
13	62	25%	4.9E-05	9.9E-06
14	41	17%	6.6E-05	1.3E-05
15	26	10%	1.0E-04	1.8E-05
16	12	5%	1.1E-04	2.0E-05
17	14	6%	1.5E-04	2.6E-05
18	5	2%	1.8E-04	3.2E-05
19	1	0%	2.4E-04	4.1E-05
20	2	1%	2.7E-04	4.1E-05
21	2	1%	3.4E-04	5.2E-05
22	0	0%	4.3E-04	6.4E-05
23	0	0%	5.1E-04	7.6E-05

Wind Speed Bin (mph)	2014			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
24	0	0%	6.0E-04	9.0E-05
25	0	0%	7.2E-04	9.5E-05
26	0	0%	8.9E-04	1.2E-04
27	0	0%	9.9E-04	1.3E-04
28	0	0%	1.2E-03	1.5E-04
29	0	0%	1.3E-03	1.8E-04
30	0	0%	1.5E-03	1.9E-04
		Adjusted EFs	4.17E-05	7.73E-06

Table A-32: Adjusted Emission Factors - 2015

Wind Speed Bin (mph)	2015			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
12	98	32%	3.1E-05	6.2E-06
13	69	22%	4.9E-05	9.9E-06
14	55	18%	6.6E-05	1.3E-05
15	36	12%	1.0E-04	1.8E-05
16	23	7%	1.1E-04	2.0E-05
17	13	4%	1.5E-04	2.6E-05
18	6	2%	1.8E-04	3.2E-05
19	6	2%	2.4E-04	4.1E-05
20	1	0%	2.7E-04	4.1E-05
21	1	0%	3.4E-04	5.2E-05
22	1	0%	4.3E-04	6.4E-05
23	0	0%	5.1E-04	7.6E-05
24	0	0%	6.0E-04	9.0E-05
25	0	0%	7.2E-04	9.5E-05
26	0	0%	8.9E-04	1.2E-04
27	0	0%	9.9E-04	1.3E-04
28	0	0%	1.2E-03	1.5E-04
29	0	0%	1.3E-03	1.8E-04
30	0	0%	1.5E-03	1.9E-04
		Adjusted EFs	3.96E-05	7.33E-06

Table A-33: Adjusted Emission Factors - 2016

Wind Speed Bin (mph)	2016			
	Wind Count	Percentage	Disturbed EFs (g/m^2*s)	Undisturbed EFs (g/m^2*s)
12	89	29%	3.1E-05	6.2E-06
13	66	22%	4.9E-05	9.9E-06
14	57	19%	6.6E-05	1.3E-05
15	42	14%	1.0E-04	1.8E-05
16	22	7%	1.1E-04	2.0E-05
17	14	5%	1.5E-04	2.6E-05
18	6	2%	1.8E-04	3.2E-05
19	1	0%	2.4E-04	4.1E-05
20	4	1%	2.7E-04	4.1E-05
21	1	0%	3.4E-04	5.2E-05
22	0	0%	4.3E-04	6.4E-05
23	0	0%	5.1E-04	7.6E-05
24	1	0%	6.0E-04	9.0E-05
25	0	0%	7.2E-04	9.5E-05
26	0	0%	8.9E-04	1.2E-04
27	0	0%	9.9E-04	1.3E-04
28	0	0%	1.2E-03	1.5E-04
29	0	0%	1.3E-03	1.8E-04
30	0	0%	1.5E-03	1.9E-04
		Adjusted EFs	4.47E-05	8.21E-06

Effective Land Area

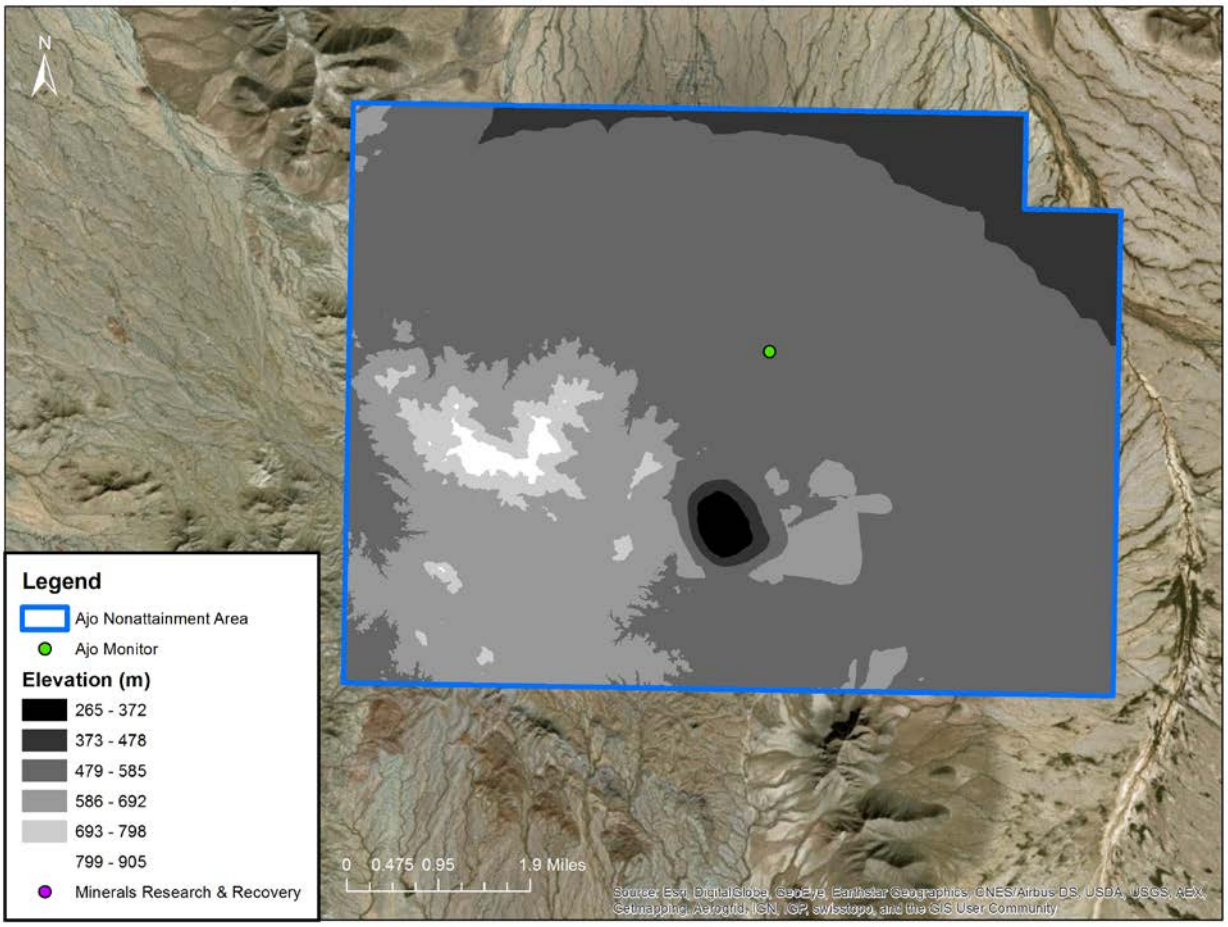
The final adjustment involves the calculation of an effective land area for use in the Vacant Land & Open Area category. While not as extreme as in other areas of Arizona, generally as elevation in the Ajo PM_{10} area increases so does the amount of vegetative cover. Also, the higher elevations in the Ajo PM_{10} area tend to be more mountainous and rocky. This results in an inverse correlation between terrain elevation and windblown dust potential. To account for the different emission characteristics of these various biomes and elevations ADEQ employed the use of an effective land area. The effective land area adjusts the amount of total land in the vacant land category by taking a weighted average of the land area found at various terrain elevations.

The first step in developing these effective land areas is to determine terrain elevation bins. For this calculation, bins were established using ArcGIS and were generated by an equal interval method such that 6 bins were established. These bins and their associated elevations are presented in Table A-34 and graphically displayed in Figure A-20.

Table A-34: Elevation Bins

Elevation Bin	Elevation Range (m)
A	265 – 372
B	373 – 478
C	479 – 585
D	586 – 692
E	693 – 798
F	799 – 905

Figure A-20: Ajo PM_{10} Area Elevation



Once the elevation bins have been established, the next step is to determine the amount of land contained within each bin. ADEQ used ArcGIS to perform this spatial analysis, which resulted in the land area breakdown presented in Table A-35.

Table A-35: Elevation Distribution

Elevation Type	Break Values (m)	Count	Percent of Total
A	372	5,117	1.90%
B	478	6,987	2.60%
C	585	80,879	30.05%
D	692	133,274	49.52%
E	798	34,532	12.83%
F	905	8,363	3.11%

The next step is to assign appropriate adjustment factors to each elevation bin. ADEQ established the adjustment factors based on the following methodology:

- Land area for each bin was calculated by multiplying the Vacant Land & Open Area total area (4.66E+07 m^2) by the corresponding percentage value in Table A-35.
- The lowest elevation bin would represent the baseline condition and receive no adjustment factor.
- The highest elevation would receive an adjustment factor of 0.195[10].
- Linear interpolation was used to establish the adjustment factors for the intermediate elevation bins.
- The total effective land area represents the sum of the effective land areas of the individual bins.

Table A-36: Effective Land Area

Elevation Type	Land Area (m^2)	Adjustment Factor	Effective Land Area (m^2)
A	1.64E+06	1.000	1.64E+06
B	2.24E+06	0.839	1.88E+06
C	2.59E+07	0.678	1.76E+07
D	4.27E+07	0.517	2.21E+07
E	1.11E+07	0.356	3.94E+06
F	2.68E+06	0.195	5.22E+05
		Total Effective Land Area (m^2)	4.76E+07

Calculate Emissions

Now that all of the calculation parameters have been established, the final step is to apply them to the emission calculations. In order to consolidate the resulting tables the reference codes listed in Table A-37 are used in place of land use category descriptions.

[10] (Marek Korcz, 2009). Table 5 lists correction factors for various vegetative cover types. The "moors, shrubland, savanna" category lists a correction factor of 0.195, which was used in this methodology as the adjustment factor applied to the highest elevation Sonoran mixed scrubland in the Ajo PM_{10} area.

Table A-37: Land Use Reference Codes

Land Category	Land Use Description	Reference Code
Developed Rural Land (low density residential)	Unpaved Roads/Alleys	DRL-UNRD
Developed Rural Land (low density residential)	Unpaved Parking Areas	DRL-UNPK
Developed Rural Land (low density residential)	Disturbed Open Areas/Vacant Lots	DRL-OAVL
Developed Rural Land (low density residential)	Other	DRL-OTHR
Non-Developed Land	Unpaved Roads	NDL-UNRD
Non-Developed Land	Vacant Land & Open Areas	NDL-VLOA
Non-Developed Land	Agriculture	NDL-AGLR
Non-Developed Land	Other (Freeport-McMoRan)	NDL-OTHR

Table A-38: Emission Calculation Inputs

Year	Reference Code	Disturbed Area (m^2)	Undisturbed Area (m^2)	Wind Event Duration (s)	Adjusted Disturbed EF (g/m^2*s)	Adjusted Undisturbed EF (g/m^2*s)
2011	DRL-UNRD	9.26E+04	3.86E+03	1,958,400	5.2E-05	9.1E-06
2011	DRL-UNPK	2.91E+03	1.21E+02	1,958,400	5.2E-05	9.1E-06
2011	DRL-OAVL	8.22E+04	9.13E+03	1,958,400	5.2E-05	9.1E-06
2011	DRL-OTHR	8.90E+05	8.01E+06	1,958,400	5.2E-05	9.1E-06
2011	NDL-UNRD	9.22E+04	4.18E+03	1,958,400	5.2E-05	9.1E-06
2011	NDL-VLOA	7.14E+06	4.05E+07	1,958,400	5.2E-05	9.1E-06
2011	NDL-AGLR	4.66E+03	4.07E+03	1,958,400	5.2E-05	9.1E-06
2011	NDL-OTHR	2.53E+06	2.27E+07	1,958,400	5.2E-05	9.1E-06
2012	DRL-UNRD	9.26E+04	3.86E+03	1,612,800	6.6E-05	1.1E-05
2012	DRL-UNPK	2.91E+03	1.21E+02	1,612,800	6.6E-05	1.1E-05
2012	DRL-OAVL	8.22E+04	9.13E+03	1,612,800	6.6E-05	1.1E-05
2012	DRL-OTHR	8.90E+05	8.01E+06	1,612,800	6.6E-05	1.1E-05
2012	NDL-UNRD	9.22E+04	4.18E+03	1,612,800	6.6E-05	1.1E-05
2012	NDL-VLOA	7.14E+06	4.05E+07	1,612,800	6.6E-05	1.1E-05
2012	NDL-AGLR	4.66E+03	4.07E+03	1,612,800	6.6E-05	1.1E-05
2012	NDL-OTHR	2.53E+06	2.27E+07	1,612,800	6.6E-05	1.1E-05
2013	DRL-UNRD	9.26E+04	3.86E+03	2,138,400	5.5E-05	9.6E-06
2013	DRL-UNPK	2.91E+03	1.21E+02	2,138,400	5.5E-05	9.6E-06
2013	DRL-OAVL	8.22E+04	9.13E+03	2,138,400	5.5E-05	9.6E-06
2013	DRL-OTHR	8.90E+05	8.01E+06	2,138,400	5.5E-05	9.6E-06
2013	NDL-UNRD	9.22E+04	4.18E+03	2,138,400	5.5E-05	9.6E-06
2013	NDL-VLOA	7.14E+06	4.05E+07	2,138,400	5.5E-05	9.6E-06
2013	NDL-AGLR	4.66E+03	4.07E+03	2,138,400	5.5E-05	9.6E-06
2013	NDL-OTHR	2.53E+06	2.27E+07	2,138,400	5.5E-05	9.6E-06
2014	DRL-UNRD	9.26E+04	3.86E+03	950,400	4.2E-05	7.7E-06

Year	Reference Code	Disturbed Area (m^2)	Undisturbed Area (m^2)	Wind Event Duration (s)	Adjusted Disturbed EF (g/m^2*s)	Adjusted Undisturbed EF (g/m^2*s)
2014	DRL-UNPK	2.91E+03	1.21E+02	950,400	4.2E-05	7.7E-06
2014	DRL-OAVL	8.22E+04	9.13E+03	950,400	4.2E-05	7.7E-06
2014	DRL-OTHR	8.90E+05	8.01E+06	950,400	4.2E-05	7.7E-06
2014	NDL-UNRD	9.22E+04	4.18E+03	950,400	4.2E-05	7.7E-06
2014	NDL-VLOA	7.14E+06	4.05E+07	950,400	4.2E-05	7.7E-06
2014	NDL-AGLR	4.66E+03	4.07E+03	950,400	4.2E-05	7.7E-06
2014	NDL-OTHR	2.53E+06	2.27E+07	950,400	4.2E-05	7.7E-06
2015	DRL-UNRD	9.26E+04	3.86E+03	1,144,800	4.0E-05	7.3E-06
2015	DRL-UNPK	2.91E+03	1.21E+02	1,144,800	4.0E-05	7.3E-06
2015	DRL-OAVL	8.22E+04	9.13E+03	1,144,800	4.0E-05	7.3E-06
2015	DRL-OTHR	8.90E+05	8.01E+06	1,144,800	4.0E-05	7.3E-06
2015	NDL-UNRD	9.22E+04	4.18E+03	1,144,800	4.0E-05	7.3E-06
2015	NDL-VLOA	7.14E+06	4.05E+07	1,144,800	4.0E-05	7.3E-06
2015	NDL-AGLR	4.66E+03	4.07E+03	1,144,800	4.0E-05	7.3E-06
2015	NDL-OTHR	2.53E+06	2.27E+07	1,144,800	4.0E-05	7.3E-06
2016	DRL-UNRD	9.26E+04	3.86E+03	1,134,000	4.5E-05	8.2E-06
2016	DRL-UNPK	2.91E+03	1.21E+02	1,134,000	4.5E-05	8.2E-06
2016	DRL-OAVL	8.22E+04	9.13E+03	1,134,000	4.5E-05	8.2E-06
2016	DRL-OTHR	8.90E+05	8.01E+06	1,134,000	4.5E-05	8.2E-06
2016	NDL-UNRD	9.22E+04	4.18E+03	1,134,000	4.5E-05	8.2E-06
2016	NDL-VLOA	7.14E+06	4.05E+07	1,134,000	4.5E-05	8.2E-06
2016	NDL-AGLR	4.66E+03	4.07E+03	1,134,000	4.5E-05	8.2E-06
2016	NDL-OTHR	2.53E+06	2.27E+07	1,134,000	4.5E-05	8.2E-06

As mentioned on page A-41, below is the equation for calculating windblown dust from vacant lands.

$$PM10 = EF\left(\frac{g}{m^2 s}\right) * Wind\ Event\ Duration\ (s) * Effective\ Area\ (m^2)$$

The inputs for the calculation are all listed in Table A-38. The only additional calculation is to convert the PM_{10} from grams/year into tons/year. Results are presented in Table A-39 below.

Table A-39: Emission Totals – Windblown Dust from Vacant Land

Year	Reference Code	Disturbed Land Emissions (tons/year)	Undisturbed Land Emissions (tons/year)	Total PM_{10} Emission (tons/year)
2011	DRL-UNRD	10.33	0.08	10.41
	DRL-UNPK	0.33	0.00	0.33
	DRL-OAVL	9.18	0.18	9.35
	DRL-OTHR	99.35	157.70	257.05

Year	Reference Code	Disturbed Land Emissions (tons/year)	Undisturbed Land Emissions (tons/year)	Total PM_{10} Emission (tons/year)
	NDL-UNRD	10.30	0.08	10.38
	NDL-VLOA	797.15	796.71	1,593.86
	NDL-AGLR	0.52	0.08	0.60
	NDL-OTHR	82.24	129.53	211.77
	Total	**1,009.40**	**1,084.36**	**2,093.76**
2012	DRL-UNRD	10.83	0.08	10.91
	DRL-UNPK	0.34	0.00	0.34
	DRL-OAVL	9.62	0.19	9.81
	DRL-OTHR	104.17	163.12	267.29
	NDL-UNRD	10.80	0.09	10.88
	NDL-VLOA	835.82	824.07	1,659.89
	NDL-AGLR	0.55	0.08	0.63
	NDL-OTHR	85.97	128.94	214.91
	Total	**1,058.10**	**1,116.57**	**2,174.67**
2013	DRL-UNRD	11.94	0.09	12.03
	DRL-UNPK	0.38	0.00	0.38
	DRL-OAVL	10.61	0.21	10.81
	DRL-OTHR	114.85	182.22	297.07
	NDL-UNRD	11.90	0.10	12.00
	NDL-VLOA	921.54	920.55	1,842.09
	NDL-AGLR	0.60	0.09	0.69
	NDL-OTHR	94.97	149.20	244.20
	Total	**1,166.79**	**1,252.46**	**2,419.25**
2014	DRL-UNRD	4.04	0.03	4.07
	DRL-UNPK	0.13	0.00	0.13
	DRL-OAVL	3.59	0.07	3.66
	DRL-OTHR	38.88	64.89	103.77
	NDL-UNRD	4.03	0.03	4.06
	NDL-VLOA	311.93	327.83	639.76
	NDL-AGLR	0.20	0.03	0.24
	NDL-OTHR	32.23	53.19	85.42
	Total	**395.03**	**446.07**	**841.11**
2015	DRL-UNRD	4.63	0.04	4.66
	DRL-UNPK	0.15	0.00	0.15
	DRL-OAVL	4.11	0.08	4.19
	DRL-OTHR	44.49	74.12	118.61
	NDL-UNRD	4.61	0.04	4.65
	NDL-VLOA	356.98	374.43	731.42
	NDL-AGLR	0.23	0.04	0.27
	NDL-OTHR	35.74	59.54	95.28

Year	Reference Code	Disturbed Land Emissions (tons/year)	Undisturbed Land Emissions (tons/year)	Total PM_{10} Emission (tons/year)
	Total	**450.94**	**508.29**	**959.23**
2016	DRL-UNRD	5.18	0.04	5.22
	DRL-UNPK	0.16	0.00	0.16
	DRL-OAVL	4.60	0.09	4.69
	DRL-OTHR	49.77	82.22	131.99
	NDL-UNRD	5.16	0.04	5.20
	NDL-VLOA	399.35	415.37	814.72
	NDL-AGLR	0.26	0.04	0.30
	NDL-OTHR	39.99	66.05	106.05
	Total	**504.47**	**563.85**	**1,068.33**

Table A-40: Freeport-McMoRan Land (NDL-OTHR) Windblown Emissions

	2011	2012	2013	2014	2015	2016
Tailings Impoundment	15.12	15.34	17.44	6.10	6.97	7.76
Slag Reprocessing Facility	5.45	5.53	6.29	2.20	0.18*	0.20
Ajo Mine	23.93	24.29	27.60	9.65	11.03	12.28
Remaining Freeport Property	167.26	169.74	192.87	67.47	77.11	85.81
Total	211.76	214.90	244.20	85.42	95.29	106.05

*Stabilization of the Slag Reprocessing Facility was completed in 2015

Figure A-21: Windblown Emission Totals

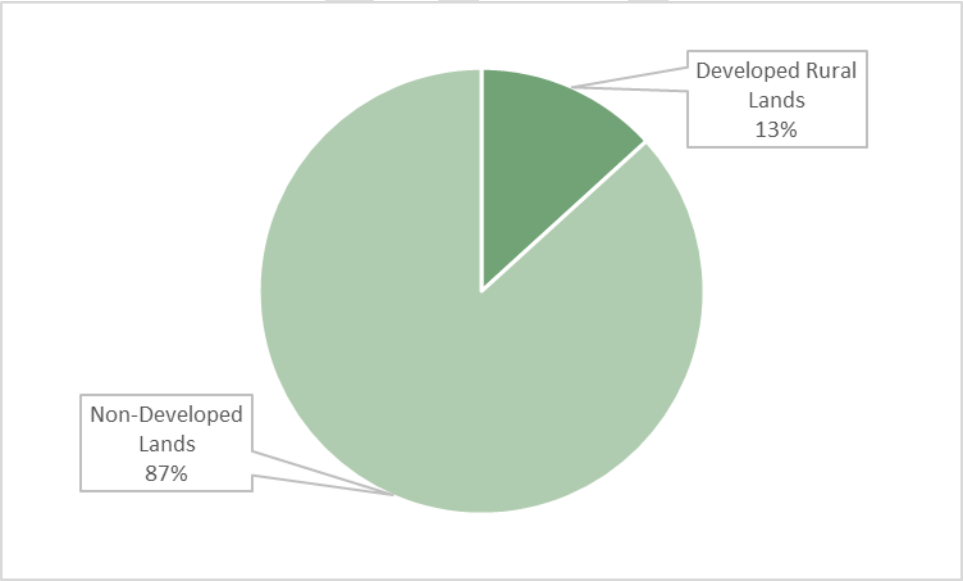


Figure A-22: Windblown Developed Rural Land Emissions

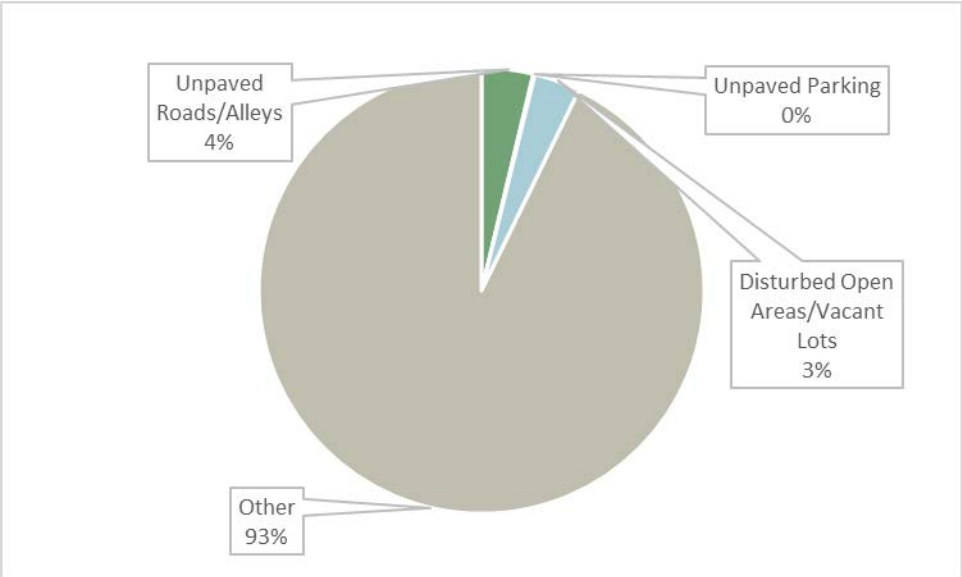
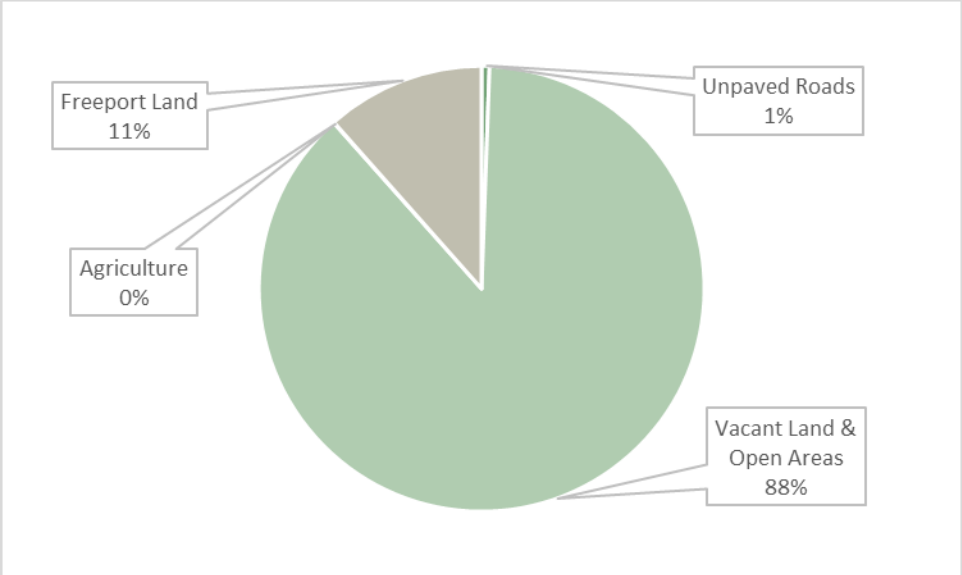


Figure A-23: Windblown Rural Non-Developed Land Emissions



A5.3.1.3 Fires

Fire emission estimates for the Ajo PM_{10} area were calculated using the 2014 NEI. Fire emissions were broken down into three sectors: agriculture field burning, prescribed fires, and wildfires. The estimate for agricultural field burning was calculated by allocating county totals to the NAA based on cropland area. Details of this allocation method are in Section A5.3.2. Both wildfires and prescribed fires were estimated based on the use of GIS software (ArcGIS). A raw data file containing geocoded event-level fire data was obtained from via email from Venkatesh

Rao (EPA OAQPS).[11]. This data was uploaded into ArcMap and clipped to the Ajo PM_{10} area. The resulting subset of the data file was analyzed to determine that no fires occurred within the NAA. There were three nearby (<25 miles away) wildfires that did occur but the total PM_{10} from these wildfires was negligible.

Table A-41: 2014 Fire Events Nearby

Date	Event ID	Event Name	Area	$PM_{2.5}$	PM_{10}	NH_3
5/1/2014	SF11E530392	Unknown Fire	100	0.340243	0.401476	0.058201
6/1/2014	SF11E552252	Ajo Fire	0.993587	0.003386	0.003993	0.000578
6/2/2014	SF11E547672	Pole Line Fire	0.099359	0.000341	0.000396	0.000053

A5.3.2 Emission Allocation Methodology

In general, this TSD relied on the 2014 NEI for emission estimates. County-level emissions were obtained from the 2014 NEI and allocated down to the Ajo PM_{10} NAA based on an allocation method that was most appropriate. These allocation methods include population, land area, cropland area, and rail length. The methodologies associated with these allocation methods are described in the following sub-sections.

Table A-42 summarizes the allocation methods used for each of the nonpoint emission sectors. Several changes in allocation methodology have been made since the initial Inventory Preparation Plan. Agricultural field burning will be allocated based on cropland area instead of land area. Wildfire and prescribed fire emissions in the NAA will be determined based on geocoded event-level data, so no allocation methods will be needed. Industrial processes – mining emissions are covered under the point category, and so no allocation will be needed. Dust – Windblown from Vacant Land is a new sector category that EPA Region 9 recommended after reviewing the IPP. This category will be calculated based on a custom methodology and will not require a specific allocation methodology.

Table A-42: Nonpoint Sector Allocation Methods

Emission Sector	Allocation Method
Agriculture - Crops & Livestock Dust	Cropland Area
Commercial Cooking	Population
Dust - Construction Dust	Population
Dust - Paved Road Dust	Population
Dust - Unpaved Road Dust	Population
Dust – Windblown from Vacant Land	N/A
Fires - Agricultural Field Burning	Cropland Area*
Fires - Prescribed Fires	N/A*
Fires – Wildfires	N/A*
Fuel Comb - Comm/Institutional - Biomass	Population
Fuel Comb - Comm/Institutional - Coal	Population
Fuel Comb - Comm/Institutional - Natural Gas	Population

[11] Data obtained by ADEQ with regards to the Hayden PM_{10} plan.

Emission Sector	Allocation Method
Fuel Comb - Comm/Institutional - Oil	Population
Fuel Comb - Electric Generation - Natural Gas	Population
Fuel Comb - Electric Generation - Oil	Population
Fuel Comb - Industrial Boilers, ICEs - Biomass	Population
Fuel Comb - Industrial Boilers, ICEs - Natural Gas	Population
Fuel Comb - Industrial Boilers, ICEs - Oil	Population
Fuel Comb - Industrial Boilers, ICEs - Other	Population
Fuel Comb - Residential - Natural Gas	Population
Fuel Comb - Residential – Oil	Population
Fuel Comb - Residential - Other	Population
Fuel Comb - Residential - Wood	Population
Industrial Processes - Chemical Manuf	Population
Industrial Processes – Mining	N/A*
Industrial Processes - NEC	Population
Industrial Processes - Non-ferrous Metals	Population
Industrial Processes - Oil & Gas Production	Population
Industrial Processes - Pulp & Paper	Population
Industrial Processes - Storage and Transfer	Population
Miscellaneous Non-Industrial NEC	Population
Solvent - Industrial Surface Coating & Solvent Use	Population
Waste Disposal	Population
* *Indicates allocation methodology change from Inventory Preparation Plan*	

A5.3.2.1 Population

The population allocation methodology is a ratio of population in the given county to the population in the NAA, as shown in the equation below. Since the 2014 NEI served as the basis for the emission calculations, 2014 population totals were used to derive the allocation factor.

$$\frac{P_{na}}{P_c} = AF_p$$

Where:

- P_{na}= *Population estimate for county portion of Nonattainment Area*
- P_c= *Population estimate of entire county*
- AF_p= *Population allocation factor*

Table A-43: Population

Area	2014 Population
Pima County	1,007,162
NAA	3,295

Table A-44: Population Allocation Factors

Area	Allocation Factor
Pima County	0.003271545

A5.3.2.2 Land Area

The land area allocation methodology is a ratio of land area in the given county to the land area of the NAA, as shown in the following equation:

$$\frac{LA_{na}}{LA_c} = AF_{la}$$

Where:

- *LA_{na}= Land area estimate for county portion of Nonattainment Area*
- *LA_c= Land area estimate of entire county*
- *AF_{la}= Land area allocation factor*

Table A-45 lists the land area totals for the NAA and Pima County. These totals served as inputs to the land area allocation equation and resulted in the allocation factor presented in Table A-46.

Table A-45: Land Area

Area	Land Area (mi^2)
Pima County	9,138.58
NAA	47.04

Table A-46: Land Area Allocation Factors

Area	Allocation Factor
Pima County	0.005122185

A5.3.2.3 Cropland Area

The cropland area allocation methodology is similar to the land area methodology, however instead of total land area this method uses cropland area. Estimates of cropland area were obtained from CropScape, a cropland data layer provided by the U.S. Department of Agriculture[12]. The CropScape data layer contains annual cropland acreage data for various crop types, and the web application allows for detailed information on user-defined areas of interest. To derive the appropriate data, ADEQ defined two areas of interest in CropScape: Pima County and the Ajo PM_{10} NAA. ADEQ downloaded 2014 cropland acreage data for these areas and then imported it into ArcMap. Finally, using ArcMap the totals presented in Table A-47 were calculated. The allocation factor is a ratio of cropland area in a given county to the cropland area of that county's portion of the NAA, as shown in the following equation:

$$\frac{CLA_{na}}{CLA_c} = AF_{cla}$$

Where:

- *CLA_{na}= Cropland area estimate for county portion of Nonattainment Area*
- *CLA_c= Cropland area estimate of entire county*

[12] (U.S. Department of Agriculture - National Agriculture Statistics Service, 2016)

- AF_{cla} = *Cropland area allocation factor*

Table A-47: Cropland

Area	Cropland (acres)	Noncropland (acres)
Pima County	34,792.70	5,846,339.30
Total NAA	6.40 (0.02%)	30,100.20 (99.98%)

Table A-48: Cropland Allocation Factors

Area	Allocation Factor
Pima County	0.000183947

A5.3.3 Emission Projection Methodology

In general, this TSD relied on the county-level 2014 NEI for emission estimates. These county-level emissions were allocated to the NAA as explained in Section A5.3.2. Once appropriately allocated to the NAA, the emissions were then projected to establish emission estimates for future years. Since 2014 served as the baseline emission inventory, all other inventory years were projected forward from this 2014 dataset. As with the allocation methodologies, the most appropriate projection methodologies were used for the individual emission sectors. Table A-49 summarizes the projection methods used for each of the nonpoint emission sectors. Some changes in projection methodology have been made since the initial Inventory Preparation Plan.

Table A-49: Nonpoint Sector Projection Methods

Emission Sector	Projection Method
Agriculture - Crops & Livestock Dust	None – Emissions will be held constant
Commercial Cooking	Population Growth
Dust - Construction Dust	Population Growth
Dust - Paved Road Dust	Population Growth
Dust - Unpaved Road Dust	Population Growth
Dust - Windblown from Vacant Land	None – Emissions will be held constant
Fires - Agricultural Field Burning	None – Emissions will be held constant
Fires - Prescribed Fires	None – Emissions will be held constant
Fires – Wildfires	None – Emissions will be held constant
Fuel Comb - Comm/Institutional - Biomass	Population Growth
Fuel Comb - Comm/Institutional - Coal	Population Growth
Fuel Comb - Comm/Institutional - Natural Gas	Population Growth
Fuel Comb - Comm/Institutional - Oil	Population Growth
Fuel Comb - Electric Generation - Natural Gas	Population Growth
Fuel Comb - Electric Generation - Oil	Population Growth
Fuel Comb - Industrial Boilers, ICEs - Biomass	Population Growth
Fuel Comb - Industrial Boilers, ICEs - Natural Gas	Population Growth
Fuel Comb - Industrial Boilers, ICEs - Oil	Population Growth

Emission Sector	Projection Method
Fuel Comb - Industrial Boilers, ICEs - Other	Population Growth
Fuel Comb - Residential - Natural Gas	Population Growth
Fuel Comb - Residential – Oil	Population Growth
Fuel Comb - Residential - Other	Population Growth
Fuel Comb - Residential - Wood	Population Growth
Industrial Processes - Chemical Manuf	Population Growth
Industrial Processes – Mining	N/A*
Industrial Processes - NEC	Population Growth
Industrial Processes - Non-ferrous Metals	Population Growth
Industrial Processes - Oil & Gas Production	Population Growth
Industrial Processes - Pulp & Paper	Population Growth
Industrial Processes - Storage and Transfer	Population Growth
Miscellaneous Non-Industrial NEC	Population Growth
Solvent - Industrial Surface Coating & Solvent Use	Population Growth
Waste Disposal	Population Growth
* *Indicates allocation methodology change from Inventory Preparation Plan*	

A5.4 On-road & Non-road Mobile Source Inventory

Table A-50: Emission Totals - On-road & Non-road

Emission Sector	PM_{10} (tons)					
	2011	2014	2016	2021	2026	2031
Mobile – Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Mobile - Locomotives	0.00	0.00	0.00	0.00	0.00	0.00
Mobile - Non-Road Equipment - Diesel	0.78	0.62	0.63	0.67	0.70	0.74
Mobile - Non-Road Equipment - Gasoline	0.44	0.45	0.45	0.48	0.50	0.53
Mobile - Non-Road Equipment - Other	0.02	0.02	0.02	0.02	0.02	0.02
Mobile - On-Road Diesel Heavy Duty Vehicles	0.17	0.15	0.15	0.09	0.08	0.07
Mobile - On-Road Diesel Light Duty Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Mobile - On-Road non-Diesel Heavy Duty Vehicles	0.02	0.02	0.02	0.02	0.03	0.03
Mobile - On-Road non-Diesel Light Duty Vehicles	0.10	0.12	0.13	0.14	0.17	0.18
Total	**1.53**	**1.38**	**1.39**	**1.42**	**1.50**	**1.56**

A5.4.1 Emission Calculation Methodology

The on-road and non-road mobile sectors were calculated based on two methodologies; the 2014 NEIv1 and MOVES. ADEQ used estimates provided in the 2014 NEIv1 for the aircraft and locomotive sectors and utilized the MOVES model for the remaining sectors. For these calculations ADEQ used MOVES2014a with locally defined inputs where available.

Table A-51: Mobile Calculation Methods

Emission Sector	Calculation Method
Mobile – Aircraft	2014 NEIv1
Mobile - Locomotives	2014 NEIv1
Mobile - Non-Road Equipment - Diesel	2014 NEIv1
Mobile - Non-Road Equipment - Gasoline	2014 NEIv1
Mobile - Non-Road Equipment - Other	2014 NEIv1
Mobile - On-Road Diesel Heavy Duty Vehicles	MOVES2014a*
Mobile - On-Road Diesel Light Duty Vehicles	MOVES2014a*
Mobile - On-Road non-Diesel Heavy Duty Vehicles	MOVES2014a*
Mobile - On-Road non-Diesel Light Duty Vehicles	MOVES2014a*
* *Indicates allocation methodology change from Inventory Preparation Plan*	

A5.4.2 Emission Allocation Methodology

ADEQ utilized several different methods in allocating emissions to the Ajo area, which are summarized below in Table A-52. The mobile on-road sectors were not explicitly allocated to the Ajo area, instead parameters were input into the MOVES2014a model for the Ajo area. Therefore, the resulting emission totals pertained to only the Ajo area.

Table A-52: Mobile Allocation Methods

Emission Sector	Allocation Method
Mobile – Aircraft	Airport Activity – See A5.4.2.1
Mobile - Locomotives	Rail Line Length – See A5.4.2.2
Mobile - Non-Road Equipment - Diesel	Population
Mobile - Non-Road Equipment - Gasoline	Population
Mobile - Non-Road Equipment - Other	Population
Mobile - On-Road Diesel Heavy Duty Vehicles	MOVES2014a*
Mobile - On-Road Diesel Light Duty Vehicles	MOVES2014a*
Mobile - On-Road non-Diesel Heavy Duty Vehicles	MOVES2014a*
Mobile - On-Road non-Diesel Light Duty Vehicles	MOVES2014a*
* *Indicates allocation methodology change from Inventory Preparation Plan*	

A5.4.2.1 Airport Activity

The airport activity allocation factor is used only to allocate emissions in the Mobile – Aircraft emission sector. ADEQ based this allocation methodology on a ratio of airport activity in a given county to the airport activity in that county's portion of the NAA, as shown in the following equation:

$$\frac{AA_{na}}{AA_c} = AF_{aa}$$

Where:

- AA_{na} = *Airport activity estimate for county portion of Nonattainment Area*

- *AA_c= Airport activity estimate of entire county*
- *AF_{aa}= Airport activity allocation factor*

ADEQ obtained the list of airports and their associated activity levels from the website www.airnav.com/airports/us/AZ.

Table A-53: Airport Activity

ID	Name	City	County	In NAA?	Aircraft Operations (average per day)
P01	Eric Marcus Municipal Airport	Ajo	Pima	No	0.83
KAVQ	Marana Regional Airpark	Marana	Pima	No	247
E78	Sells Airport	Sells	Pima	No	0.73
KTUS	Tucson International Airport	Tucson	Pima	No	350
KRYN	Ryan Field Airport	Tucson	Pima	No	300

Area	Airport Activity (average/day)
Pima County	179.712
NAA	0

Table A-54: Airport Activity Allocation Factors

Area	Allocation Factor
Pima County	0

A5.4.2.2 Rail Line Length

The rail length allocation methodology is a ratio of rail length in a given county to the rail length of that county's portion of the NAA, as shown in the following equation:

$$\frac{RL_{na}}{RL_c} = AF_{rl}$$

Where:

- *RL_{na}= Rail length estimate for county portion of Nonattainment Area*
- *RL_c= Rail length estimate of entire county*
- *AF_{rl}= Rail length allocation factor*

Table A-55: Rail Length

Area	Rail Length (miles)
Pima County	193.51
NAA	0 [13]

[13] Satellite imagery was used to determine that the rail tracks in the NAA either go to nowhere, have been removed, or have portions that are covered by pavement or sediment. Due to the lack of operable railway tracks, we can then assume zero locomotive emissions for this area.

Table A-56: Rail Length Allocation Factors

Area	Allocation Factor
Pima County	0

A5.4.3 Emission Projection Methodology

ADEQ used two methods to project future-year emissions: population growth and MOVES. For the aircraft, locomotive, and non-road sectors ADEQ used population growth as an indicator of future emissions growth. For the on-road sectors, ADEQ did not specifically project the emission totals, rather future-year parameter values were input into MOVES2014a. Examples of this are projected Vehicle Miles Traveled (VMT) totals obtained from the Arizona Department of Transportation (ADOT).

Table A-57: Mobile Projection Methods

Emission Sector	Projection Method
Mobile – Aircraft	Population Growth
Mobile - Locomotives	Population Growth
Mobile - Non-Road Equipment - Diesel	Population Growth
Mobile - Non-Road Equipment - Gasoline	Population Growth
Mobile - Non-Road Equipment - Other	Population Growth
Mobile - On-Road Diesel Heavy Duty Vehicles	MOVES2014a*
Mobile - On-Road Diesel Light Duty Vehicles	MOVES2014a*
Mobile - On-Road non-Diesel Heavy Duty Vehicles	MOVES2014a*
Mobile - On-Road non-Diesel Light Duty Vehicles	MOVES2014a*
* *Indicates allocation methodology change from Inventory Preparation Plan*	

A5.4.4 Transportation Conformity

Transportation conformity is used to ensure that any federally funded transportation plan, program, or project does not interfere with an area's ability to attain the NAAQS. For transportation conformity in the Ajo PM_{10} area, ADEQ proposed the following approach:

1. Determine the overall contribution of motor vehicle PM_{10} emissions in the Ajo PM_{10} nonattainment area
    a. If motor vehicle emissions constitute a significant proportion of total PM_{10} emissions, then ADEQ will develop a motor vehicle emission budget for the area
    b. If motor vehicle emissions constitute an insignificant proportion of total PM_{10} emissions, then ADEQ will include an explicit statement that no regional emissions analyses for PM_{10} or its precursors is necessary for attainment and therefore is not necessary for conformity
    c. ADEQ will also perform an analysis showing how future population growth affects the proportion of motor vehicle emissions in the Ajo PM_{10} area.

2. Determine through consultation with the Arizona Department of Transportation if any major transportation projects are anticipated to occur in the Ajo PM_{10} area within the maintenance timeframe of this plan
    a. If any major transportation projects are anticipated, ADEQ will evaluate their potential impact on PM_{10} emissions in the Ajo PM_{10} area and their potential effect on the maintenance of the NAAQS.

In their comments to this approach, EPA Region 9 (L. Lawrence, previous communication regarding the Hayden PM_{10} maintenance plan, November 30, 2016) stated that for an insignificancy determination the motor vehicle inventory would need to include PM_{10} estimates from vehicle exhaust, paved and unpaved re-entrainment, road construction. Once these PM_{10} emissions have been estimated their totals can be compared to the total PM_{10} emissions of the area, considering some additional criteria. These additional criteria are excerpted below:

- Only allowed when EPA has determined through the adequacy or approval process that a SIP demonstrates that regional on-road mobile source emissions are insignificant for a given pollutant/precursor and NAAQS
- Section 93.109(f):
    - "The SIP would have to demonstrate that it would be unreasonable to expect that such an area would experience enough motor vehicle emissions growth in that pollutant/precursor for a NAAQS violation to occur."
- Insignificance is expected to occur in limited cases (e.g., small area dominated by stationary sources)
- In general, insignificance applies on the basis for the entire nonattainment or maintenance area (rather than a portion of an area in the same state)
- EPA's insignificance findings based on a number of factors, including:
    - % of on-road mobile emissions in the context of the total SIP inventory, e.g.:
    - Less than 10%: NOx, VOC, and direct PM_{10}
    - Less than 3%: direct $PM_{2.5}$
- Absence of SIP on-road control measures
- Historical and future projections of on-road emissions

Motor Vehicle Contributions

Table A-58: Transportation Related Emissions

Emission Sector	PM_{10} (tons)					
	2011	**2014**	**2016**	**2021**	**2026**	**2031**
On-road Mobile	0.30	0.29	0.30	0.26	0.27	0.28
Re-entrained Dust	31.84	32.78	32.97	35.03	36.88	38.63
Road Construction	0	0	0	0	0	0
Total Motor Vehicle Contribution	**32.14**	**33.07**	**33.27**	**35.29**	**37.15**	**38.91**
Percent of Total Inventory	1.84%	1.91%	1.98%	2.09%	2.20%	2.30%

- **On-Road Mobile** – Includes PM_{10} emissions from vehicle exhaust, tire wear, & brake wear. Obtained by summing the PM_{10} from the four on-road emission sectors (Table A-50).
- **Re-entrained Dust** – Includes re-entrained PM_{10} from paved & unpaved roads. Obtained by summing the PM_{10} totals in the Dust - Paved Road Dust and Dust - Unpaved Road Dust nonpoint emission sectors (Table A-23).
- **Road Construction** – No major road construction projects have occurred in the Ajo PM_{10} area and no major future projects are included in any current planning documents[14].

Summary

Based on the data and findings discussed in this Section, ADEQ believes that mobile on-road source emissions are an insignificant source of PM_{10} in the Ajo PM_{10} area. PM_{10} emissions in the Ajo PM_{10} area are dominated by windblown emissions, with on-road mobile emissions comprising only 1.91% of the 2014 emissions inventory. With no new road construction or road projects anticipated to occur, there is no reason to believe that mobile emissions will become a significant source of PM_{10} during the maintenance period. Additionally, NOx, VOCs, and direct PM2.5 are considered insignificant sources of PM_{10} in this NAA (as previously discussed in Section A5.1) and therefore no evaluation of these pollutants is needed.

[14] Review of Arizona Department of Transportation's five-year planning documents, https://www.azdot.gov/planning/transportation-programming/overview.

A6 Maintenance Analysis

Overall emissions in the Ajo area have decreased over the past 20 years due mainly to the closure of the significant point sources. The Ajo New Cornelia mine and smelter ceased operation in the late 1980s, which was then followed by the capping of the tailings impoundment in 1991-1992. The capping of the tailings impoundment led to a 90% emissions reduction of windblown emissions, which has continued through today (see Table A-59).

In addition to the capping of the tailings impoundment, the closure and stabilization of the slag reprocessing facility (MRRI) added additional emissions reduction to the area. Table A-60 shows the reduction in operational emissions due to the closure of the facility in 2015. Additionally, Table A-61 shows the reductions from both operation and windblown emissions due to the closure of the facility as well as the stabilization of the slag pile in 2015.

In addition to the reductions in emissions from the closure of significant point sources, growth of the Ajo area is limited. The Ajo area is bounded to the West/Northwest by the Cabeza Prieta National Wildlife Refuge and nearby to the East by the Tohono O'odham Nation's reservation (see Figure A-1 above). This limits the available space for the Ajo area to grow.

State Route 85 passes through the center of Ajo, joining the Mexican border to Interstate 8 in Gila Bend. While the Ajo area does get through traffic going to and from Mexico, this traffic is considerably less than that of the other two major border crossings in Arizona (Yuma and Nogales). Additionally, the Arizona Department of Transportation's traffic data does not show any major increase in traffic in the area over the past 10 years.

Table A-59: Freeport-McMoRan Tailings Impoundment Emissions

		1991 Pre-Capping Emissions (tpy)		1992 Post-Capping Emissions (tpy)	
Tailings Impoundment		112		11	
Windblown Emissions					
2011	**2012**	**2013**	**2014**	**2015**	**2016**
15.12	15.34	17.44	6.10	6.97	7.76

Table A-60: Minerals Research and Recovery, Inc. Operation Emissions

	2006 PTE	2005 Actual Emissions (tons)	2006 Actual Emissions (tons)	2007 Actual Emissions (tons)	2014 Emissions* (PTE)	2016 Emissions (tpy)
MRRI	51.45	22.43	16.75	15.40	51.45	0
*Since no emissions data is available for 2014, the permit PTE will be used						

Table A-61: Minerals Research and Recovery, Inc. Windblown and Operation Emissions

	2011	2012	2013	2014	2015	2016**
MRRI	56.90 (5.45 + 51.45)*	56.98 (5.53 + 51.45)	57.74 (6.29 + 51.45)	53.65 (2.20 + 51.45)	2.51	0.20

*(Windblown emissions + Operations PTE)
**Operations at MRRI ended in 2014, followed by the stabilization of the slag pile that was completed at the end of 2015

While the point source inventory has seen reductions due to the closure of Minerals Research and Recovery, as well as the stabilization of the slag pile, the overall inventory does increase slightly from the attainment year (2016) to the projected years (2021-2031) due mainly to a minor projected increase in population. This increase in the inventory is less than one percent over the next 15 years, as shown in Table A-63. In order to determine the effect this slight increase will have on the ambient air in the area, the 2017 design concentration was scaled up by the percentage increase for the maintenance period inventory from the attainment year (Table A-63). The base design concentration (2017) was determined for the Ajo monitor using the "Table Look-Up" method described in the 1987 PM10 SIP Development Guideline[15] (Table A-62). The scaled up design concentrations for Ajo are well within a margin of safety under the NAAQS and demonstrate that Ajo will continue to maintain to the standard through the maintenance period.

Table A-62: Ajo Design Concentrations

	Number of Valid Days	Yearly 1st Max	Yearly 2nd Max	Yearly 3rd Max	Yearly 4th Max
2012	357	138	116	109	109
2013	363	299	141	100	99
2014	355	134	122	88	80
2015	325	67	65	50	49
2016	362	141	121	102	88
2017	365	109	83	82	77

	3 Year Total Valid Days	Data Point Used for Design Concen.	3 Year Design Concentration
2014	1075	4th Highest	134
2015	1043	4th Highest	122
2016	1042	3rd Highest	122
2017	1052	4th Highest	102

Table A-63: Scaled Up Ajo Design Concentrations

	2016	2021	2026	2031
Total Emissions	1,680.35	1,685.73	1,690.61	1,695.26
% Change from Attainment Year	0.00%	0.32%	0.61%	0.89%
Scaled Up 2017 Design Concen. (µg/m³)	102	102	103	103

[15] (EPA, 1987). The "table look up" method described in Section 6.3.1 was used to determine the PM10 design concentration for the Ajo monitor.

A7 References

Arizona Department of Environmental Quality. (2015). *2015 West Pinal Moderate PM10 Nonattainment Area SIP.* Retrieved from http://azdeq.gov/environ/air/plan/download/2015_west_pinal_sip_all.pdf

Environmental Protection Agency. (1987). *PM_{10} SIP Development Guideline*, U.S. EPA, June 1987 (Publication No. EPA-450/2-86-001), Chapter 6.

Marek Korcz, J. F. (2009). Estimation of wind blown dust emissions in Europe and its vicinity. *Atmospheric Environment*, 1410-1420.

U.S. Department of Agriculture - National Agriculture Statistics Service. (2016, 02 23). *CropScape - Cropland Data Layer*. Retrieved from http://nassgeodata.gmu.edu/CropScape/

Exhibit AI – Exhibit Basics

AI1 Population Projection Methodology

Methodology for Population Estimates and Projections of Ajo PM_{10} Nonattainment Area

1. ArcMap 10.3.1 was used to overlay the Ajo PM_{10} Nonattainment Area boundary shapefiles onto the 2010 Census TIGER shapefiles for blocks in Pima County.

2. Calculate the proportion of each block within Pima County which are contained in the nonattainment area (AREA_PROP).

3. Calculate the proportion of county population contained in each block (BLOCKPROP).

4. Assume that the proportions calculated in steps 2 and 3 do not change from Census 2010 to 2040. Also assume that population within each block is evenly distributed over the total area of the block. The population estimates EST_i and projections $PROJ_i$ for year *i* are obtained using the equations:

$$EST_i = AREA\_PROP * BLOCKPROP * COUNTY_{ij}$$

$$PROJ_i = AREA\_PROP * BLOCKPROP * COUNTY_{ij}$$

$COUNTY_{ij}$ is the population estimate or projection for year *i* and county *j* as published by ADOA. The 2015 Medium Series Population Projections were used for Pima County.

5. As part of step 2, ArcMap produced the land area which falls within the nonattainment area by block. This is aggregated to the county level and reported in square miles.

AI2 MOVES Methodology

AI2.1 Summary

To calculate and project mobile road emissions for the Ajo PM_{10} Maintenance area ADEQ used EPA's Motor Vehicle Emission Simulator (MOVES). MOVES is an emission modeling system that estimates emissions for mobile sources. ADEQ used MOVES2014a the most recent model version at the time of the plan's development.

Detailed below in Table A-64 are the planning assumptions used in the base year and the projection years.

Table A-64: Planning Assumptions

Assumption	Source
Population and Employment	Under the Governor's Executive Order No. 2011-04 all State agencies are required to use population estimates and population projections produced by ADOA.
Age Distribution	July 2014 vehicle registration data was provided by ADOT
Source Type Population	July 2014 and July 2016 vehicle registration data was adjusted by maintenance area ADOA population factor.
Meteorology Data	Default Values were applied.
I/M Programs	No I/M program information applied, there are no programs implemented in the Ajo maintenance area.
Vehicle Miles of Travel	VMT calculated from traffic counts from CY 2014 provided from ADOT. ADEQ used the EPA conversion tool to calculate monthly and daily VMT fractions.
Fuels	Default Values were applied.
Average Speed Distribution	Default Values were applied.
Road Type Distribution	GIS data from Arizona Transportation Information System (ATIS) was used to calculate distribution in Ajo Maintenance Area.
Fuels	Default Values were applied.
Ramp Fraction	No values were applied.

AI2.2 Population and Employment

Under the Governor's Executive Order No. 2011-04 the Arizona Department of Administration was designated the State agency responsible for preparing official population estimates and projections for the state of Arizona. All State agencies are required to use population estimates and population projections produced by ADOA.

ADEQ prepared official Arizona population projections for Pima counties using the 2010 U.S. census data as the base and ADOA population projects for future years. The official

methodology used by ADEQ, which is consistent with ADOA's methodology, can be found in Exhibit AI1 to the Ajo PM_{10} Maintenance TSD. Values used are provided in Table A-66. Values calculated are provided in Table A-65.

Table A-65: Percentage of County Population in Ajo PM_{10} Maintenace Area

County	Percentage
Pima	0.33%

Table A-66: Ajo PM_{10} NAA Population Estimates and Growth Projection Factors

Year	Pima County Maintenance Area Population	Pima Growth from 2014
2014	3,295	0.00%
2016	3,333	1.15%
2021	3,521	6.86%
2026	3,707	12.50%
2031	3,884	17.88%

AI2.3 Source Type Population

ADOT provided the vehicle registration data for July 2014. Since the data provided by Arizona vehicle registration only contained the HPMS vehicle type ADOT also provided a conversion process spreadsheet to convert HPMS vehicle type IDs to MOVES Source Type IDs. The final source type population can be found in Table A-67.

Table A-67: Ajo PM_{10} Maintenance Area Source Type Population

Type ID	sourceTypePopulation				
	2014	**2016**	**2017**	**2026**	**2031**
11	90	92	93	97	107
21	956	1009	1019	1065	1175
31	647	681	688	719	793
32	161	172	174	183	202
41	0	0	0	0	0
42	1	1	1	1	1
43	9	9	9	9	10
51	11	11	11	12	13
52	369	375	379	396	436
53	16	16	16	17	18
54	93	95	96	100	112
61	20	19	19	19	20
62	21	21	22	24	27

AI2.4 Age Distribution

To determine vehicle age distribution ADEQ used ADOT registration data from 2014. ADOT's MOVES converter was then used to convert said data from the MVD values to a MOVES compatible format.

Projected values for age distribution were calculated using EPA's age distribution projection tool using the 2014 values as the base value for each projected year.

AI2.5 Meteorology Data

ADEQ used defaults for Pima County.

AI2.6 I/M Programs

There are no I/M programs currently implemented or planning for the Ajo Maintenance Area.

AI2.7 Vehicle Miles of Travel

ADEQ used traffic counts obtained from ADOT's Automatic Traffic Recorders (ATRs). ATRs collect data 24 hours a day, 365 days a year for each lane including traffic volumes, speed and classification of vehicles. ADEQ used ATRs GIS data to pull the roads tracked by ATRs within the Ajo PM_{10} Maintenance Area. ADEQ multiplied the segment mileage by the average annual daily traffic (AADT) to calculate the average annual daily vehicle miles traveled (AADVMT) for each HPMS vehicle type for the Maintenance Area.

ADOT projected AADT to 2030, and ADEQ interpolated the projection year (AADVMT) from these values. These values for AADVMT as are detailed in Table A-68.

Table A-68: Annual VMT for Ajo PM_{10} Maintenance Area

HPMS Vehicle Type	2014	2016	2021	2026	2031
10	410905	450913	550934	650954	750974
25	64678025	70975457	86719037	102462616	118206196
40	435450	477848	583843	689838	795833
50	3260107	3577531	4371089	5164647	5958205
60	2036875	2235198	2731003	3226808	3722614

AI2.8 Fuels

ADEQ used the default inputs for Pima County.

AI2.9 Road Type Distribution

ADEQ calculated the mileage for all in roads in the Ajo Maintenance Area from GIS files using ATIS. The totals are detailed in Table A-69.

Table A-69: Road Type Distribution in Ajo Maintenance Area

	Road Miles	Distribution
Total	100.07	1.00
Rural Restricted	15.09	0.15
Rural Unrestricted	84.98	0.85

AI2.10 Ramp Fraction

No ramp fraction was applied.

Appendix B: Procedural Requirements and Authority – SIP

Exhibit B-I: Delegation of Authority

Exhibit B-II: Authorizing Statutes

Exhibit B-III: Public Notice and Affidavit of Publication

Exhibit B-IV: Public Hearing Agenda

Exhibit B-V: Public Hearing Sign-in Sheet

Exhibit B-VI: Public Hearing Officer Certification

Exhibit B-VII: Public Hearing Transcript

Exhibit B-VIII: Compilation of Comments and State Responses

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Exhibit B-VIII: Compilation of Comments and State Responses

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Appendix C: Rules for Approval

Exhibit C-I: Public Notice for Proposed Rulemaking

Exhibit C-II: Notice of Proposed Rulemaking

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Exhibit C-I: Public Notice for Proposed Rulemaking

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NOTICE OF PROPOSED RULEMAKING
PROPOSING AMENDMENTS
TO PIMA COUNTY CODE TITLE 17
CHAPTER 17.16 ADDING SECTION 17.16.125

The Pima County Board of Supervisors (BOS) as the governing body for the Pima County Air Quality Control District adopts ordinances which are codified in the Pima County Code (PCC). The Pima County Air Quality Control District operates within the Pima County Department of Environmental Quality (PDEQ). PDEQ periodically proposes updates to PCC through the BOS. This Notice of Proposed Rulemaking proposes the addition of a new section to PCC Title 17, Chapter 17.16, Section 17.16.125- Inactive Mineral Tailings Impoundment and Slag Storage Area within the Ajo PM_{10} Planning Area. The intention of this rulemaking is to meet State Implementation Plan (SIP) requirements to provide permanence and enforceability for control measures that have already been implemented. Under this new section, owners or operators are subject to implement and maintain required Particulate Matter (PM_{10}) control measures on applicable sources to meet visible emissions and stabilization requirements, in order to ensure continued Particulate Matter emissions reductions in the Ajo PM_{10} Planning Area. The inactive tailings and slag storage area must be controlled to 20 percent opacity for fugitive emissions on the property. For both the tailings and slag areas, owners or operators must also install and maintain signs and physical barriers to prevent trespass and re-disturbance on the property. The rule text and other related information is available at the PDEQ office, and on the PDEQ website (noted below), or you may request a copy by contacting our department.

A public hearing before the Pima County Board of Supervisors will be held on Tuesday, January 22, 2019, at, or after, 9:00 a.m. in the Board Hearing Room, located at 130 W. Congress, 1st floor, Tucson, Arizona.

Comments pertaining to the Notice of Proposed Rulemaking may be submitted at the above noticed public hearing, in writing to PDEQ (Attn: Sarah Reitmeyer, 33 N Stone Ave Suite 700, Tucson, AZ 85701), or via e-mail to sarah.reitmeyer@pima.gov. Written comments on the Notice of Proposed Rulemaking will be accepted by PDEQ until 5:00 p.m. on November 28, 2018.

For additional information please contact Sarah Reitmeyer, Regulatory Program Manager, at (520) 724-7437 or visit PDEQ's website at
http://webcms.pima.gov/government/environmental_quality/

Exhibit C-II: Notice of Proposed Rulemaking

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NOTICE OF PROPOSED RULEMAKING

PIMA COUNTY CODE

TITLE 17 – AIR QUALITY CONTROL

CHAPTER 16 - EMISSION LIMITING STANDARDS

PREAMBLE

1.	**Sections Affected**	**Rulemaking Action**
	PCC 17.16.125	New Section

2. Statutory authority for the rulemaking:

Authorizing Statutes: Arizona Revised Statutes (A.R.S.) §§ 49-471.04, 49-402, and 49-479

Implementing Statutes: A.R.S. §§ 49-112, 49-479

3. The agency's contact person who can answer questions about the rulemaking:

Name: Sarah Reitmeyer

Address: Pima County DEQ
33 N. Stone Avenue, Suite 700
Tucson, AZ 85701

Telephone: (520) 724-7437

Fax: (520) 838-7432

E-mail: sarah.reitmeyer@pima.gov

4. An agency's justification and reason why a rule should be made, amended, repealed or renumbered, to include an explanation about the rulemaking:

The Pima County Board of Supervisors (BOS) as the governing body for the Pima County Air Quality Control District adopts ordinances which are codified in the Pima County Code (PCC). The Pima County Air Quality Control District operates within the Pima County Department of Environmental Quality (PDEQ). PDEQ periodically proposes updates to PCC through the BOS. This Notice of Proposed Rulemaking proposes the addition of a new section to PCC Title 17, Chapter 17.16, Section 17.16.125- Inactive Mineral Tailings Impoundment and Slag Storage Area within the Ajo PM_{10} Planning Area. The intention of this rulemaking is to meet State Implementation Plan (SIP) requirements to provide permanence and enforceability for control measures that have already been implemented. Under this new section, owners or operators are subject to implement and maintain required Particulate Matter (PM_{10}) control measures on applicable sources to meet visible emissions and stabilization requirements, in order

to ensure continued particulate matter emissions reductions in the Ajo PM_{10} Planning Area. The inactive tailings and slag storage area must be controlled to 20 percent opacity for fugitive emissions on the property. For both the tailings and slag areas, owners or operators must also install and maintain signs and physical barriers to prevent trespass and re-disturbance on the property.

5. Demonstration of compliance with A.R.S. § 49-471.04 notice of proposed rule or ordinance making:

Per A.R.S. §49-479(A), the Pima County Board of Supervisors has specific authority, subject to procedural requirements, to adopt and implement rules to control the atmospheric release of air contaminants originating within the Pima County territorial limits. The County may adopt rules that are more stringent than State statute per A.R.S. §49-112 as long as certain conditions are met such as the rule is necessary to address a peculiar local condition and there is credible evidence that the rule is either: (1) necessary to prevent significant threat to public health or the environment and the rule is technically and economically feasible, or (2) the rule is required under federal statute or regulation. The State of Arizona has no similar tailings rule, therefore the measure is more stringent than State rules. This rule, however, is federally required per CAA section 172(d)(3)(E)(iii), insofar as to ensure that the State is able to submit a SIP on behalf of Pima County for the Ajo moderate PM_{10} nonattainment area, and that there are rules in place to control PM emissions for a significant source of fugitive dust.

6. Reference to any study relevant to the rule that the control officer reviewed and either relied or did not rely on in its evaluation of or justification for the rule, where the public may review each study, all data underlying each study, and any analysis of each study and other supporting material:

No studies were reviewed in reference to this rulemaking action.

7. A showing of good cause why the rules are necessary to promote a statewide interest if the rules will diminish a previous grant of authority of a political subdivision of this state:

Not Applicable.

8. The preliminary summary of the economic, small business, and consumer impact:

This revision will not have an economic impact on businesses in Pima County, and will not impose additional costs on the regulated community, small businesses, political subdivisions, and members of the public beyond that already incurred by reason of federal or state rule or law.

9. The name and address of agency personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:

Name: Sarah Reitmeyer

Address: 33 N. Stone Avenue, Suite 700
Tucson, AZ 85701-1429

Telephone: (520) 724-7437

Fax: (520) 838-7432

E-mail: sarah.reitmeyer@pima.gov

10. The time, place, and nature of the proceedings for the making, amendment, or repeal of the rule, or if no proceeding is scheduled, where, when, and how persons may request an oral proceeding on the proposed rule:

Written comments will be accepted if received between the date of this publication and **November 28, 2018 by 5:00 p.m**. Written comments may be mailed or hand delivered to the Pima County Department of Environmental Quality (see #9 above). Written comments received during the comment period will be considered formal comments to the expedited rule or ordinance, and will be responded to in the notice of final rulemaking.

Oral Proceeding: **Tuesday, January 22, 2018**

Time: **9 a.m.**

Location: **Pima County Board of Supervisors**
Public Hearing Room, First Floor
130 West Congress Street
Tucson, Arizona 85701

11. Any other matters prescribed by the statute that are applicable to the specific agency or to any specific rule or class of rules:

None

12. The full text of the rule follows:

Chapter 17.16 - EMISSION LIMITING STANDARDS

. . .

Article III. - Emissions from Existing and New Nonpoint Sources

. . .

17.16.125 - Inactive mineral tailings impoundment and slag storage area within the Ajo PM_{10} Planning Area.

A. Applicability. This Section applies to the owner or operator of the inactive mineral tailings impoundment and slag storage area within the Ajo PM_{10} Planning Area.

B. Definitions. The following definitions apply for the purposes of this Section:

1. "Affected area" means the Ajo PM_{10} Planning Area.
2. "Ajo PM_{10} Planning Area" means the area designated in 40 C.F.R. §81.303, adopted as of June 30, 2017 with no future editions or amendments.
3. "Chemical or organic soil stabilizer" means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other chemical or organic dust palliative that is not prohibited by the U. S. Environmental Protection Agency, the Arizona Department of Environmental Quality, the Pima County Department of Environmental Quality or any applicable law, rule, or regulation, as a treatment material for reducing PM_{10} emissions.
4. "Coarse" with respect to copper smelter slag material means no less than 3/8 inches in diameter.
5. "Copper smelter slag" means the waste material consisting primarily of iron sulfides separated from copper matte during the smelting and refining of copper ore concentrates.
6. "Crushed rock" means crushed stone or angular rock of a size 2 inches or greater in diameter.
7. "Department" means the Pima County Department of Environmental Quality.
8. "Gravel" means a loose aggregation of rock fragments of low silt content (5% or less) and less than 2 inches in diameter.
9. "High wind event" means an hourly average wind speed of 25 miles per hour or more or an instantaneous wind gust of 40 miles per hour or more as measured in the affected area by a meteorological monitoring station.
10. "Inactive" with respect to the mineral tailings impoundment and slag storage area means that activities in support of ongoing mining operations or for any commercial purpose no longer occur.
11. "Meteorological monitoring station" means one of the following:
    a. A Pima County Department of Environmental Quality meteorological monitoring station;
    b. A station operated by the National Weather Service;
    c. A Remote Automated Weather Station operated by the United States Forest Service, or United States Bureau of Land Management;
    d. An Automated Weather Observing System or Automated Surface Observing System station, located at an airport, and either operated or certified by the Federal Aviation Administration; or
    e. Any other meteorological equipment or wind instrument that is installed, calibrated, operated, and maintained by the owner or operator in accordance with the requirements for SLAMS/SPM (non-NCore) instruments in *Quality Assurance*

Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements Version 2.0 (Final), publication number EPA-454/B-08-002, March 2008, and no future editions or amendments, and manufacturer's specifications, as applicable.

12. "Mineral tailings impoundment" means the earth-fill embankment dams used to store byproducts of prior mining operations that separated mineral ore from other unused material.

13. "Opacity" means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

14. "Particulate matter" means any airborne finely divided solid or liquid material with an aerodynamic diameter smaller than one hundred micrometers.

15. "PM_{10}" means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 C.F.R. Part 50, Appendix J or by an equivalent method designated in accordance with 40 C.F.R. Part 53, both sections adopted as of June 30, 2017 with no future editions or amendments.

16. "Slag storage area" means the area used to store copper smelter slag.

17 "Vegetative cover" means rooted vegetation or unattached vegetative debris lying on the surface that is not susceptible to movement by wind.

C. Control Measures.

1. The owner or operator shall implement and maintain at least one of the following reasonably available control measures to reduce PM_{10} emissions from the inactive mineral tailings impoundment to ensure compliance with subsection D.1 below:

   a. Application of crushed rock or gravel;

   b. Application of chemical or organic soil stabilizers;

   c. Application of water;

   d. Establishment of vegetative cover; or

   e. Any other equivalent methods or techniques approved by the Department and EPA Region IX.

2. The owner or operator shall implement and maintain at least one of the following reasonably available control measures to reduce PM_{10} emissions from the inactive slag storage area:

   a. Application of a cap consisting of coarse copper smelter slag material; or

   b. Any other equivalent methods or techniques approved by the Department and EPA Region IX.

3. To prevent trespass in the inactive mineral tailings impoundment and slag storage area, the owner or operator shall install and maintain the following:

   a. No trespassing signs; and

   b. Physical barriers such as fences, gates, posts, shrubs, trees, or other measures to effectively restrict access from the general public.

D. Opacity Standard.

1. The owner or operator shall not cause or allow visible emissions to exceed twenty percent opacity from the mineral tailings impoundment. Opacity shall be determined in accordance with subsection E.1 below.

2. The opacity standard in subsection D.1 above shall not apply during high wind events if the owner or operator has implemented and maintained reasonably available control measures required in subsections C.1 and C.3 above for the mineral tailings impoundment, as documented by subsection F.1.a below.

E. Monitoring.

1. To demonstrate compliance with subsections C.1 and D.1 above, the owner or operator shall conduct weekly visible emission observations of the mineral tailings impoundment.

   a. All observations shall be conducted in accordance with 40 C.F.R. Part 60, Appendix A, Reference Method 9.

   b. As an alternative to subsection E.1.a, the owner or operator may elect to conduct observation in accordance with ASTM D7520-16. If so, the owner or operator must have standard operating procedures in place to ensure that equipment is operated and maintained in accordance with manufacturer's specifications per Section 8.1 of ASTM D7520-16.

2. To demonstrate compliance with subsection C.2 above, the owner or operator shall conduct monthly inspections of the slag storage area to assess the effectiveness of control measures. Inspection reports shall, at a minimum, include identification of inspector; inspection date and time; findings of inspection, and any corrective action or preventive measures to be taken.

3. To demonstrate compliance with subsection C.3 above, the owner or operator shall conduct monthly inspections of trespassing signs and physical constraints. Inspection reports shall, at a minimum, include identification of inspector; inspection date and time; findings of inspection, and any corrective action or preventive measures to be taken.

F. Recordkeeping.

1. The owner or operator shall maintain and make available to the Department or EPA Region IX the following records upon request:

   a. Records of reasonably available control measures implemented and maintained as required by subsection C above;

   b. Records of visible emission observations required by subsection E.1 above;

   c. Records of inspections required by subsections E.2 and E.3 above;

   d. Records of observer EPA Reference Method 9 or ASTM D7520-16 certifications;

   e. Records of the owner or operator's installation, calibration, certification, operation, and maintenance of any meteorological equipment or wind instrument used for purposes of identifying high wind events; and

   f. Records of meteorological monitoring station data used for purposes of identifying high wind events.

2. If the owner or operator elects to conduct weekly visual observations in accordance with subsection E.1.b, the following records shall be maintained:

a. ASTM D7520-16 certification documentation, data sheets, and all raw unaltered JPEGs used for opacity and certification determination, recorded in a form suitable and readily available for expeditious inspection and review.

b. Standard operating procedures used to ensure that equipment is operated and maintained in accordance with manufacturer's specifications per Section 8.1 of ASTM D7520-16.

3. All records required by this section shall be maintained by the owner or operator for a minimum of 5 years.

G. Notification.

1. The owner or operator shall provide written notification to the Department at least 30 days prior to initiating weekly visual observations in accordance with subsection E.1. The notification shall identify proposed observation points/locations and provide justification for the selection of those points/locations.

2. The owner or operator shall provide written notification to the Department at least 30 days prior to using any meteorological monitoring station as described in subsection B.11.e.

H. Reporting.

1. The owner or operator shall report to the Department any visible emissions in excess of opacity limit established by subsection D.1. The report shall be in two parts as specified below:

a. Notification by telephone or facsimile within 24 hours of the time the owner or operator first learned of the occurrence of excess opacity that includes all available information from subsection H.2.

b. Detailed written notification by submission of an excess opacity report within 72 hours of the notification under subsection H.1.a.

2. The excess opacity report shall contain the following information:

a. The approximate location at the mineral tailing impoundment where the excess opacity occurred;

b. The level of excess opacity as measured in accordance with subsection F;

c. The time and duration or expected duration of the excess opacity;

d. The nature and cause or suspected cause of the excess opacity;

e. The steps that were or are being taken to limit the excess opacity; and

f. Any corrective action or preventative measures taken.

3. In the case of continuous or recurring excess opacity events, the notification requirements of this subsection shall be satisfied if the owner or operator provides the required notification after excess opacity events are first detected and includes in the notification an estimate of the time the excess opacity events will continue. Excess opacity occurring after the estimated time period or changes in the nature of the excess opacity as originally reported shall require additional notification pursuant to subsections H.1 and H.2.

. . .